As confidentially submitted to the Securities and Exchange Commission on April 16, 2021

Registration No. 333-

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM S-1
REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933

VERVE THERAPEUTICS, INC.
(Exact name of registrant as specified in its charter)

Delaware	2834	82-4800132
(State or other jurisdiction of incorporation or organization)	**(Primary Standard Industrial Classification Code Number)**	**(I.R.S. Employer Identification Number)**

500 Technology Square, Suite 901
Cambridge, Massachusetts 02139
(617) 603-0070
(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

Sekar Kathiresan, M.D.
Chief Executive Officer
500 Technology Square, Suite 901
Cambridge, Massachusetts 02139
(617) 603-0070
(Name, address, including zip code, and telephone number, including area code, of agent for service)

Copies to:

Lia Der Marderosian
Craig Hilts
Timothy J. Kulis
Wilmer Cutler Pickering Hale and Dorr LLP
60 State Street
Boston, Massachusetts 02109
(617) 526-6000

Brent B. Siler
Divakar Gupta
Richard Segal
Darah Protas
Cooley LLP
1299 Pennsylvania Avenue, NW, Suite 700
Washington, DC 20004
(202) 842-7800

Approximate date of commencement of proposed sale to the public:
As soon as practicable after this Registration Statement is declared effective.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, check the following box. ☐

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this Form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	☐	Accelerated filer	☐
Non-accelerated filer	☒	Smaller reporting company	☐
		Emerging growth company	☒

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 7(a)(2)(B) of the Securities Act. ☐

CALCULATION OF REGISTRATION FEE

Title of Each Class of Securities to Be Registered	Proposed Maximum Aggregate Offering Price(1)	Amount of Registration Fee(2)
Common stock, par value $0.001 per share	$	$

(1) Estimated solely for the purpose of calculating the registration fee pursuant to Rule 457(o) under the Securities Act of 1933, as amended. Includes the aggregate offering price of additional shares that the underwriters have the option to purchase.
(2) Calculated pursuant to Rule 457(o) under the Securities Act of 1933, as amended, based on an estimate of the proposed maximum aggregate offering price.

The Registrant hereby amends this Registration Statement on such date or dates as may be necessary to delay its effective date until the Registrant shall file a further amendment which specifically states that this Registration Statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933 or until the Registration Statement shall become effective on such date as the Securities and Exchange Commission, acting pursuant to said Section 8(a), may determine.

Table of Contents

The information in this preliminary prospectus is not complete and may be changed. We may not sell these securities until the registration statement filed with the Securities and Exchange Commission is effective. This preliminary prospectus is not an offer to sell these securities and we are not soliciting offers to buy these securities in any state or other jurisdiction where the offer or sale is not permitted.

Subject to completion, dated , 2021

Preliminary prospectus

shares

Common stock

This is an initial public offering of shares of common stock by Verve Therapeutics, Inc. We are offering shares of our common stock. The initial public offering price is expected to be between $ and $ per share.

Prior to this offering, there has been no public market for our common stock. We are applying to list our common stock on the Nasdaq Global Market under the symbol "VERV."

We are an "emerging growth company" as that term is used in the Jumpstart Our Business Startups Act of 2012 and, as such, have elected to comply with certain reduced public company reporting requirements for this prospectus and future filings. See "Prospectus summary—Implications of being an emerging growth company."

	Per share	Total
Initial public offering price	$	$
Underwriting discounts and commissions(1)	$	$
Proceeds to Verve Therapeutics, Inc., before expenses	$	$

(1) See the section titled "Underwriting" for a description of the compensation payable to the underwriters.

We have granted the underwriters an option for a period of 30 days to purchase up to additional shares of common stock from us at the public offering price, less underwriting discounts and commissions.

Investing in our common stock involves a high degree of risk. See "Risk factors" beginning on page 12 of this prospectus.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or passed upon the accuracy or adequacy of this prospectus. Any representation to the contrary is a criminal offense.

The underwriters expect to deliver the shares of common stock to purchasers on or about , 2021.

J.P. Morgan **Jefferies** **Guggenheim Securities** **William Blair**

, 2021

TABLE OF CONTENTS

Neither we nor the underwriters have authorized anyone to provide you with any information other than that contained in this prospectus, any amendment or supplement to this prospectus or in any free writing prospectus we may authorize to be delivered or made available to you. We and the underwriters take no responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. We are offering to sell, and seeking offers to buy, shares of our common stock only in jurisdictions where offers and sales are permitted. The information contained in this prospectus is accurate only as of the date of this prospectus, regardless of the time of delivery of this prospectus or any sale of shares of our common stock. Our business, financial condition, results of operations and prospects may have changed since that date.

For investors outside the United States: we have not, and the underwriters have not, done anything that would permit this offering or possession or distribution of this prospectus in any jurisdiction where action for that purpose is required, other than in the United States. Persons outside the United States who come into possession of this prospectus must inform themselves about, and observe any restrictions relating to, the offering of the shares of common stock and the distribution of this prospectus outside the United States.

Prospectus summary

This summary highlights information contained elsewhere in this prospectus and does not contain all of the information that you should consider in making your investment decision. Before investing in our common stock, you should carefully read this entire prospectus, including our consolidated financial statements and the related notes thereto and the information set forth in the sections titled "Risk factors" and "Management's discussion and analysis of financial condition and results of operations" before making an investment decision. As used in this prospectus, unless the context otherwise requires, references to "we," "us," "our" and "Verve" refer to Verve Therapeutics, Inc. and its consolidated subsidiaries.

Overview

We are a genetic medicines company pioneering a new approach to the care of cardiovascular disease, or CVD, transforming treatment from chronic management to single-course gene editing medicines. Despite advances in treatment over the last 50 years, CVD remains the leading cause of death worldwide. The current paradigm of chronic care is fragile – requiring rigorous patient adherence, extensive healthcare infrastructure and regular healthcare access – and leaves many patients without adequate care. Our goal is to disrupt the chronic care model for CVD by providing a new therapeutic approach with single-course *in vivo* gene editing treatments focused on addressing the root causes of this highly prevalent and life-threatening disease. Our initial two programs target PCSK9 and ANGPTL3, respectively, genes that have been extensively validated as targets for lowering blood lipids, such as low-density lipoprotein cholesterol, or LDL-C. We believe that editing these genes could potently and durably lower LDL-C throughout the lifetime of patients with or at risk for atherosclerotic cardiovascular disease, or ASCVD, the most common form of CVD.

Transforming cardiovascular care

CVD collectively refers to diseases of the heart and blood vessels, of which ASCVD is a large subset. In ASCVD, cholesterol drives the development of atherosclerotic plaque, a mixture of cholesterol, cells and cellular debris in the wall of a blood vessel that results in the hardening of the arteries. High cumulative life-long exposure to blood cholesterol, which is carried in each of low-density lipoprotein, or LDL, triglyceride-rich lipoprotein, or TRL, or lipoprotein (a), or Lp(a), is a root cause of ASCVD.

The relationship between lowering of cumulative LDL-C exposure and reduction in the risk of ASCVD is among the best understood relationships in medicine. However, the current standard of care to lower LDL-C utilizes continuous, life-long treatment, and due to the limitations of this chronic care model, cumulative exposure to LDL-C for many patients with ASCVD remains insufficiently controlled. As a result, a large proportion of patients with established ASCVD have LDL-C levels above clinical treatment guidelines from the American Heart Association, or the AHA, and the American College of Cardiology, or the ACC, leaving them at risk for recurrent ASCVD events and the potential for invasive medical procedures or even death. Furthermore, given the silent nature of the damage done by elevated LDL-C, many patients at risk for ASCVD do not properly appreciate the therapeutic benefits of consistent treatment as well as the substantial risk of foregoing treatment, focusing instead on the heavy, life-long medication burden of daily pills, lifestyle changes and other chronic approaches.

We believe that single-course gene editing medicines that potently and durably control cumulative LDL-C exposure could fundamentally disrupt the chronic care model for treating patients with or at risk for ASCVD and relieve the significant burden placed on patients, providers and the healthcare system.

Our approach

Our approach leverages multiple breakthroughs in 21st century biomedicine—human genetic analysis, gene editing, messenger RNA, or mRNA, -based therapies and lipid nanoparticle, or LNP, delivery—to target genes that are predominantly expressed in the liver and disrupt the production of proteins that cause CVD. Our gene editing programs target validated genes in the liver that are supported by extensive human genetics and human pharmacology data and are known to be implicated in CVD. We use base editing for our initial programs, a next-generation gene editing approach that enables precise and efficient editing at the single base level in the genome without making a double-stranded break in the DNA. If standard CRISPR-Cas gene editing approaches are akin to “scissors” for the genome, base editors are akin to “pencils,” erasing and rewriting one letter in a gene**.** Our gene editing programs consist of LNPs that encapsulate mRNA encoding for a gene or base editor as well as a guide RNA, or gRNA, targeting the gene of interest expressed in the liver.

We believe that our approach will help us achieve our goal of delivering single-course gene editing treatments on a global scale for millions of patients with CVD, as it benefits from the following advantages:

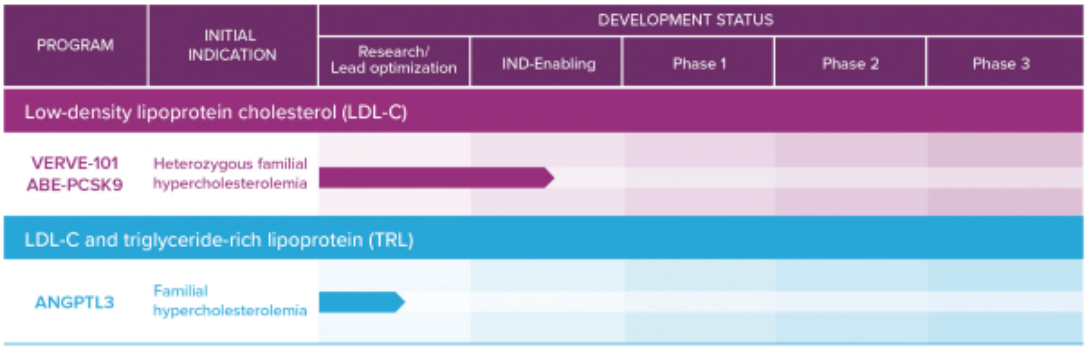
- Our approach specifically targets genes that are predominantly expressed in the liver and have been validated through human genetics research.
- We are focused on targeting distinct pathways to create a suite of complementary single-course gene editing treatments to broadly reduce blood lipids and ASCVD risk.
- We are leveraging gene editing technologies, including base editing, to make a permanent change in the target gene resulting in potent, durable and life-long lowering of blood lipids through a single course of treatment.
- All of our gene editing programs utilize non-viral LNP delivery of a gene editor to the liver designed and optimized to reduce or avoid safety risks.
- We have designed our single-course treatments as LNPs encapsulating mRNA and gRNA, which we believe will enhance our potential to manufacture our gene editing programs at scale.

Our pipeline

We are advancing a pipeline of single-course *in vivo* gene editing programs, each designed to mimic natural disease resistance mutations and turn off specific genes in order to lower blood lipids, thereby reducing the risk of ASCVD. Our initial programs focus on PCSK9 and ANGPTL3, two genes that regulate levels of blood lipids. We are developing these gene editing treatments initially for patients with familial hypercholesterolemia, or FH, a genetic disease that causes life-long severely elevated blood cholesterol, leading to increased risk of early-onset ASCVD and which is estimated to affect approximately 31 million patients globally. We intend to use a stepwise clinical development plan for these programs, evaluating efficacy and safety in these genetic populations and then, if successful, expanding into larger populations of patients with established ASCVD, which represents hundreds of millions of potential patients globally. Ultimately, we believe that our single-course gene editing treatment could be useful to people at risk for ASCVD as a preventative measure in the general population.

Our initial indication, FH, is an autosomal dominant genetic disorder that results in life-long severely elevated blood LDL-C, leading to increased risk of early-onset ASCVD. Individuals with FH may harbor one mutant allele and are thereby heterozygous for the disease, known as HeFH, or two mutated alleles and are therefore homozygous for the disease, known as HoFH, with HoFH typically being more severe than HeFH. While dietary and lifestyle modifications are important for LDL-C lowering in patients with FH, multidrug treatment is often required to achieve recommended LDL-C levels. Treatment for FH patients tends to start earlier than those with or at risk for ASCVD without FH, and typically follows a more aggressive course with multidrug treatment given the elevated risk of early-onset ASCVD.

Our current pipeline of *in vivo* gene editing programs for ASCVD is shown below:



We envision expanding beyond our PCSK9 and ANGPTL3 programs to develop a suite of single-course gene editing treatments designed to comprehensively and robustly address additional independent causes of CVD. We are exploring additional targets in two categories: lipoprotein targets for ASCVD and other liver-cardiovascular targets for cardiomyopathy, thrombotic disorders or cardiometabolic disorders. We plan to continue to focus on programs where the target has biology substantially validated by human genetics and, in many cases, by clinical development programs using other modalities.

VERVE-101

Our lead product candidate, VERVE-101, is designed to be a single-course gene editing treatment that permanently turns off the PCSK9 gene in the liver. PCSK9 is a highly validated target that plays a critical role in controlling blood LDL-C through its regulation of the LDL receptor, or LDLR. Reduction of PCSK9 protein in the blood improves the ability of the liver to clear LDL-C from the blood.

VERVE-101 utilizes LNP-mediated delivery to target the liver and base editing technology to make a single A-to-G base change at a specific site in the PCSK9 gene in order to disrupt PCSK9 protein production. We discovered VERVE-101 based on screening of a large library of gRNA candidates, evaluation of multiple LNP formulations and optimization of the adenine base editor, or ABE, mRNA construct. We have studied VERVE-101 and its precursor formulations extensively in mouse and non-human primate, or NHP, models, in which we observed durable and specific editing of the PCSK9 gene in the liver and significant decreases in blood PCSK9 protein and blood LDL-C.

In an ongoing *in vivo* proof-of-concept study in NHPs, we observed substantial lowering of LDL-C levels that was sustained over an extended period of time following treatment. In this study, following a single intravenous infusion of a base editor targeting PCSK9, we observed an average reduction of blood PCSK9 protein of 89%

accompanied by an average reduction of blood LDL-C levels of 59% at two weeks after treatment. This LDL-C reduction was maintained at an average of 62% for ten months following treatment. If we are able to achieve similar reductions in PCSK9 protein levels in humans, we believe this could result in marked and sustained LDL-C reductions of approximately 60%, which would potentially offer superior cumulative LDL-C lowering to what has been clinically demonstrated with other PCSK9-targeting treatment modalities.

In addition, in our preclinical studies in NHPs, VERVE-101 has been well tolerated following a single administration, with only mild elevations in liver function tests that resolved within two weeks. In primary human hepatocytes treated with VERVE-101, we observed on-target editing at the PCSK9 target site and did not observe editing at any of 141 identified potential off-target sites.

Based on our preclinical data, we are advancing VERVE-101 initially for the treatment of heterozygous familial hypercholesterolemia, or HeFH. We plan to expand clinical development of VERVE-101 in a stepwise fashion beyond HeFH for the treatment of patients with established ASCVD. We have initiated investigational new drug application, or IND, -enabling studies for VERVE-101, and intend to submit an IND for VERVE-101 to the FDA and comparable foreign regulatory authorities in 2022, followed by initiation of clinical development for patients with HeFH.

ANGPTL3 program

Our second program is designed to permanently turn off the ANGPTL3 gene in the liver. ANGPTL3 is a key regulator of cholesterol and triglyceride metabolism. We believe that disrupting ANGPTL3 protein production may lead to reductions in LDL-C and triglyceride levels through a mechanism distinct from that of PCSK9. We plan to develop this program initially for the treatment of FH, including both homozygous familial hypercholesterolemia, or HoFH, which affects approximately 1,300 patients in the United States, as well as the more prevalent HeFH indication. Similar to our approach with VERVE-101, we plan to expand the clinical development of our ANGPTL3 program in a stepwise fashion beyond FH to patients with established ASCVD. Ultimately, we believe that our ANGPTL3 program may also be useful to people at risk for ASCVD as a preventative measure in the general population.

In ongoing preclinical studies of our ANGPTL3 program in NHPs, we observed an average reduction of blood ANGPTL3 protein levels of 96% during the ten-month period following a single treatment. We anticipate nominating a lead development candidate for our ANGPTL3 program and initiating IND-enabling studies in 2022.

Our strategy

To achieve our vision of transforming treatment for patients with CVD from chronic care to single-course gene editing medicines, we are executing a strategy with the following key elements:

- Employ a stepwise approach to realize the full potential of VERVE-101, with initial development for the treatment of patients with HeFH followed by expansion to the broader population of patients with or at risk for ASCVD.
- Expand our pipeline of single-course gene editing treatments within ASCVD and beyond to additional CVD indications.
- Leverage our expertise and access to multiple gene editing technologies to become the leader in gene editing for CVD.
- Advance our internal LNP capabilities to complement our external LNP collaborations.

- Prioritize rapid iteration of product candidates in NHP preclinical models as an early development strategy.
- Develop manufacturing capabilities to produce *in vivo* gene editing medicines at scale.
- Build the leading cardiovascular gene editing company by maintaining a dynamic culture that attracts and retains a talented and collaborative team.

Our team and our history

Since our founding in 2018, we have built an organization and culture driven by a talented team of individuals who embody the meaning behind our name – vigor, spirit and enthusiasm – and who are motivated by a common goal of transforming the care of patients with or at risk for CVD.

Members of our leadership team have extensive collective experience in human genetics, gene editing, CVD, and drug development and commercialization. Our chief executive officer, Sekar Kathiresan, M.D., is a preventive cardiologist who has made groundbreaking discoveries of genetic mutations that confer resistance to CVD. Andrew Ashe, J.D., our president and chief operating officer, is an accomplished biotech executive with over 20 years of experience in operations and legal management. Andrew Bellinger, M.D., Ph.D., our chief scientific officer, is a cardiologist with proven expertise in drug delivery, drug development and translational medicine.

We have in-licensed technologies and intellectual property covering various elements of gene editing, including base editing and CRISPR nucleases, as well as multiple LNPs, with licenses from Beam Therapeutics Inc., the Broad Institute, Inc., or Broad, Editas Medicine, Inc., the President and Fellows of Harvard College, or Harvard, Massachusetts General Hospital and Acuitas Therapeutics Inc. In addition, since our inception through March 31, 2021, we have raised $216.5 million in capital from premier venture capital funds, healthcare-dedicated funds, major mutual funds and other leading investors that share our vision of transforming the treatment of CVD from chronic management to single-course gene editing medicines.

Risks associated with our business

Our business is subject to a number of risks of which you should be aware before making an investment decision. These risks are discussed more fully in the “Risk factors” section of this prospectus. These risks include, but are not limited to, the following:

- Even if we consummate this offering, we will need substantial additional funding. If we are unable to raise capital when needed, we could be forced to delay, reduce or eliminate our product development programs or commercialization efforts;
- Our limited operating history may make it difficult for you to evaluate the success of our business to date and to assess our future viability;
- We are very early in our development efforts, and we have not yet completed IND-enabling studies or initiated clinical development of any product candidate. As a result, we expect it will be many years before we commercialize any product candidate, if ever. If we are unable to advance our current or future product candidates into and through clinical trials, obtain marketing approval and ultimately commercialize our product candidates or experience significant delays in doing so, our business will be materially harmed;
- Gene editing, including base editing, is a novel technology in a rapidly evolving field that is not yet clinically validated for human therapeutic use. The approaches we are taking to discover and develop novel

therapeutics are unproven and may never lead to marketable products. We are focusing our research and development efforts on gene editing using base editing technology, but other gene editing technologies may be discovered that provide significant advantages over base editing, which could materially harm our business;

- The outcome of preclinical studies and earlier-stage clinical trials may not be predictive of future results or the success of later preclinical studies and clinical trials;
- If any of the product candidates we may develop, or the delivery modes we rely on to administer them, cause serious adverse events, undesirable side effects or unexpected characteristics, such events, side effects or characteristics could delay or prevent regulatory approval of the product candidates, limit the commercial potential or result in significant negative consequences following any potential marketing approval;
- Adverse public perception of genetic medicines, and gene editing and base editing in particular, may negatively impact regulatory approval of, and/or demand for, our potential products;
- Genetic medicines are complex and difficult to manufacture. We could experience delays in satisfying regulatory authorities or production problems that result in delays in our development programs, limit the supply of our product candidates we may develop, or otherwise harm our business;
- We rely, and expect to continue to rely, on third parties to conduct some or all aspects of our product manufacturing, research and preclinical and clinical testing, and these third parties may not perform satisfactorily;
- We have entered into collaborations, and may enter into additional collaborations, with third parties for the research, development, manufacture and commercialization of programs or product candidates. If these collaborations are not successful, our business could be adversely affected;
- If we or our licensors are unable to obtain, maintain, defend and enforce patent rights that cover our gene editing technology and product candidates or if the scope of the patent protection obtained is not sufficiently broad, our competitors could develop and commercialize technology and products similar or identical to ours, and our ability to successfully develop and commercialize our technology and product candidates may be adversely affected;
- If we fail to comply with our obligations in our intellectual property licenses arrangements with third parties, or otherwise experience disruptions to our business relationships with our licensors, we could lose intellectual property rights that are important to our business;
- The intellectual property landscape around genome editing technology, including base editing, is highly dynamic, and third parties may initiate legal proceedings alleging that we are infringing, misappropriating, or otherwise violating their intellectual property rights, the outcome of which would be uncertain and may prevent, delay or otherwise interfere with our product discovery and development efforts;
- We face substantial competition, which may result in others discovering, developing or commercializing products before us or more successfully than we do; and
- The COVID-19 pandemic may affect our ability to initiate and complete preclinical studies, delay the initiation of future clinical trials, disrupt regulatory activities or have other adverse effects on our business and operations. In addition, this pandemic has adversely impacted economies worldwide, both of which could result in adverse effects on our business, operations and ability to raise capital.

Our corporate information

Our principal executive offices are located at 500 Technology Square, Suite 901, Cambridge, Massachusetts 02139, and our telephone number is (617) 603-0070. Our website address is http://www.vervetx.com. The information contained on, or that can be accessed through, our website is not a part of this prospectus. We have included our website address in this prospectus solely as an inactive textual reference.

The Verve Therapeutics name is our trademark. We own or have rights to, or have applied for, trademarks, service marks and trade names that we use in connection with the operation of our business, including our corporate name, logos and website names. Other trademarks, service marks and trade names appearing in this prospectus are the property of their respective owners. Solely for convenience, some of the trademarks, service marks and trade names referred to in this prospectus are listed without the ® and ™ symbols, but we will assert, to the fullest extent under applicable law, our rights to our trademarks, service marks and trade names.

Implications of being an emerging growth company

We are an “emerging growth company” as defined in the Jumpstart Our Business Startups Act, or the JOBS Act. As a result, we are able to take advantage of certain reduced reporting requirements that are otherwise applicable to public companies, including delaying auditor attestation of internal control over financial reporting, providing only two years of audited financial statements and related Management’s discussion and analysis of financial condition and results of operations and reduced executive compensation disclosures.

We may remain an emerging growth company for up to five years from the date of the first sale in this offering. However, if certain events occur prior to the end of such five-year period, including if we become a “large accelerated filer,” under SEC rules, our annual gross revenue exceeds $1.07 billion, or we issue more than $1 billion of non-convertible debt in any three-year period, we will cease to be an emerging growth company prior to the end of such five-year period.

We have elected to take advantage of certain of the reduced disclosure obligations in the registration statement of which this prospectus is a part and may elect to take advantage of other reduced reporting requirements in future filings. In particular, we have provided only two years of audited financial statements and have not included all of the executive compensation related information that would be required if we were not an emerging growth company. As a result, the information that we provide to our stockholders may be different than what you might receive from other public reporting companies in which you hold equity interests. In addition, the JOBS Act provides that an emerging growth company can take advantage of an extended transition period for complying with new or revised accounting standards. We have elected not to “opt out” of such extended transition period, which means that when a standard is issued or revised and it has different application dates for public or private companies, we can adopt the new or revised standard at the time private companies adopt the new or revised standard and may do so until such time that we either (1) irrevocably elect to “opt out” of such extended transition period or (2) no longer qualify as an emerging growth company.

The offering

Common stock offered by us	shares
Option to purchase additional shares	We have granted the underwriters an option for a period of 30 days to purchase up to additional shares of our common stock at the initial public offering price less underwriting discounts and commissions.
Common stock to be outstanding immediately following this offering	shares (shares if the underwriters exercise their option to purchase additional shares in full).
Use of proceeds	We estimate that the net proceeds from this offering will be approximately $ million (or approximately $ million if the underwriters exercise their option to purchase additional shares in full), based on an assumed initial public offering price of $ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. We intend to use the net proceeds from this offering, together with our existing cash, cash equivalents and marketable securities, for continued research and development of VERVE-101, including completion of IND-enabling studies and initiation of Phase 1b clinical trials; for continued research and development of our ANGPTL3 program, including preclinical research, completion of IND-enabling studies and initiation of Phase 1b clinical trials; for research and development to support new programs and optimization of existing technology, including new targets, novel LNP delivery technology and novel process development to enable manufacturing at scale; and for working capital and other general corporate purposes. See “Use of proceeds.”
Risk factors	You should read the “Risk factors” section of this prospectus for a discussion of factors to consider carefully before deciding to invest in shares of our common stock.
Proposed Nasdaq Global Market symbol	“VERV”

The number of shares of our common stock to be outstanding after this offering is based on 29,372,698 shares of our common stock outstanding as of March 31, 2021, which includes 3,733,669 shares of unvested restricted stock subject to a repurchase option, and gives effect to the automatic conversion of all outstanding shares of our preferred stock into 256,682,054 shares of our common stock upon the closing of this offering.

The number of shares of our common stock to be outstanding after this offering excludes:

- 48,043,456 shares of common stock issuable upon the exercise of stock options outstanding as of March 31, 2021 under our 2018 Equity Incentive Plan, as amended, or the 2018 Plan, at a weighted average exercise price of $0.41 per share;

- an additional 3,525,000 shares of common stock issuable upon the exercise of stock options granted after March 31, 2020, at an exercise price of $0.97 per share;
- 15,208,735 shares of common stock reserved for future issuance under the 2018 Plan as of March 31, 2021 (which does not account for stock options to purchase an aggregate of 3,525,000 shares of common stock granted after March 31, 2021); and
- and additional shares of our common stock that will become available for future issuance under our 2021 Stock Incentive Plan and our 2021 Employee Stock Purchase Plan, respectively, each of which will become effective immediately prior to the effectiveness of the registration statement of which this prospectus is a part, as well as any automatic increases in the number of shares of common stock reserved for future issuance under these plans.

Unless otherwise indicated, all information in this prospectus reflects and assumes:

- the automatic conversion of all outstanding shares of our preferred stock into an aggregate of 256,682,054 shares of our common stock upon the closing of this offering;
- our expected issuance of an aggregate of shares of common stock to Broad and Harvard upon the closing of this offering pursuant to our Cas9 License Agreement, based on our issuance and sale of shares of our common stock in this offering as further described under “Description of capital stock—License agreement with The Broad Institute and the President and Fellows of Harvard College”;
- no exercise of the outstanding options described above;
- no exercise by the underwriters of their option to purchase additional shares of our common stock; and
- the filing and effectiveness of our restated certificate of incorporation and the adoption of our amended and restated bylaws upon the closing of this offering.

Summary consolidated financial data

You should read the following summary consolidated financial data together with our consolidated financial statements and the related notes appearing elsewhere in this prospectus and the "Management's discussion and analysis of financial condition and results of operations" section of this prospectus. We have derived the consolidated statement of operations data for the years ended December 31, 2020 and 2019 and the consolidated balance sheet data as of December 31, 2020 from our audited consolidated financial statements appearing elsewhere in this prospectus. Our historical results are not necessarily indicative of the results that may be expected in the future.

	Year ended December 31,	
	2020	2019
	(in thousands, except share and per share data)	
Consolidated Statement of Operations Data:		
Operating expenses:		
Research and development	$ 35,371	$ 11,144
General and administrative	5,256	2,498
Total operating expenses	40,627	13,642
Loss from operations	(40,627)	(13,642)
Other income (expense):		
Change in fair value of preferred stock tranche liability	2,507	(4,883)
Change in fair value of antidilution rights liability	(5,359)	(982)
Change in fair value of success payment liability	(2,387)	(68)
Interest and other income (expense), net	162	278
Total other income (expense), net	(5,077)	(5,655)
Net loss	$ (45,704)	$ (19,297)
Net loss per common share attributable to common stockholders, basic and diluted(1)	$ (2.19)	$ (1.63)
Weighted-average common shares used in calculating net loss per share attributable to common stockholders, basic and diluted	20,834,742	11,825,835
Pro forma net loss per share, basic and diluted(2)	$ (0.28)	
Pro forma weighted average common shares outstanding(2)	164,258,784	

(1) See Note 2 and Note 13 to our consolidated financial statements included elsewhere in this prospectus for a description of the method used to calculated basic and diluted net loss per share attributable to common stockholders.

(2) The pro forma basic and diluted net loss per share for the year ended December 31, 2020 has been computed to give effect to the automatic conversion of all outstanding shares of our preferred stock into shares of common stock. The unaudited pro forma basic and diluted net loss per share for the year ended December 31, 2020 was computed using the weighted average number of shares of common stock outstanding,

including the pro forma effect of the conversion of all outstanding shares of our preferred stock into shares of common stock, as if the closing of this offering had occurred on the later of January 1, 2020 or the original issuance dates of the respective preferred stock.

	As of December 31, 2020		
	Actual	Pro forma(2)	Pro forma, as adjusted(3)
		(in thousands)	
Consolidated Balance Sheet Data:			
Cash and cash equivalents	$ 8,993	$	$
Marketable securities	63,119		
Working capital(1)	66,651		
Total assets	78,413		
Total liabilities	17,162		
Convertible preferred stock	125,160		
Total stockholders' equity (deficit)	(63,909)		

(1) We define working capital as current assets less current liabilities.

(2) The pro forma balance sheet data give effect to (i) our issuance and sale of 77,163,022 shares of Series B preferred stock in January 2021 for gross proceeds of $94.0 million, (ii) our expected issuance of an aggregate of shares of common stock to The Broad Institute and the President and Fellows of Harvard College upon the closing of this offering pursuant to our Cas9 License Agreement, based on our issuance and sale of shares of our common stock in this offering and assuming our post-money valuation exceeds $500 million as further described under "Description of capital stock—License agreement with The Broad Institute and the President and Fellows of Harvard College," and (iii) the automatic conversion of all outstanding shares of our preferred stock into an aggregate of 256,682,054 shares of our common stock upon the closing of this offering.

(3) The pro forma as adjusted balance sheet data give further effect to our issuance and sale of shares of our common stock in this offering at an assumed initial public offering price of $ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

The pro forma as adjusted information discussed above is illustrative only and will depend on the actual initial public offering price and other terms of this offering determined at pricing. A $1.00 increase (decrease) in the assumed initial public offering price of $ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, would increase (decrease) the pro forma as adjusted amount of each of cash and cash equivalents, marketable securities, working capital, total assets and total stockholders' equity by $ million, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. An increase (decrease) of 1,000,000 shares in the number of shares offered by us, as set forth on the cover page of this prospectus, would increase (decrease) the pro forma as adjusted amount of each of cash and cash equivalents, marketable securities, working capital, total assets and total stockholders' equity by $ million, assuming no change in the assumed initial public offering price per share and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

Risk factors

Investing in our common stock involves a high degree of risk. You should carefully consider the risks and uncertainties described below together with all of the other information contained in this prospectus, including our consolidated financial statements and the related notes appearing elsewhere in this prospectus, before deciding to invest in our common stock. The risks described below are not the only risks facing us. The occurrence of any of the following risks, or additional risks and uncertainties not presently known to us or that we currently believe to be immaterial, could cause our business, prospects, operating results and financial condition to suffer materially. In such event, the trading price of our common stock could decline and you might lose all or part of your investment.

Risks related to our financial position and need for additional capital

We have incurred significant losses since our inception and have no products approved for sale. We expect to incur losses for the foreseeable future and may never achieve or maintain profitability.

Since our inception, we have devoted substantially all of our financial resources and efforts to research and development, including preclinical studies, and have incurred significant operating losses. Our net loss was $19.3 million and $45.7 million for the years ended December 31, 2019 and 2020, respectively. As of December 31, 2020, we had an accumulated deficit of $66.5 million. To date, we have generated no revenue and have financed our operations primarily through sales of our preferred stock. We have devoted all of our efforts to research and development, are still in the early stages of development of our research programs and have not commenced clinical development of any product candidates. We expect to continue to incur significant expenses and operating losses for the foreseeable future. Our operating expenses and net losses may fluctuate significantly from quarter to quarter and year to year. We anticipate that our expenses will increase substantially if and as we:

- continue our current research programs and our preclinical development of product candidates from our current research programs;
- seek to identify additional research programs and additional product candidates;
- advance our existing and future product candidates into clinical development;
- initiate preclinical studies and clinical trials for any additional product candidates we identify and develop or expand development of existing programs into additional patient populations;
- maintain, expand, enforce, defend and protect our intellectual property portfolio and provide reimbursement of third-party expenses related to our patent portfolio;
- seek regulatory and marketing approvals for any of our product candidates that we develop;
- seek to identify, establish and maintain additional collaborations and license agreements, and the success of those collaborations and license agreements;
- make milestone payments to Beam Therapeutics Inc., or Beam, under our collaboration and license agreement with Beam, or the Beam Agreement, to Acuitas Therapeutics Inc., or Acuitas, under our non-exclusive license agreement with Acuitas, or the Acuitas Agreement, and to The Broad Institute, Inc., or Broad, and the President and Fellows of Harvard College, or Harvard, under our license agreement with Broad and Harvard (as amended, the Cas9 License Agreement), and under any additional future collaboration or license agreements that we obtain;
- ultimately establish a sales, marketing, and distribution infrastructure to commercialize any drug products for which we may obtain marketing approval, either by ourselves or in collaboration with others;

- generate revenue from commercial sales of product candidates we may develop for which we receive marketing approval;
- further develop our base editing technology;
- hire additional personnel including research and development, clinical and commercial personnel;
- add operational, financial and management information systems and personnel, including personnel to support our product development;
- acquire or in-license products, intellectual property, medicines and technologies;
- satisfy any post-marketing requirements, such as a cardiovascular outcomes trial, or CVOT;
- establish commercial-scale current good manufacturing practices capabilities through a third-party or our own manufacturing facility; and
- operate as a public company.

In addition, our expenses will increase if, among other things:

- we are required by the U.S. Food and Drug Administration, or the FDA, the European Medicines Agency, or the EMA, or other regulatory authorities to perform trials or studies in addition to, or different than, those expected;
- there are any delays in completing our clinical trials or the development of any of our product candidates; or
- there are any third-party challenges to our intellectual property or we need to defend against any intellectual property-related claim.

Even if we obtain marketing approval for, and are successful in commercializing, one or more of our product candidates, we expect to incur substantial additional research and development and other expenditures to develop and market additional product candidates and/or to expand the approved indications of any marketed product. We may encounter unforeseen expenses, difficulties, complications, delays and other unknown factors that may adversely affect our business. The size of our future net losses will depend, in part, on the rate of future growth of our expenses and our ability to generate revenue.

We have never generated revenue from product sales and may never achieve or maintain profitability.

We have not initiated clinical development of any product candidate and expect that it will be many years, if ever, before we have a product candidate ready for commercialization. To become and remain profitable, we must succeed in developing, obtaining the necessary regulatory approvals for and eventually commercializing a product or products that generate significant revenue. The ability to achieve this success will require us to be effective in a range of challenging activities, including:

- completing preclinical testing and clinical trials;
- identifying additional product candidates;
- obtaining marketing approval for these product candidates;
- manufacturing, marketing and selling any products for which we may obtain marketing approval; and
- achieving market acceptance of products for which we may obtain marketing approval as viable treatment options.

We are only in the preliminary stages of these activities and there is no assurance that we will be successful in these activities and, even if we are, may never generate revenues that are significant enough to achieve profitability. We are currently only in the preclinical stage of our research programs. Because of the numerous risks and uncertainties associated with pharmaceutical product development, we are unable to accurately predict the timing or amount of increased expenses or when, or if, we will be able to generate revenue or achieve profitability.

Even if we are able to generate revenue from the sale of any approved products, we may not become profitable and may need to obtain additional funding to continue operations. Our revenue will be dependent, in part, upon the size of the markets in the territories for which we gain regulatory approval, the accepted price for the product, the ability to obtain coverage and reimbursement, and whether we own the commercial rights for that territory. If the number of our addressable patients is not as significant as we estimate, the indication approved by regulatory authorities is narrower than we expect, or the treatment population is narrowed by competition, physician choice or treatment guidelines, we may not generate significant revenue from sales of such products, even if approved.

Even if we consummate this offering, we will need substantial additional funding. If we are unable to raise capital when needed, we could be forced to delay, reduce or eliminate our product development programs or commercialization efforts.

We expect to devote substantial financial resources to our ongoing and planned activities, particularly as we conduct research, development and preclinical testing, initiate clinical trials and potentially seek marketing approval for our current and any additional product candidates we may develop. We expect our expenses to increase substantially in connection with our ongoing activities, particularly as we advance our preclinical activities and initiate clinical trials. In addition, if we obtain marketing approval for any of our product candidates, we expect to incur significant commercialization expenses related to product manufacturing, sales, marketing and distribution. Furthermore, upon the closing of this offering, we expect to incur additional costs associated with operating as a public company. Accordingly, we will need to obtain substantial additional funding in connection with our continuing operations. If we are unable to raise capital or obtain adequate funds when needed or on acceptable terms, we may be forced to delay, limit, reduce or terminate our research and development programs or any future commercialization efforts or grant rights to develop and market product candidates that we would otherwise prefer to develop and market ourselves.

Our future capital requirements will depend on many factors, including:

- the costs of acquiring licenses for the delivery modalities that will be used with our product candidates;
- the scope, progress, results and costs of discovery, preclinical and clinical development for any product candidates we may develop;
- the cost and timing of completion of commercial-scale manufacturing activities;
- the costs and timing of preparing, filing and prosecuting patent applications, maintaining and enforcing our intellectual property and proprietary rights, and defending intellectual property-related claims, including claims of infringement, misappropriation or other violation of third-party intellectual property;
- the costs, timing and outcome of regulatory review of the product candidates we may develop;
- the costs of future commercialization activities, either by ourselves or in collaboration with others, including product sales, marketing, manufacturing, and distribution for any product candidates for which we receive marketing approval;
- the costs of satisfying any post-marketing requirements, such as a CVOT;

- the revenue, if any, received from commercial sales of product candidates we may develop for which we receive marketing approval;
- the success of our license agreements and our collaborations;
- our ability to establish and maintain additional collaborations on favorable terms, if at all;
- the achievement of milestones or occurrence of other developments that trigger payments under any additional collaboration agreements we obtain;
- the extent to which we acquire or in-license products, intellectual property and technologies;
- the costs of operational, financial and management information systems and associated personnel; and
- the costs of operating as a public company.

Identifying potential product candidates and conducting preclinical testing and clinical trials is a time-consuming, expensive and uncertain process that takes years to complete, and we may never generate the necessary data or results required to obtain marketing approval and achieve product sales. In addition, even if we successfully identify and develop product candidates and those are approved, we may not achieve commercial success. Our commercial revenues, if any, may not be sufficient to sustain our operations. Accordingly, we will need to continue to rely on additional financing to achieve our business objectives.

As of December 31, 2020, we had cash, cash equivalents and marketable securities of approximately $72.1 million, which does not include $94.0 million of gross proceeds received from the sale of shares of Series B preferred stock in January 2021. We believe that the net proceeds from this offering, together with our existing cash, cash equivalents and marketable securities, will enable us to fund our operating expenses and capital expenditure requirements into . However, we have based this estimate on assumptions that may prove to be wrong, and our operating plan may change as a result of many factors currently unknown to us. As a result, we could deplete our capital resources sooner than we currently expect and could be forced to see additional funding sooner than planned.

Any additional fundraising efforts may divert our management from their day-to-day activities, which may adversely affect our ability to develop and commercialize any product candidates. We cannot be certain that additional funding will be available on acceptable terms, or at all. For example, while the potential impact and duration of the COVID-19 pandemic on the global economy and our business in particular may be difficult to assess or predict, the pandemic has resulted in, and may continue to result in, significant disruption of global financial markets, reducing our ability to access capital, which could in the future negatively affect our liquidity. We have no committed source of additional capital and, if we are unable to raise additional capital in sufficient amounts or on terms acceptable to us, we may have to significantly delay, scale back or discontinue the development or commercialization of our product candidates or other research and development initiatives. We could be required to seek collaborators for product candidates we may develop at an earlier stage than otherwise would be desirable or on terms that are less favorable than might otherwise be available or relinquish or license on unfavorable terms our rights to product candidates we may develop in markets where we otherwise would seek to pursue development or commercialization ourselves.

Any of the above events could significantly harm our business, prospects, financial condition and results of operations and cause the price of our common stock to decline.

Raising additional capital may cause dilution to our stockholders, including purchasers of our common stock in this offering, restrict our operations or require us to relinquish rights to our technologies or product candidates.

Until such time, if ever, as we can generate substantial revenues from product sales, we expect to finance our cash needs through a combination of equity offerings, debt financings, collaborations, strategic alliances and marketing, distribution or licensing arrangements. We do not have any source of committed external funds. To the extent that we raise additional capital through the sale of equity or convertible debt securities, your ownership interest will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect your rights as a common stockholder. Debt financing and preferred equity financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, selling or licensing our assets, making capital expenditures, declaring dividends or encumbering our assets to secure future indebtedness.

If we raise additional funds through collaborations, strategic alliances or marketing, distribution or licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies, future revenue streams, research programs or product candidates or grant licenses on terms that may not be favorable to us. If we are unable to raise additional funds through equity or debt financings or other arrangements when needed or on terms acceptable to us, we would be required to delay, limit, reduce or terminate our product development or future commercialization efforts or grant rights to develop and market product candidates that we would otherwise prefer to develop and market ourselves.

Our limited operating history may make it difficult for you to evaluate the success of our business to date and to assess our future viability.

We commenced operations in 2018 and are an early-stage company. Our operations to date have been limited to organizing and staffing our company, business planning, raising capital, developing our technology, identifying potential product candidates, securing intellectual property rights and undertaking preclinical studies. All of our research programs are still in the research or preclinical stage of development, and their risk of failure is high. We have not yet demonstrated our ability to initiate or complete any clinical trials, obtain marketing approvals, manufacture a clinical development or commercial scale product or arrange for a third party to do so on our behalf, or conduct sales and marketing activities necessary for successful product commercialization. In part because of this lack of experience, we cannot be certain that our ongoing preclinical studies will be completed on time or if the planned preclinical studies and clinical trials will begin or be completed on time, if at all. Consequently, any predictions you make about our future success or viability may not be as accurate as they could be if we had a longer operating history or a history of successfully developing and commercializing gene editing products.

Our limited operating history, particularly in light of the rapidly evolving genetic medicines field, may make it difficult to evaluate our technology and industry and predict our future performance. Our limited history as an operating company makes any assessment of our future success or viability subject to significant uncertainty. We will encounter risks and difficulties frequently experienced by early-stage companies in rapidly evolving fields. If we do not address these risks successfully, our business will suffer.

In addition, as our business grows, we may encounter unforeseen expenses, restrictions, difficulties, complications, delays and other known and unknown factors. We will need to transition at some point from a company with a research and development focus to a company capable of supporting commercial activities. We may not be successful in such a transition.

Our ability to use our net operating losses and research and development tax credit carryforwards to offset future taxable income or taxes may be subject to certain limitations.

We have a history of cumulative losses and anticipate that we will continue to incur significant losses in the foreseeable future; thus, we do not know whether or when we will generate taxable income necessary to utilize our net operating losses, or NOLs, or research and development tax credit carryforwards. As of December 31, 2020, we had federal NOL carryforwards of $49.2 million and state NOL carryforwards of $41.6 million.

In general, under Sections 382 and 383 of the Internal Revenue Code of 1986, as amended, or the Code, and corresponding provisions of state law, a corporation that undergoes an "ownership change," generally defined as a greater than 50 percentage point change (by value) in its equity ownership by certain stockholders over a three-year period, is subject to limitations on its ability to utilize its pre-change NOLs and research and development tax credit carryforwards to offset post-change taxable income or taxes. We have not conducted a study to assess whether any such ownership changes have occurred. We may have experienced such ownership changes in the past and may experience such ownership changes in the future as a result of this offering and/or subsequent changes in our stock ownership (which may be outside our control). As a result, if, and to the extent that, we earn net taxable income, our ability to use our pre-change NOLs and research and development tax credit carryforwards to offset such taxable income may be subject to limitations. Our NOLs or credits may also be impaired under state law.

There is also a risk that due to regulatory changes, such as suspensions on the use of NOLs, or other unforeseen reasons, our existing NOLs could expire or otherwise become unavailable to offset future income tax liabilities. As described below in "Changes in tax laws or in their implementation or interpretation may adversely affect our business and financial condition," the Tax Cuts and Jobs Act, or the Tax Act, as amended by the Coronavirus Aid, Relief, and Economic Security Act, or CARES Act, includes changes to U.S. federal tax rates and the rules governing NOL carryforwards that may significantly impact our ability to utilize our NOLs to offset taxable income in the future. For these reasons, even if we attain profitability, we may be unable to use a material portion of our NOLs and other tax attributes.

Risks related to discovery and development

We are very early in our development efforts, and we have not yet completed IND-enabling studies or initiated clinical development of any product candidate. As a result, we expect it will be many years before we commercialize any product candidate, if ever. If we are unable to advance our current or future product candidates into and through clinical trials, obtain marketing approval and ultimately commercialize our product candidates or experience significant delays in doing so, our business will be materially harmed.

We are very early in our development efforts and have focused our research and development efforts to date on research efforts and preclinical development. Currently, all of our programs are in preclinical development or in discovery. Our ability to generate product revenues, which we do not expect will occur for many years, if ever, will depend heavily on the successful development, marketing approval and eventual commercialization of our product candidates, which may never occur. We have not yet generated revenue from product sales or otherwise, and we may never be able to develop or commercialize a marketable product.

Commencing clinical trials in the United States is subject to acceptance by the FDA of an IND and finalizing the trial design based on discussions with the FDA and other regulatory authorities. In the event that the FDA requires us to complete additional preclinical studies or we are required to satisfy other FDA requests prior to commencing clinical trials, the start of our first clinical trials may be delayed. Even after we receive and incorporate guidance from these regulatory authorities, the FDA or other regulatory authorities could disagree that we have satisfied their requirements to commence any clinical trial or change their position on the

acceptability of our trial design or the clinical endpoints selected, which may require us to complete additional preclinical studies or clinical trials, delay the enrollment of our clinical trials or impose stricter approval conditions than we currently expect. There are equivalent processes and risks applicable to clinical trial applications in other countries, including countries in the European Union.

Commercialization of any product candidates we may develop will require preclinical and clinical development; regulatory and marketing approval in multiple jurisdictions, including by the FDA and the EMA; manufacturing supply, capacity and expertise; a commercial organization; and significant marketing efforts. The success of product candidates we may identify and develop will depend on many factors, including the following:

- timely and successful completion of preclinical studies, including toxicology studies, biodistribution studies and minimally efficacious dose studies in animals, where applicable;
- effective INDs or comparable foreign applications that allow commencement of our planned clinical trials or future clinical trials for any product candidates we may develop;
- successful enrollment and completion of clinical trials, including under the FDA's current Good Clinical Practices, or GCPs, current Good Laboratory Practices and any additional regulatory requirements from foreign regulatory authorities;
- positive results from our future clinical trials that support a finding of safety and effectiveness and an acceptable risk-benefit profile in the intended populations;
- receipt of marketing approvals from applicable regulatory authorities;
- establishment of arrangements through our own facilities or with third-party manufacturers for clinical supply and, where applicable, commercial manufacturing capabilities;
- establishment, maintenance, defense and enforcement of patent, trademark, trade secret and other intellectual property protection or regulatory exclusivity for any product candidates we may develop;
- commercial launch of any product candidates we may develop, if approved, whether alone or in collaboration with others;
- acceptance of the benefits and use of our product candidates we may develop, including method of administration, if and when approved, by patients, the medical community and third-party payers;
- effective competition with other therapies;
- maintenance of a continued acceptable safety, tolerability and efficacy profile of any product candidates we may develop following approval; and
- establishment and maintenance of healthcare coverage and adequate reimbursement by payers.

If we do not succeed in one or more of these factors in a timely manner or at all, we could experience significant delays or an inability to successfully commercialize any product candidates we may develop, which would materially harm our business. If we are unable to advance our product candidates to clinical development, obtain regulatory approval and ultimately commercialize our product candidates, or experience significant delays in doing so, our business will be materially harmed.

Gene editing, including base editing, is a novel technology that is not yet clinically validated for human therapeutic use. The approaches we are taking to discover and develop novel therapeutics are unproven and may never lead to marketable products.

We are focused on developing medicines utilizing gene editing technology, which is new and largely unproven. The base editing technologies that we have licensed and that we are utilizing with VERVE-101 and in our

ANGPTL3 program have not yet been clinically tested, nor are we aware of any clinical trials for safety or efficacy having been completed by third parties using our base editing or similar technologies. The scientific evidence to support the feasibility of developing product candidates based on gene editing technologies is both preliminary and limited. Successful development of our product candidates will require us to safely deliver a gene editor into target cells, optimize the efficiency and specificity of such product candidates and ensure the therapeutic selectivity of such product candidates. There can be no assurance that base editing technology will lead to the development of genetic medicines or that we will be successful in solving any or all of these issues.

Our future success is highly dependent on the successful development of gene editing technologies, cellular delivery methods and therapeutic applications of that technology. We may decide to alter or abandon our initial programs as new data become available and we gain experience in developing gene editing therapeutics. We cannot be sure that our technologies will yield satisfactory products that are safe and effective, scalable or profitable in our initial indications or any other indication we pursue. Adverse developments in the clinical development efforts of other gene editing technology companies could adversely affect our efforts or the perception of our product candidates by both investors and regulatory authorities.

Similarly, another new gene editing technology that has not been discovered yet may be determined to be more attractive than base editing. Moreover, if we decide to develop gene editing technologies other than those involving base editing, we cannot be certain we will be able to obtain rights to such technologies. Although all of our founders who currently provide consulting and advisory services to us in the area of base editing technologies have assignment of inventions obligations to us with respect to the services they perform for us, these assignment of inventions obligations are subject to limitations and do not extend to their work in other fields or to the intellectual property arising from their employment with their respective academic and research institutions. To obtain intellectual property rights assigned by these founders to such institutions, we would need to enter into license agreements with such institutions, which may not be available on commercially reasonable terms or at all. Any of these factors could reduce or eliminate our commercial opportunity and could have a material adverse effect on our business, financial condition, results of operations and prospects.

Development activities in the field of gene editing are currently subject to a number of risks related to the ownership and use of certain intellectual property rights that are subject to patent interference proceedings in the United States and opposition proceedings in Europe. For additional information regarding the risks that may apply to our and our licensors' intellectual property rights, see the section entitled "—Risks related to our intellectual property" for more information.

Additionally, public perception and related media coverage relating to the adoption of new therapeutics or novel approaches to treatment, as well as ethical concerns related specifically to gene editing, may adversely influence the willingness of subjects to participate in clinical trials, or, if any therapeutic is approved, of physicians and patients to accept these novel and personalized treatments. Physicians, health care providers and third-party payors often are slow to adopt new products, technologies and treatment practices, particularly those that may also require additional upfront costs and training. Physicians may not be willing to undergo training to adopt these novel and potentially personalized therapies, may decide the particular therapy is too complex or potentially risky to adopt without appropriate training, and may choose not to administer the therapy. Further, due to health conditions, genetic profile or other reasons, certain patients may not be candidates for the therapies. In addition, responses by federal and state agencies, Congressional committees and foreign governments to negative public perception, ethical concerns or financial considerations may result in new legislation, regulations or medical standards that could limit our ability to develop or commercialize any product candidates, obtain or maintain regulatory approval or otherwise achieve profitability. New government requirements may be established that could delay or prevent regulatory approval of our product candidates under development. It is impossible to predict whether legislative changes will be enacted, regulations, policies

or guidance changed, or interpretations by agencies or courts changed, or what the impact of such changes, if any, may be. Based on these and other factors, health care providers and payors may decide that the benefits of these new therapies do not or will not outweigh their costs.

The gene editing field is relatively new and is evolving rapidly. We are focusing our research and development efforts on gene editing using base editing technology, but other gene editing technologies may be discovered that provide significant advantages over base editing, which could materially harm our business.

To date, we have focused our efforts on gene editing technologies using base editing. Other companies have previously undertaken research and development of gene editing technologies using zinc finger nucleases, engineered meganucleases and transcription activator-like effector nucleases, but to date none have obtained marketing approval for a product candidate. There can be no certainty that base editing technology will lead to the development of genetic medicines or that other gene editing technologies will not be considered better or more attractive for the development of medicines. For example, Feng Zhang's group at the Massachusetts Institute of Technology, or MIT, and Broad, and, separately, Samuel Sternberg's group at Columbia University recently announced the discovery of the use of transposons, or "jumping genes." Transposons can insert themselves into different places in the genome and can be programmed to carry specific DNA sequences to specific sites, without the need for making double-stranded breaks in DNA. Beam uses prime editing technology, which utilizes a CRISPR protein to target a mutation site in DNA and to nick a single strand of the target DNA. Guide RNA allows the CRISPR protein to recognize a DNA sequence that is complementary to the guide RNA and also carries a primer for reverse transcription and a replacement template. The reverse transcriptase copies the template sequence in the nicked site, installing the edit. A number of alternative approaches are being developed by others, including, for example, Intellia Therapeutics, Inc. Similarly, another new gene editing technology that has not been discovered yet may be determined to be more attractive than base editing. Moreover, if we decide to develop gene editing technologies other than those involving base editing, we cannot be certain we will be able to obtain rights to such technologies. Any of these factors could reduce or eliminate our commercial opportunity, and could have a material adverse effect on our business, financial condition, results of operations and prospects.

We may not be successful in our efforts to identify and develop potential product candidates. If these efforts are unsuccessful, we may never become a commercial stage company or generate any revenues.

The success of our business depends primarily upon our ability to identify, develop and commercialize product candidates based on our approach to gene editing. All of our product development programs are still in the research or preclinical stage of development and we have not yet completed IND-enabling studies for any product candidate. Our research programs may fail to identify potential product candidates for clinical development for a number of reasons. Our research methodology may be unsuccessful in identifying additional potential product candidates, our potential product candidates may be shown to have harmful side effects in preclinical *in vitro* experiments or animal model studies, they may not show promising signals of therapeutic effect in such experiments or studies or they may have other characteristics that may make the product candidates impractical to manufacture, unmarketable or unlikely to receive marketing approval.

If any of these events occur, we may be forced to abandon our research or development efforts for a program or programs, which would have a material adverse effect on our business, financial condition, results of operations and prospects. Research programs to identify new product candidates require substantial technical, financial and human resources. We may focus our efforts and resources on potential programs or product candidates that ultimately prove to be unsuccessful, which would be costly and time-consuming.

The COVID-19 pandemic may affect our ability to initiate and complete preclinical studies, delay the initiation of future clinical trials, disrupt regulatory activities or have other adverse effects on our business and operations. In addition, this pandemic has adversely impacted economies worldwide, both of which could result in adverse effects on our business, operations and ability to raise capital.

In December 2019, a novel strain of coronavirus, SARS-CoV-2, causing a disease referred to as COVID-19, emerged in China. Since then, COVID-19 has spread to multiple countries worldwide, including the United States. In March 2020, the World Health Organization declared the COVID-19 outbreak a pandemic. The COVID-19 pandemic is causing many governments to implement measures to slow the spread of the outbreak through quarantines, travel restrictions, heightened border scrutiny and other measures. The outbreak and government measures taken in response have also had a significant impact, both direct and indirect, on businesses and commerce, as worker shortages have occurred; supply chains have been disrupted; facilities and production have been suspended; and demand for certain goods and services, such as medical services and supplies, has spiked, while demand for other goods and services, such as travel, has fallen.

The future progression of the outbreak and its effects on our business and operations are uncertain. We and our contract manufacturing organizations, or CMOs, and contract research organizations, or CROs, have experienced a reduction in the capacity to undertake research-scale production and to execute some preclinical studies, and we have faced and may face disruptions that affect our ability to initiate and complete preclinical studies, and disruptions in procuring items that are essential for our research and development activities, including:

- raw materials and supplies used in the production and purification of mRNA nucleic acids as well as lipids used in the production of LNPs;
- raw materials and supplies used in the manufacture of any product candidates we may develop;
- laboratory supplies used in our preclinical studies; and
- animals that are used for preclinical testing for which there are shortages because of ongoing efforts to address the outbreak.

We and our CROs and CMOs may also face disruptions related to our future IND-enabling studies and clinical trials arising from delays in preclinical studies, manufacturing disruptions, and the ability to obtain necessary IRB, IBC or other necessary site approvals, as well as other delays at clinical trial sites.

The response to the COVID-19 pandemic may also redirect resources with respect to regulatory and intellectual property matters in a way that would adversely impact our ability to progress regulatory approvals and protect our intellectual property, for example by causing interruption or delays in the operations of the FDA or other regulatory authorities, which may impact review and approval timelines. We have experienced delays with the FDA as a result of the COVID-19 pandemic. In addition, we may face impediments or delays to regulatory meetings and approvals due to measures intended to limit in-person interactions. The pandemic has already caused significant disruptions in worldwide financial markets, and may continue to cause such disruptions, which could impact our ability to raise additional funds through public offerings and may also impact the volatility of our stock price and trading in our stock. We cannot be certain what the overall impact of the COVID-19 pandemic will be on our business, although for the reasons described above it has the potential to adversely affect our business, financial condition, results of operations and prospects.

Clinical drug development involves a lengthy and expensive process, with an uncertain outcome. If we are ultimately unable to obtain regulatory approval for our product candidates, our business will be substantially harmed.

The risk of failure for each of our product candidates is high. It is impossible to predict when or if any of our product candidates will prove effective or safe in humans or will receive marketing approval. The time required to obtain approval from the FDA, EMA or other comparable foreign regulatory authorities is unpredictable but typically takes many years following the commencement of clinical trials and depends upon numerous factors, including the substantial discretion of regulatory authorities. Before obtaining marketing approval from regulatory authorities for the sale of any product candidate, we must complete preclinical development and then conduct extensive clinical trials to demonstrate the safety and efficacy of our product candidates in humans. We have not yet begun or completed a clinical trial of any product candidate. Clinical trials may fail to demonstrate that our product candidates are safe for humans and effective for indicated uses. Even if initial clinical trials in any of our product candidates we may develop are successful, these product candidates we may develop may fail to show the desired safety and efficacy in later stages of clinical development despite having successfully advanced through preclinical studies and initial clinical trials. There is a high failure rate for drugs and biologics proceeding through clinical trials. A number of companies in the pharmaceutical and biotechnology industries have suffered significant setbacks in later stage clinical trials even after achieving promising results in earlier stage clinical trials. Furthermore, even if the clinical trials are successful, changes in marketing approval policies during the development period, changes in or the enactment or promulgation of additional statutes, regulations or guidance or changes in regulatory review for each submitted product application may cause delays in the approval or rejection of an application.

Before we can commence clinical trials for a product candidate, we must complete extensive preclinical testing and studies that support our planned INDs and other regulatory filings in the United States and abroad. We cannot be certain of the timely completion or outcome of our preclinical testing and studies and cannot predict if the outcome of our preclinical testing and studies will ultimately support the further development of our current or future product candidates or whether regulatory authorities will accept our proposed clinical programs. As a result, we may not be able to submit applications to initiate clinical development on the timelines we expect, if at all, and the submission of these applications may not result in regulatory authorities allowing clinical trials to begin. Furthermore, product candidates are subject to continued preclinical safety studies, which may be conducted concurrently with our clinical testing. The outcomes of these safety studies may delay the launch of or enrollment in future clinical trials and could impact our ability to continue to conduct our clinical trials.

Clinical testing is expensive, is difficult to design and implement, can take many years to complete and is uncertain as to outcome. We cannot guarantee that any of our clinical trials will be conducted as planned or completed on schedule, or at all. A failure of one or more clinical trials can occur at any stage of testing, which may result from a multitude of factors, including, but not limited to, flaws in study design, dose selection issues, placebo effects, patient enrollment criteria and failure to demonstrate favorable safety or efficacy traits.

Preclinical and clinical data are often susceptible to varying interpretations and analyses, and many companies that have believed their product candidates performed satisfactorily in preclinical studies and clinical trials have nonetheless failed to obtain marketing approval of their products. Furthermore, the failure of any of our product candidates to demonstrate safety and efficacy in any clinical trial could negatively impact the perception of our other product candidates and/or cause the FDA, EMA or other regulatory authorities to require additional testing before approving any of our product candidates.

Our current and future product candidates could fail to receive regulatory approval for many reasons, including the following:

- the FDA, EMA or other foreign regulatory authorities may disagree with the design or implementation of our clinical trials;
- we may be unable to demonstrate to the satisfaction of the FDA, EMA or other foreign regulatory authorities that a product candidate is safe, pure and potent or effective for its proposed indication;
- the results of clinical trials may not meet the level of statistical significance required by the FDA, EMA or other foreign regulatory authorities for approval;
- we may be unable to demonstrate that a product candidate's clinical and other benefits outweigh its safety risks;
- the FDA, EMA or other foreign regulatory authorities may disagree with our interpretation of data from clinical trials or preclinical studies;
- the data collected from clinical trials of our product candidates may not be sufficient to support the submission of a Biologics License Application, or BLA, to the FDA, or similar foreign submission to the EMA or other foreign regulatory authority, to obtain approval in the United States, the European Union or elsewhere;
- the FDA, EMA or other foreign regulatory authorities may find deficiencies with or fail to approve the manufacturing processes or facilities of third-party manufacturers with which we contract for clinical and commercial supplies; and
- the approval policies or regulations of the FDA, EMA or other foreign regulatory authorities may significantly change in a manner rendering our clinical data insufficient for approval.

This lengthy approval process as well as the unpredictability of clinical trial results may result in our failing to obtain regulatory approval to market any product candidate we develop, which would significantly harm our business, financial condition, results of operations and prospects.

The FDA, EMA and other comparable foreign regulatory authorities have substantial discretion in the approval process and determining when or whether regulatory approval will be obtained for any product candidate that we develop. Even if we believe the data collected from future clinical trials of our product candidates are promising, such data may not be sufficient to support approval by the FDA, EMA or any other comparable foreign regulatory authorities.

Even if we were to obtain approval, regulatory authorities may approve any of our product candidates for fewer or more limited indications than we request, may grant approval contingent on the performance of costly post-marketing clinical trials or may approve a product candidate with a label that does not include the labeling claims necessary or desirable for the successful commercialization of that product candidate. Additionally, outside of the United States, regulatory authorities may not approve the price we intend to charge for our products. Any of the foregoing scenarios could materially harm the commercial prospects for our product candidates.

The outcome of preclinical studies and earlier-stage clinical trials may not be predictive of future results or the success of later preclinical studies and clinical trials.

We are in the early stage of research in the development of our programs and have not conducted any clinical trials. As a result, our belief in the potential capabilities of our programs is based on early research and preclinical studies. However, the results of preclinical studies may not be predictive of the results of later

preclinical studies or clinical trials, and the results of any early-stage clinical trials may not be predictive of the results of later clinical trials. In addition, initial success in clinical trials may not be indicative of results obtained when such trials are completed. Moreover, preclinical and clinical data are often susceptible to varying interpretations and analyses, and many companies that have believed their product candidates performed satisfactorily in preclinical studies and clinical trials have nonetheless failed to obtain marketing approval of their products. Our future clinical trials may not ultimately be successful or support further clinical development of any product candidates we may develop. There is a high failure rate for product candidates proceeding through clinical trials. A number of companies in the pharmaceutical and biotechnology industries have suffered significant setbacks in clinical development even after achieving encouraging results in earlier studies. Any such setbacks in our clinical development could materially harm our business and results of operations.

We may incur unexpected costs or experience delays in completing, or ultimately be unable to complete, the development and commercialization of our product candidates.

We may experience numerous unforeseen events during, or as a result of, clinical trials that could delay or prevent our ability to receive marketing approval or commercialize our product candidates, including:

- regulators or institutional review boards, or IRBs, or independent ethics committees may not authorize us or our investigators to commence a clinical trial or conduct a clinical trial at a prospective trial site;
- we may experience delays in reaching, or fail to reach, agreement on acceptable clinical trial contracts or clinical trial protocols with prospective trial sites;
- regulators may decide that longer follow-up data are needed before they will consider our marketing application, which would delay our ability to obtain approval;
- regulators may decide the design of our clinical trials is flawed, for example if regulators do not agree with our chosen primary endpoints;
- regulators may decide to slow patient enrollment, resulting in delays to our ability to meet our timelines;
- clinical trials of our product candidates may produce negative or inconclusive results, and we may decide, or regulators may require us, to conduct additional clinical trials or abandon product development programs;
- preclinical testing may produce results based on which we may decide, or regulators may require us, to conduct additional preclinical studies before we proceed with certain clinical trials, limit the scope of our clinical trials, halt ongoing clinical trials or abandon product development programs;
- the number of patients required for clinical trials of our product candidates may be larger than we anticipate, enrollment in these clinical trials may be slower than we anticipate or participants may drop out of these clinical trials at a higher rate than we anticipate;
- our third-party contractors may fail to comply with regulatory requirements or meet their contractual obligations to us in a timely manner, or at all;
- regulators, IRBs or ethics committees may require us to perform additional or unanticipated clinical trials to obtain approval or we may be subject to additional post-marketing testing requirements to maintain regulatory approval, such as a CVOT;
- regulators may revise the requirements for approving our product candidates, or such requirements may not be as we anticipate;
- the cost of clinical trials of our product candidates may be greater than we anticipate;

- the supply or quality of our product candidates or other materials necessary to conduct clinical trials of our product candidates may be insufficient or inadequate;
- our product candidates may have undesirable side effects or other unexpected characteristics, causing us or our investigators, regulators, IRBs or ethics committees to suspend or terminate the trials; and
- regulators may withdraw their approval of a product or impose restrictions on its distribution, such as in the form of a risk evaluation and mitigation strategy, or REMS.

We could encounter delays if a clinical trial is suspended or terminated by us, by the IRBs of the institutions in which such trials are conducted or their ethics committees, by the data review committee or data safety monitoring board for such trial or by the FDA, EMA or other foreign regulatory authorities. Such authorities may suspend or terminate a clinical trial due to a number of factors, including failure to conduct the clinical trial in accordance with regulatory requirements or our clinical protocols, inspection of the clinical trial operations or trial site by the FDA, EMA or other foreign regulatory authorities resulting in the imposition of a clinical hold, unforeseen safety issues or adverse side effects, including those relating to the class of products to which our product candidates belong.

If we are required to conduct additional clinical trials or other testing of our product candidates beyond those that we currently contemplate, if we are unable to successfully complete clinical trials of our product candidates or other testing, if the results of these trials or tests are not positive or are only modestly positive or if there are safety concerns, we may:

- be delayed in obtaining marketing approval for our product candidates;
- not obtain marketing approval at all;
- obtain approval for indications or patient populations that are not as broad as intended or desired;
- obtain approval with labeling or a REMS that includes significant use or distribution restrictions or safety warnings;
- be subject to additional post-marketing testing requirements; or
- have the product removed from the market after obtaining marketing approval.

Our development costs will also increase if we experience delays in preclinical studies or clinical trials or in obtaining marketing approvals. We do not know whether any of our preclinical studies or clinical trials will begin as planned, will need to be restructured or will be completed on schedule, or at all. We may also determine to change the design or protocol of one or more of our clinical trials, including to add additional patients or arms, which could result in increased costs and expenses and/or delays. Significant preclinical study or clinical trial delays also could shorten any periods during which we may have the exclusive right to commercialize our product candidates or allow our competitors to bring products to market before we do and impair our ability to successfully commercialize our product candidates and may harm our business and results of operations.

Preclinical drug development is uncertain. Some or all of our preclinical programs may experience delays or may never advance to clinical trials, which would adversely affect our ability to obtain marketing approvals or commercialize these product candidates on a timely basis or at all, which would have an adverse effect on our business.

In order to obtain FDA approval to market a new biological product, we must demonstrate product purity (or product quality) as well as proof of safety and potency or efficacy in humans. To satisfy these requirements, we will have to conduct adequate and well-controlled clinical trials. Before we can commence clinical trials for a

product candidate, we must complete extensive preclinical testing and studies that support an IND in the United States. We have not yet submitted an IND to the FDA for any of our product candidates. We cannot be certain of the timely completion or outcome of our preclinical testing and studies, and we cannot predict if the FDA will accept our proposed clinical programs or if the outcome of our preclinical testing and studies will ultimately support the further development of these product candidates. As a result, we cannot be sure that we will be able to submit INDs or similar applications for any preclinical programs on the timelines we expect, if at all, and we cannot be sure that submission of INDs or similar applications will result in the FDA or other regulatory authorities allowing clinical trials to begin.

Conducting preclinical testing is a lengthy, time-consuming and expensive process. The length of time may vary substantially according to the type, complexity, novelty and intended use of the product candidate, and often can be several years or more per product candidate. Delays associated with product candidates for which we are conducting preclinical testing and studies ourselves may cause us to incur additional operating expenses. Moreover, we may be affected by delays associated with the preclinical testing and studies of certain product candidates conducted by our potential partners over which we have no control. The commencement and rate of completion of preclinical studies and clinical trials for a product candidate may be delayed by many factors, including, for example:

- inability to generate sufficient preclinical or other *in vivo* or *in vitro* data to support the initiation of clinical trials; and
- delays in reaching a consensus with regulatory agencies on study design.

Moreover, even if we do initiate clinical trials for other product candidates, our development efforts may not be successful, and clinical trials that we conduct or that third parties conduct on our behalf may not demonstrate product purity (or quality) as well as proof of safety and potency or efficacy necessary to obtain the requisite marketing approvals for any of our product candidates or product candidates employing our technology. Even if we obtain positive results from preclinical studies or initial clinical trials, we may not achieve the same success in future trials.

If we experience delays or difficulties in the enrollment of patients in clinical trials, our receipt of necessary regulatory approvals could be delayed or prevented.

Identifying and qualifying patients to participate in clinical trials for our product candidates is critical to our success. Successful and timely completion of clinical trials will require that we enroll a sufficient number of patients who remain in the trial until its conclusion. We may not be able to initiate or continue clinical trials for our product candidates if we are unable to locate and enroll a sufficient number of eligible patients to participate in these trials as required by the FDA or similar regulatory authorities outside of the United States. Given the large patient population for atherosclerotic cardiovascular disease, or ASCVD, if we expand clinical development of VERVE-101 for the treatment of patients with established ASCVD, the number of patients that may be required for clinical trials could be high, we may not be able to enroll a sufficient number of patients and we may not be able to initiate or complete clinical trials of VERVE-101 for the treatment of patients with established ASCVD. Because of the small patient population for homozygous familial hypercholesterolemia, or HoFH, we may have difficulty enrolling patients and we may not be able to initiate or complete clinical trials for our ANGPTL3 program for the treatment of HoFH.

Patient enrollment is affected by a variety of other factors, including:

- the prevalence and severity of the disease under investigation;
- the eligibility criteria for the trial in question;
- the perceived risks and benefits of the product candidate under trial;

- the requirements of the trial protocols, which for products targeting cardiovascular disease, or CVD, could include up to 15 years of long-term patient follow-up;
- the availability of existing treatments for the indications for which we are conducting clinical trials;
- the ability to recruit clinical trial investigators with the appropriate competencies and experience;
- the efforts to facilitate timely enrollment in clinical trials;
- the patient referral practices of physicians;
- the ability to monitor patients adequately during and after treatment;
- the proximity and availability of clinical trial sites for prospective patients;
- perceived negative public perception of gene editing;
- the conduct of clinical trials by competitors for product candidates that treat the same indications or address the same patient populations as our product candidates; and
- the cost to, or lack of adequate compensation for, prospective patients.

Other pharmaceutical and biotechnology companies have reported experiencing delays in enrollment in their ongoing clinical trials as a result of the COVID-19 pandemic, and we could also experience such delays. Our inability to locate and enroll a sufficient number of patients for our clinical trials would result in significant delays, could require us to abandon one or more clinical trials altogether and could delay or prevent our receipt of necessary regulatory approvals. Enrollment delays in our clinical trials may result in increased development costs for our product candidates, which would cause the value of our company to decline and limit our ability to obtain additional financing.

Even if we are able to enroll a sufficient number of patients for our future clinical trials, we may have difficulty maintaining patients in our clinical trials. Many of the patients who end up receiving placebo may perceive that they are not receiving the product candidate being tested, and they may decide to withdraw from our clinical trials to pursue alternative therapies rather than continue the trial. If we have difficulty enrolling or maintaining a sufficient number of patients to conduct our clinical trials, we may need to delay, limit or terminate clinical trials, any of which would harm our business, financial condition, results of operations and prospects.

If any of the product candidates we may develop, or the delivery modes we rely on to administer them, cause serious adverse events, undesirable side effects or unexpected characteristics, such events, side effects or characteristics could delay or prevent regulatory approval of the product candidates, limit the commercial potential or result in significant negative consequences following any potential marketing approval.

We have not evaluated any product candidates in human clinical trials. Moreover, there have been only a limited number of clinical trials involving the use of gene editing technologies and none involving base editing technology similar to our technology. Furthermore, there has not been any gene editing product candidate that has received regulatory approval for use in humans. It is impossible to predict when or if any product candidates we may develop will prove safe in humans. There can be no assurance that gene editing technologies will not cause undesirable side effects, as improper editing of a patient's DNA could lead to lymphoma, leukemia or other cancers or other aberrantly functioning cells.

A significant risk in any gene editing product candidate is that "off-target" edits may occur, which could cause serious adverse events, undesirable side effects or unexpected characteristics. We cannot be certain that off-target editing will not occur in any of our planned or future clinical studies, and the lack of observed side effects in preclinical studies does not guarantee that such side effects will not occur in human clinical studies.

There is also the potential risk of delayed or late presentation of adverse events following exposure to gene editors due to the potential permanence of edits to DNA or due to other components of product candidates used to carry the genetic material. Further, because gene editing makes a permanent change, the therapy cannot be withdrawn, even after a side effect is observed.

We intend to use lipid nanoparticles, or LNPs, to deliver our gene editors to the liver. LNPs have recently been used to deliver mRNA in humans, including the COVID-19 vaccines developed by Pfizer Inc., or Pfizer, and BioNTech SE and by Moderna, Inc., and LNPs are being used to deliver mRNA for therapeutic use in clinical trials. LNPs have the potential to induce liver injury and/or initiate a systemic inflammatory response, either of which could potentially be fatal. While we aim to continue to optimize our LNPs, there can be no assurance that our LNPs will not have undesired effects. Our LNPs could contribute, in whole or in part, to one or more of the following: liver injury, immune reactions, infusion reactions, complement reactions, opsonization reactions, antibody reactions including IgA, IgM, IgE or IgG or some combination thereof, or reactions to the polyethylene glycol, or PEG, from some lipids or PEG otherwise associated with the LNP. Certain aspects of our investigational medicines may induce immune reactions from either the mRNA or the lipid as well as adverse reactions within liver pathways or degradation of the mRNA or the LNP, any of which could lead to significant adverse events in one or more of our future clinical trials. Some of these types of adverse effects have been observed for other LNPs. There may be uncertainty as to the underlying cause of any such adverse event, which would make it difficult to accurately predict side effects in future clinical trials and would result in significant delays in our programs.

If any product candidates we develop are associated with serious adverse events, undesirable side effects or unexpected characteristics, we may need to abandon their development or limit development to certain uses or subpopulations in which the serious adverse events, undesirable side effects or other characteristics are less prevalent, less severe or more acceptable from a risk-benefit perspective, any of which would have a material adverse effect on our business, financial condition, results of operations and prospects.

If in the future we are unable to demonstrate that any of the above adverse events were caused by factors other than our product candidate, the FDA, the EMA or other regulatory authorities could order us to cease further development of, or deny approval of, any product candidates we are able to develop for any or all targeted indications. They could also revoke a marketing authorization if a serious safety concern is identified in any post-marketing follow up studies. Even if we are able to demonstrate that all future serious adverse events are not product-related, such occurrences could affect patient recruitment or the ability of enrolled patients to complete the trial. Moreover, if we elect, or are required, to delay, suspend or terminate any clinical trial of any product candidate we may develop, the commercial prospects of such product candidates may be harmed and our ability to generate product revenues from any of these product candidates may be delayed or eliminated. Any of these occurrences may harm our ability to identify and develop product candidates, and may harm our business, financial condition, result of operations, and prospects significantly.

Adverse public perception of genetic medicines, and gene editing and base editing in particular, may negatively impact regulatory approval of, and/or demand for, our potential products.

Our programs involve editing the human genome. The clinical and commercial success of our product candidates will depend in part on public understanding and acceptance of the use of gene editing therapy for the prevention or treatment of human diseases. Public attitudes may be influenced by claims that gene editing is unsafe, unethical or immoral, and, consequently, our product candidates may not gain the acceptance of the public or the medical community. Adverse public attitudes may adversely impact our ability to enroll clinical trials. Moreover, our success will depend upon physicians prescribing, and their patients being willing to receive, treatments that involve the use of product candidates we may develop in lieu of, or in addition to, existing treatments with which they are already familiar and for which greater clinical data may be available.

In addition, gene editing technology is subject to public debate and heightened regulatory scrutiny due to ethical concerns.

More restrictive government regulations or negative public opinion would have a negative effect on our business or financial condition and may delay or impair our development and commercialization of product candidates or demand for any product candidates we may develop. Adverse events in our preclinical studies or clinical trials or those of our licensors, partners or competitors or of academic researchers utilizing gene editing technologies, even if not ultimately attributable to product candidates we may identify and develop, and the resulting publicity could result in increased governmental regulation, unfavorable public perception, potential regulatory delays in the testing or approval of potential product candidates we may identify and develop, stricter labeling requirements for those product candidates that are approved and a decrease in demand for any such product candidates. Use of gene editing technology by a third party or government to develop biological agents or products that threaten U.S. national security could similarly result in such negative impacts to us.

Interim and preliminary results from our clinical trials that we announce or publish from time to time may change as more participant data become available and are subject to audit and verification procedures, which could result in material changes in the final data.

From time to time, we may publish or report interim or preliminary results from our clinical trials. Interim results from clinical trials that we may complete are subject to the risk that one or more of the clinical outcomes may materially change as participant enrollment continues and more participant data become available. We also make assumptions, estimations, calculations, and conclusions as part of our analyses of data, and we may not have received or had the opportunity to fully evaluate all data. Preliminary or top-line results also remain subject to audit and verification procedures that may result in the final data being materially different from the preliminary data we previously published. As a result, interim and preliminary data should be viewed with caution until the final data are available. Adverse differences between preliminary or interim data and final data could be material and could significantly harm our reputation and business prospects and may cause the trading price of our common stock to fluctuate significantly.

Genetic medicines are complex and difficult to manufacture. We could experience delays in satisfying regulatory authorities or production problems that result in delays in our development programs, limit the supply of our product candidates we may develop, or otherwise harm our business.

Any product candidates we may develop will likely require processing steps that are more complex than those required for most chemical pharmaceuticals. Moreover, unlike chemical pharmaceuticals, the physical and chemical properties of a biologic such as the product candidates we intend to develop generally cannot be fully characterized. As a result, assays of the finished product candidate may not be sufficient to ensure that the product candidate will perform in the intended manner. Problems with the manufacturing process, even minor deviations from the normal process, could result in product defects or manufacturing failures that result in lot failures, product recalls, product liability claims or insufficient inventory or potentially delay progression of our potential IND filings. If we successfully develop product candidates, we may encounter problems achieving adequate quantities and quality of clinical-grade materials that meet FDA, EMA or other comparable applicable foreign standards or specifications with consistent and acceptable production yields and costs. In addition, the product candidates we may develop will require complicated delivery modalities, such as LNPs, which will introduce additional complexities in the manufacturing process.

In addition, the FDA, the EMA and other regulatory authorities may require us to submit samples of any lot of any approved product together with the protocols showing the results of applicable tests at any time. Under some circumstances, the FDA, the EMA or other regulatory authorities may require that we not distribute a lot until the agency authorizes its release. Slight deviations in the manufacturing process, including those affecting

quality attributes and stability, may result in unacceptable changes in the product that could result in lot failures or product recalls. Lot failures or product recalls could cause us to delay clinical trials or product launches, which could be costly to us and otherwise harm our business, financial condition, results of operations and prospects.

We also may encounter problems hiring and retaining the experienced scientific, quality control and manufacturing personnel needed to manage our manufacturing process, which could result in delays in our production or difficulties in maintaining compliance with applicable regulatory requirements.

Given the nature of biologics manufacturing, there is a risk of contamination during manufacturing. Any contamination could materially harm our ability to produce product candidates on schedule and could harm our results of operations and cause reputational damage. Some of the raw materials that we anticipate will be required in our manufacturing process are derived from biologic sources. Such raw materials are difficult to procure and may be subject to contamination or recall. A material shortage, contamination, recall or restriction on the use of biologically derived substances in the manufacture of any product candidates we may develop could adversely impact or disrupt the commercial manufacturing or the production of clinical material, which could materially harm our development timelines and our business, financial condition, results of operations and prospects.

Any problems in our manufacturing process or the facilities with which we contract could make us a less attractive collaborator for potential partners, including larger pharmaceutical companies and academic research institutions, which could limit our access to additional attractive development programs. Problems in third-party manufacturing process or facilities also could restrict our ability to ensure sufficient clinical material for any clinical trials we may be conducting or are planning to conduct and meet market demand for any product candidates we develop and commercialize.

If any of our product candidates receives marketing approval and we, or others, later discover that the drug is less effective than previously believed or causes undesirable side effects that were not previously identified, our ability to market the drug could be compromised.

Clinical trials of our product candidates are conducted in carefully defined subsets of patients who have agreed to enter into clinical trials. Consequently, it is possible that our clinical trials may indicate an apparent positive effect of a product candidate that is greater than the actual positive effect, if any, or alternatively fail to identify undesirable side effects. If one or more of our product candidates receives regulatory approval, and we, or others, later discover that they are less effective than previously believed, or cause undesirable side effects, a number of potentially significant negative consequences could result, including:

- withdrawal or limitation by regulatory authorities of approvals of such product;
- seizure of the product by regulatory authorities;
- recall of the product;
- restrictions on the marketing of the product or the manufacturing process for any component thereof;
- requirement by regulatory authorities of additional warnings on the label, such as a “black box” warning or contraindication;
- requirement that we implement a REMS or create a medication guide outlining the risks of such side effects for distribution to patients;
- commitment to expensive post-marketing studies as a prerequisite of approval by regulatory authorities of such product;
- the product may become less competitive;

- initiation of regulatory investigations and government enforcement actions;
- initiation of legal action against us to hold us liable for harm caused to patients; and
- harm to our reputation and resulting harm to physician or patient acceptance of our products.

Any of these events could prevent us from achieving or maintaining market acceptance of a particular product candidate, if approved, and could significantly harm our business, financial condition, and results of operations.

We may expend our limited resources to pursue a particular product candidate or indication and fail to capitalize on product candidates or indications that may be more profitable or for which there is a greater likelihood of success.

Because we have limited financial and managerial resources, we may forego or delay pursuit of opportunities with other product candidates or for other indications that later prove to have greater commercial potential. Our resource allocation decisions may cause us to fail to capitalize on viable commercial products or profitable market opportunities. Our spending on current and future research and development programs and product candidates for specific indications may not yield any commercially viable products. If we do not accurately evaluate the commercial potential or target market for a particular product candidate, we may relinquish valuable rights to that product candidate through collaboration, licensing or other royalty arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to such product candidate. Failure to allocate resources or capitalize on strategies in a successful manner will have an adverse impact on our business, financial condition and results of operations.

We may conduct clinical trials at sites outside the United States. The FDA may not accept data from trials conducted in such locations, and the conduct of trials outside the United States could subject us to additional delays and expense.

We may conduct one or more of our clinical trials with one or more trial sites that are located outside the United States. Although the FDA may accept data from clinical trials conducted outside the United States, acceptance of these data is subject to conditions imposed by the FDA. For example, the clinical trial must be well designed and conducted and be performed by qualified investigators in accordance with ethical principles. The FDA must be able to validate the data from the trial through an onsite inspection, if necessary. The trial population must also adequately represent the U.S. population, and the data must be applicable to the U.S. population and U.S. medical practice in ways that the FDA deems clinically meaningful. In addition, while these clinical trials are subject to the applicable local laws, whether the FDA accepts the data will depend on its determination that the trials also complied with all applicable U.S. laws and regulations. There can be no assurance that the FDA will accept data from trials conducted outside of the United States. If the FDA does not accept the data from any trial that we conduct outside the United States, it would likely result in the need for additional trials, which would be costly and time-consuming and could delay or permanently halt our development of the applicable product candidates.

In addition, conducting clinical trials outside the United States could have a significant adverse impact on us. Risks inherent in conducting international clinical trials include:

- clinical practice patterns and standards of care that vary widely among countries;
- non-U.S. regulatory authority requirements that could restrict or limit our ability to conduct our clinical trials;
- administrative burdens of conducting clinical trials under multiple non-U.S. regulatory authority schema;
- foreign exchange fluctuations; and
- diminished protection of intellectual property in some countries.

Risks related to our dependence on third parties

We rely, and expect to continue to rely, on third parties to conduct some or all aspects of our product manufacturing, research and preclinical and clinical testing, and these third parties may not perform satisfactorily.

We do not expect to independently conduct all aspects of our product manufacturing, research and preclinical and clinical testing. We currently rely, and expect to continue to rely, on third parties with respect to many of these items, including CMOs for the manufacturing of any product candidates we test in preclinical or clinical development, as well as contract research organizations, or CROs for the conduct of our animal testing and research. Any of these third parties may terminate their engagements with us at any time. If we need to enter into alternative arrangements, it could delay our product development activities. Our reliance on these third parties for research and development activities will reduce our control over these activities but will not relieve us of our responsibility to ensure compliance with all required regulations and study protocols. For example, for product candidates that we develop and commercialize on our own, we will remain responsible for ensuring that each of our IND-enabling studies and clinical trials are conducted in accordance with the study plan and protocols.

Although we intend to design the clinical trials for any product candidates we may develop, CROs will conduct some or all of the clinical trials. As a result, many important aspects of our development programs, including their conduct and timing, will be outside of our direct control. Our reliance on third parties to conduct future preclinical studies and clinical trials will also result in less direct control over the management of data developed through preclinical studies and clinical trials than would be the case if we were relying entirely upon our own staff. Communicating with outside parties can also be challenging, potentially leading to mistakes as well as difficulties in coordinating activities. Outside parties may:

- have staffing difficulties;
- fail to comply with contractual obligations;
- experience regulatory compliance issues;
- undergo changes in priorities or become financially distressed; or
- form relationships with other entities, some of which may be our competitors.

These factors may materially adversely affect the willingness or ability of third parties to conduct our preclinical studies and clinical trials and may subject us to unexpected cost increases that are beyond our control. If the CROs and other third parties do not perform preclinical studies and future clinical trials in a satisfactory manner, breach their obligations to us or fail to comply with regulatory requirements, the development, regulatory approval and commercialization of any product candidates we may develop may be delayed, we may not be able to obtain regulatory approval and commercialize our product candidates or our development programs may be materially and irreversibly harmed. If we are unable to rely on preclinical and clinical data collected by our CROs and other third parties, we could be required to repeat, extend the duration of or increase the size of any preclinical studies or clinical trials we conduct and this could significantly delay commercialization and require greater expenditures.

If third parties do not successfully carry out their contractual duties, meet expected deadlines or conduct our studies in accordance with regulatory requirements or our stated study plans and protocols, we will not be able to complete, or may be delayed in completing, the preclinical studies and clinical trials required to support future IND submissions and approval of any product candidates we may develop.

Manufacturing biologic products is complex and subject to product loss for a variety of reasons. We contract with third parties for the manufacture of our product candidates for preclinical and clinical testing and expect to continue to do so for commercialization. This reliance on third parties increases the risk that we will not have sufficient quantities of our product candidates or products or such quantities at an acceptable cost or quality, which could delay, prevent or impair our development or commercialization efforts.

We do not own or operate, and currently have no plans to establish, any manufacturing facilities. We rely, and expect to continue to rely, on third parties for the manufacture of VERVE-101 and our other product candidates for preclinical and clinical testing, as well as for commercial manufacture if any of our product candidates receive marketing approval. We also rely on these third parties for packaging, labeling, sterilization, storage, distribution and other production logistics. This reliance on third parties increases the risk that we will not have sufficient quantities of our product candidates or products or such quantities at an acceptable cost or quality, which could delay, prevent or impair our development or commercialization efforts. We may be unable to establish any agreements with third-party manufacturers or to do so on acceptable terms. Even if we are able to establish agreements with third-party manufacturers, reliance on third-party manufacturers entails additional risks, including:

- reliance on the third party for regulatory compliance and quality assurance;
- the possible breach of the manufacturing agreement by the third party;
- the possible misappropriation of our proprietary information, including our trade secrets and know-how; and
- the possible termination or nonrenewal of the agreement by the third party at a time that is costly or inconvenient for us.

We or our third-party manufacturers may encounter shortages in the raw materials or active pharmaceutical ingredients necessary to produce our product candidates in the quantities needed for our clinical trials or, if our product candidates are approved, in sufficient quantities for commercialization or to meet an increase in demand, as a result of capacity constraints or delays or disruptions in the market for the raw materials or active pharmaceutical ingredients, including shortages caused by the purchase of such raw materials or active pharmaceutical ingredient by our competitors or others. The failure of us or our third-party manufacturers to obtain the raw materials or active pharmaceutical ingredients necessary to manufacture sufficient quantities of our product candidates may have a material adverse effect on our business.

Components of a finished therapeutic product approved for commercial sale or used in late-stage clinical trials must be manufactured in accordance with cGMP. Our third-party manufacturers are subject to inspection and approval by regulatory authorities before we can commence the manufacture and sale of any of our product candidates, and thereafter subject to ongoing inspection from time to time. Third-party manufacturers may not be able to comply with cGMP regulations or similar regulatory requirements outside of the United States. Our failure, or the failure of our third-party manufacturers, to comply with applicable regulations could result in regulatory actions, such as the issuance of FDA Form 483 notices of observations, warning letters or sanctions being imposed on us, including clinical holds, fines, injunctions, civil penalties, delays, suspension or withdrawal of approvals, license revocation, seizures or recalls of product candidates or products, operating restrictions and criminal prosecutions, any of which could significantly and adversely affect supplies of our products.

Manufacturing biologic products, such as VERVE-101, is complex, especially in large quantities. Biologic products must be made consistently and in compliance with a clearly defined manufacturing process. Accordingly, it is essential to be able to validate and control the manufacturing process to assure that it is reproducible. The manufacture of biologics is extremely susceptible to product loss due to contamination, equipment failure or improper installation or operation of equipment, vendor or operator error, inconsistency

in yields, variability in product characteristics and difficulties in scaling the product process. We have not yet scaled up the manufacturing process for any of our product candidates for potential commercialization. Even minor deviations from normal manufacturing processes could result in reduced production yields, product defects and other supply disruptions. If microbial, viral or other contaminations are discovered in our product candidates or in the manufacturing facilities in which our product candidates are made, such manufacturing facilities may need to be closed for an extended period of time to investigate and remedy the contamination, which could harm our results of operations and cause potential reputational damage. Our product candidates and any products that we may develop may compete with other product candidates and products for access to manufacturing facilities. As a result, we may not obtain access to these facilities on a priority basis or at all. There are a limited number of manufacturers that operate under cGMP regulations and that might be capable of manufacturing for us.

Any performance failure on the part of our existing or future manufacturers could delay clinical development or marketing approval. We do not currently have arrangements in place for redundant supply or a source for bulk drug substance nor do we have any agreements with third-party manufacturers for long-term commercial supply. If any of our future contract manufacturers cannot perform as agreed, we may be required to replace such manufacturers. Although we believe that there are several potential alternative manufacturers who could manufacture our product candidates, we may incur added costs and delays in identifying and qualifying any such replacement or be unable to reach agreement with an alternative manufacturer.

Our current and anticipated future dependence upon others for the manufacture of our product candidates or products may adversely affect our future profit margins and our ability to commercialize any products that receive marketing approval on a timely and competitive basis.

If any third-party manufacturer of our product candidates is unable to increase the scale of its production of our product candidates, and/or increase the product yield of its manufacturing, then our costs to manufacture the product candidate may increase and commercialization may be delayed.

In order to produce sufficient quantities to meet the demand for clinical trials and, if approved, subsequent commercialization of any current or future product candidates that we may develop, our third-party manufacturers will be required to increase their production and optimize their manufacturing processes while maintaining the quality of the product. The transition to larger scale production could prove difficult. In addition, if our third-party manufacturers are not able to optimize their manufacturing processes to increase the product yield for our product candidates, or if they are unable to produce increased amounts of our product candidates while maintaining the quality of the product, then we may not be able to meet the demands of clinical trials or market demands, which could decrease our ability to generate profits and have a material adverse impact on our business and results of operation.

We have entered into collaborations, and may enter into additional collaborations, with third parties for the research, development, manufacture and commercialization of programs or product candidates. If these collaborations are not successful, our business could be adversely affected.

As part of our strategy, we have entered into collaborations and intend to seek to enter into additional collaborations with third parties for one or more of our programs or product candidates. For example, in April 2019, we entered into the Beam Agreement to exclusively license certain of Beam's base editing, gene editing and delivery technology against certain cardiovascular targets for use in our product candidates, and in October 2020, we entered into the Acuitas Agreement to license from Acuitas its LNP delivery technology. Our likely collaborators for any other collaboration arrangements include large and mid-size pharmaceutical companies, regional and national pharmaceutical companies and biotechnology companies. We have under the Beam Agreement, and we may have under any other arrangements that we may enter into with any third parties,

limited control over the amount and timing of resources that collaborators dedicate to the development or commercialization of our product candidates. Our ability to generate revenue from these arrangements may depend on our collaborators' abilities to successfully perform the functions assigned to them in these arrangements.

Collaborations that we enter into may not be successful, and any success will depend heavily on the efforts and activities of such collaborators. Collaborations pose a number of risks, including the following:

- collaborators have significant discretion in determining the amount and timing of efforts and resources that they will apply to these collaborations;
- collaborators may not perform their obligations as expected;
- collaborators may not pursue development of our product candidates or may elect not to continue or renew development programs based on results of clinical trials or other studies, changes in the collaborators' strategic focus or available funding, or external factors, such as an acquisition, that divert resources or create competing priorities;
- collaborators may not pursue commercialization of any product candidates that achieve regulatory approval or may elect not to continue or renew commercialization programs based on results of clinical trials or other studies, changes in the collaborators' strategic focus or available funding, or external factors, such as an acquisition, that may divert resources or create competing priorities;
- collaborators may delay preclinical studies and clinical trials, provide insufficient funding for a preclinical study or clinical trial program, stop a preclinical study or clinical trial or abandon a product candidate, repeat or conduct new preclinical studies or clinical trials or require a new formulation of a product candidate for preclinical or clinical testing;
- we may not have access to, or may be restricted from disclosing, certain information regarding product candidates being developed or commercialized under a collaboration and, consequently, may have limited ability to inform our stockholders about the status of such product candidates on a discretionary basis;
- collaborators could independently develop, or develop with third parties, products that compete directly or indirectly with our product candidates and products if the collaborators believe that the competitive products are more likely to be successfully developed or can be commercialized under terms that are more economically attractive than ours;
- product candidates discovered in collaboration with us may be viewed by our collaborators as competitive with their own product candidates or products, which may cause collaborators to cease to devote resources to the commercialization of our product candidates;
- a collaborator may fail to comply with applicable regulatory requirements regarding the development, manufacture, distribution or marketing of a product candidate or product;
- a collaborator with marketing and distribution rights to one or more of our product candidates that achieve regulatory approval may not commit sufficient resources to the marketing and distribution of such product or products;
- disagreements with collaborators, including disagreements over intellectual property or proprietary rights, contract interpretation or the preferred course of development, might cause delays or terminations of the research, development or commercialization of product candidates, might lead to additional responsibilities for us with respect to product candidates, or might result in litigation or arbitration, any of which would be time-consuming and expensive;

- collaborators may not properly obtain, maintain, enforce, defend or protect our intellectual property or proprietary rights or may use our proprietary information in such a way as to potentially lead to disputes or legal proceedings that could jeopardize or invalidate our intellectual property or proprietary information or expose us to potential litigation;
- disputes may arise with respect to the ownership of intellectual property developed pursuant to our collaborations;
- collaborators may infringe, misappropriate or otherwise violate the intellectual property or proprietary rights of third parties, which may expose us to litigation and potential liability; and
- collaborations may be terminated for the convenience of the collaborator, and, if terminated, we could be required to raise additional capital to pursue further development or commercialization of the applicable product candidates.

Collaboration agreements may not lead to development or commercialization of product candidates in the most efficient manner, or at all. If any current or future collaborations do not result in the successful development and commercialization of products or if one of our collaborators terminates its agreement with us, we may not receive any future research funding or milestone or royalty payments under the collaboration. If we do not receive the funding we expect under these agreements, our development of our product candidates could be delayed and we may need additional resources to develop our product candidates. All of the risks relating to product development, regulatory approval and commercialization described in this prospectus also apply to the activities of our collaborators.

Collaboration agreements may require us to incur non-recurring and other charges, increase our near- and long-term expenditures, issue securities that dilute our existing stockholders, or disrupt our management and business. For example, upon execution of the Beam Agreement, we issued 2,556,322 shares of our common stock to Beam. In addition, under the Cas9 License Agreement, we issued 1,278,161 shares of our common stock to Broad and Harvard. Broad and Harvard also have anti-dilution rights, pursuant to which we have issued Broad and Harvard an additional 2,863,766 shares of our common stock in the aggregate following the completion of preferred stock financings. We also expect to issue additional shares of common stock to Broad and Harvard upon the closing of this offering pursuant to the Cas9 License Agreement, based on our issuance and sale of shares of our common stock in this offering and assuming our post-money valuation exceeds $500 million as further described under “Description of capital stock—License agreement with The Broad Institute and the President and Fellows of Harvard College—Expected issuance of shares in a private placement in connection with this offering.”

We could face significant competition in seeking appropriate collaborators, and the negotiation process is time-consuming and complex. Our ability to reach a definitive collaboration agreement will depend, among other things, upon our assessment of the collaborator’s resources and expertise, the terms and conditions of the proposed collaboration, and the proposed collaborator’s evaluation of several factors. If we license rights to any product candidates we or our collaborators may develop, we may not be able to realize the benefit of such transactions if we are unable to successfully integrate them with our existing operations and company culture.

Additionally, subject to its contractual obligations to us, if a collaborator of ours is involved in a business combination, the collaborator might deemphasize or terminate the development or commercialization of any product candidate licensed to it by us. If one of our collaborators terminates its agreement with us, we may find it more difficult to attract new collaborators and our perception in the business and financial communities could be adversely affected.

If we are not able to establish or maintain collaborations on commercially reasonable terms, we may have to alter our development and commercialization plans and our business could be adversely affected.

We face significant competition in attracting appropriate collaborators, and a number of more established companies may also be pursuing strategies to license or acquire third-party intellectual property rights that we consider attractive. These established companies may have a competitive advantage over us due to their size, financial resources and greater clinical development and commercialization capabilities. In addition, companies that perceive us to be a competitor may be unwilling to assign or license rights to us. Whether we reach a definitive agreement for a collaboration will depend, among other things, upon our assessment of the collaborator's resources and expertise, the terms and conditions of the proposed collaboration and the proposed collaborator's evaluation of a number of factors. Those factors may include the design or results of clinical trials, the likelihood of approval by the FDA, EMA or other regulatory authorities, the potential market for the subject product candidate, the costs and complexities of manufacturing and delivering such product candidate to patients, the potential of competing products, the existence of uncertainty with respect to our ownership of technology, which can exist if there is a challenge to such ownership without regard to the merits of the challenge, the terms of any existing collaboration agreements, and industry and market conditions generally. The collaborator may also have the opportunity to collaborate on other product candidates or technologies for similar indications and will have to evaluate whether such a collaboration could be more attractive than the one with us for our product candidate.

We may also be restricted under existing or future license agreements from entering into agreements on certain terms with potential collaborators.

Collaborations are complex and time-consuming to negotiate, document and execute. In addition, consolidation among large pharmaceutical and biotechnology companies has reduced the number of potential future collaborators.

We may not be able to negotiate additional collaborations on a timely basis, on acceptable terms or at all. If we are unable to do so, we may have to curtail the development of the product candidate for which we are seeking to collaborate, reduce or delay its development program or one or more of our other development programs, delay its potential commercialization or reduce the scope of any sales or marketing activities, or increase our expenditures and undertake development or commercialization activities at our own expense. If we elect to fund and undertake development or commercialization activities on our own, we may need to obtain additional expertise and additional capital, which may not be available to us on acceptable terms or at all. If we fail to enter into collaborations and do not have sufficient funds or expertise to undertake the necessary development and commercialization activities, we may not be able to further develop our product candidates or bring them to market.

We depend on single-source suppliers for some of the components and materials used in our product candidates.

We depend on single-source suppliers for some of the components and materials used in our product candidates. We cannot ensure that these suppliers or service providers will remain in business, have sufficient capacity or supply to meet our needs or that they will not be purchased by one of our competitors or another company that is not interested in continuing to work with us. Our use of single-source suppliers of raw materials, components, key processes and finished goods exposes us to several risks, including disruptions in supply, price increases or late deliveries. There are, in general, relatively few alternative sources of supply for substitute components. These vendors may be unable or unwilling to meet our future demands for our clinical trials or commercial sale. Establishing additional or replacement suppliers for these components, materials and processes could take a substantial amount of time and it may be difficult to establish replacement suppliers

who meet regulatory requirements. Any disruption in supply from any single-source supplier or service provider could lead to supply delays or interruptions, which would damage our business, financial condition, results of operations and prospects.

If we have to switch to a replacement supplier, the manufacture and delivery of any product candidates we may develop could be interrupted for an extended period, which could adversely affect our business. Establishing additional or replacement suppliers, if required, may not be accomplished quickly. If we are able to find a replacement supplier, the replacement supplier would need to be qualified and may require additional regulatory authority approval, which could result in further delay. While we seek to maintain adequate inventory of the single source components and materials used in our products, any interruption or delay in the supply of components or materials, or our inability to obtain components or materials from alternate sources at acceptable prices in a timely manner, could impair our ability to meet the demand for our product candidates.

Risks related to our intellectual property

If we or our licensors are unable to obtain, maintain, defend and enforce patent rights that cover our gene editing technology and product candidates or if the scope of the patent protection obtained is not sufficiently broad, our competitors could develop and commercialize technology and products similar or identical to ours, and our ability to successfully develop and commercialize our technology and product candidates may be adversely affected.

Our success depends in large part on our ability to obtain, maintain, defend, and enforce protection of the intellectual property we may own solely and jointly with others or may license from others, particularly patents, in the United States and other countries with respect to proprietary technology and product candidates we develop. It is difficult and costly to protect our gene editing technologies and product candidates, and we may not be able to ensure their protection. Our ability to stop unauthorized third parties from making, using, selling, offering to sell, importing or otherwise commercializing our product candidates we may develop, or operatively similar products, is dependent upon the extent to which we have rights under valid and enforceable patents or trade secrets that cover these activities.

We seek to protect our proprietary position by filing patent applications in the United States and abroad related to our product candidates that are important to our business and by in-licensing intellectual property related to our technologies and product candidates. If we are unable to obtain or maintain patent protection with respect to any proprietary technology or product candidate, our business, financial condition, results of operations and prospects could be materially harmed. Failure to obtain protection including patent protection, may be a result of specific legal and factual circumstances that may preclude the availability of protection for our product candidates in the United States or any given country. For example, inadequate, faulty or erroneous patent prosecution may result in diminution, loss or unavailability of patent rights that adequately cover our products. Patent disclosures and claims that are intended to cover our product candidates that are sufficient or allowable in one country may not be sufficient or allowable in another country. The requirements for filing a patent application in the United States may not be sufficient to support a patent filing in a country or region outside the United States.

The patent prosecution process is expensive, time-consuming and complex, and we may not be able to file, prosecute, maintain, defend or license all necessary or desirable patent applications at a reasonable cost or in a timely manner. In addition, our ability to obtain and maintain valid and enforceable patents depends on whether the differences between our inventions and the prior art allow our inventions to be patentable over the prior art. It is also possible that we will fail to identify patentable aspects of our research and development output before it is too late to obtain patent protection. Moreover, in some circumstances, we do not have the right to control the preparation, filing and prosecution of patent applications, or to maintain, enforce and

defend the patents, covering technology that we license from third parties. Therefore, these in-licensed patents and applications may not be prepared, filed, prosecuted, maintained, defended and enforced in a manner consistent with the best interests of our business.

The patent position of pharmaceutical and biotechnology companies generally is highly uncertain, involves complex legal and factual questions and has in recent years been the subject of much litigation. The field of gene editing especially has been the subject of extensive patenting activity and litigation. In addition, the scope of patent protection outside of the United States is uncertain and laws of foreign countries may not protect our rights to the same extent as the laws of the United States or vice versa. For example, European patent law restricts the patentability of methods of treatment of the human body more than United States law does.

With respect to both owned and in-licensed patent rights, we cannot predict whether the patent applications we and our licensors are currently pursuing will issue as patents in any particular jurisdiction or whether the claims of any issued patents will provide sufficient protection from competitors. Further, we may not be aware of all third-party intellectual property rights potentially relating to our product candidates.

In addition, publications of discoveries in the scientific literature often lag behind the actual discoveries, and patent applications in the United States and other jurisdictions are typically not published until 18 months after filing, or in some cases not published at all. Therefore, neither we nor our licensors can know with certainty whether either we or our licensors were the first to make the inventions claimed in the patents and patent applications we own or in-license now or in the future, or that either we or our licensors were the first to file for patent protection of such inventions. As a result, the issuance, scope, validity, enforceability and commercial value of our owned and in-licensed patent rights are highly uncertain. Moreover, our owned and in-licensed pending and future patent applications may not result in patents being issued which protect our technology and product candidates, in whole or in part, or which effectively prevent others from commercializing competitive technologies and products. Changes in either the patent laws or interpretation of the patent laws in the United States and other countries may diminish the value of our patents and our ability to obtain, protect, maintain, defend and enforce our patent rights, narrow the scope of our patent protection and, more generally, could affect the value or narrow the scope of our patent rights.

Moreover, we or our licensors may be subject to a third-party preissuance submission of prior art to the United States Patent and Trademark Office, or USPTO, or become involved in opposition, derivation, revocation, reexamination, *inter partes* review, post-grant review or interference proceedings challenging our patent rights or the patent rights of others. An adverse determination in any such submission, proceeding or litigation could reduce the scope of, or invalidate, our patent rights, allow third parties to commercialize our technology or product candidates and compete directly with us, without payment to us, or result in our inability to manufacture or commercialize drugs without infringing third-party patent rights. If the breadth or strength of protection provided by our patents and patent applications is threatened, regardless of the outcome, it could dissuade companies from collaborating with us to license, develop or commercialize current or future product candidates.

Additionally, the coverage claimed in a patent application can be significantly reduced before the patent is issued, and its scope can be reinterpreted after issuance. Even if our owned and in-licensed patent applications issue as patents, they may not issue in a form that will provide us with any meaningful protection, prevent competitors from competing with us or otherwise provide us with any competitive advantage. The issuance of a patent is not conclusive as to its inventorship, scope, validity or enforceability, and our owned and in-licensed patents may be challenged in the courts or patent offices in the United States and abroad. Such challenges may result in loss of exclusivity or freedom to operate or in patent claims being narrowed, invalidated or held unenforceable, in whole or in part, which could limit our ability to stop others from using or commercializing similar or identical technology and products, or limit the duration of the patent protection of our technology

and product candidates. Such proceedings also may result in substantial cost and require significant time from our management and employees, even if the eventual outcome is favorable to us. Given the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized. Furthermore, our competitors may be able to circumvent our owned or in-licensed patents by developing similar or alternative technologies or products in a non-infringing manner. As a result, our owned and in-licensed patent portfolio may not provide us with sufficient rights to exclude others from commercializing technology and products similar or identical to any of our technology and product candidates.

Our rights to develop and commercialize our gene editing technology and product candidates are subject, in part, to the terms and conditions of licenses granted to us by others.

We depend on intellectual property licensed from third parties, and our licensors may not always act in our best interest. If we fail to comply with our obligations under our intellectual property licenses, if the licenses are terminated, or if disputes regarding these licenses arise, we could lose significant rights that are important to our business.

We have licensed and are dependent on certain patent rights and proprietary technology from third parties that are important or necessary to the development of our gene editing technology and product candidates. For example, we are a party to the Beam Agreement, the Cas9 License Agreement, the Acuitas Agreement and other license agreements, pursuant to which we in-license key patents and patent applications for our gene editing technology, LNP technology and product candidates. These license agreements impose various diligence, milestone payment, royalty, insurance and other obligations on us. If we fail to comply with these obligations, our licensors may have the right to terminate our license, in which event we would not be able to develop or market our gene editing technology or product candidates covered by the intellectual property licensed under these agreements. For more information regarding these agreements, please see “Business—Intellectual property licenses.”

These and other licenses may not provide exclusive rights to use such intellectual property and technology in all relevant fields of use and in all territories in which we may wish to develop or commercialize our gene editing technology and product candidates in the future. Some licenses granted to us are expressly subject to certain preexisting rights held by the licensor or certain third parties. As a result, we may not be able to prevent competitors from developing and commercializing competitive products in certain territories or fields. If we determine that rights to such excluded fields are necessary to commercialize our product candidates or maintain our competitive advantage, we may need to obtain a license from such third party in order to continue developing, manufacturing or marketing our product candidates. We may not be able to obtain such a license on an exclusive basis, on commercially reasonable terms, or at all, which could prevent us from commercializing our product candidates or allow our competitors or others the chance to access technology that is important to our business.

In addition, pursuant to the Cas9 License Agreement, under certain specific circumstances, Harvard and Broad may grant a license to the patents that are the subject of such license agreements to a third party in the same field as such patents are licensed to us. Such third party may then have full rights that are the subject of the Cas9 License Agreement, which could impact our competitive position and enable a third party to commercialize products similar to our potential future product candidates and technology. Any grant of rights to a third party in this scenario would narrow the scope of our exclusive rights to the patents and patent applications we have in-licensed from Harvard and Broad.

We do not have complete control in the preparation, filing, prosecution, maintenance, enforcement and defense of patents and patent applications covering the technology that we license from third parties. It is possible that our licensors’ enforcement of patents against infringers or defense of such patents against challenges of

validity or claims of enforceability may be less vigorous than if we had conducted them ourselves, or may not be conducted in accordance with our best interests. We cannot be certain that these patents and patent applications will be prepared, filed, prosecuted, maintained, enforced and defended in a manner consistent with the best interests of our business. If our licensors fail to prosecute, maintain, enforce and defend such patents, or lose rights to those patents or patent applications, the rights we have licensed may be reduced or eliminated, our right to develop and commercialize any of our product candidates we may develop that are the subject of such licensed rights could be adversely affected and we may not be able to prevent competitors from making, using and selling competing products.

Our licensors may have relied on third-party consultants or collaborators or on funds from third parties such that our licensors are not the sole and exclusive owners of the patents we in-licensed. If other third parties have ownership rights to our in-licensed patents, the license granted to us in jurisdictions where the consent of a co-owner is necessary to grant such a license may not be valid and such co-owners may be able to license such patents to our competitors, and our competitors could market competing products and technology. In addition, our rights to our in-licensed patents and patent applications are dependent, in part, on inter-institutional or other operating agreements between the joint owners of such in-licensed patents and patent applications. If one or more of such joint owners breaches such inter-institutional or operating agreements, our rights to such in-licensed patents and patent applications may be adversely affected. Any of these events could have a material adverse effect on our competitive position, business, financial conditions, results of operations and prospects.

Furthermore, inventions contained within some of our in-licensed patents and patent applications were made using U.S. government funding. We rely on our licensors to ensure compliance with applicable obligations arising from such funding, such as timely reporting, an obligation associated with our in-licensed patents and patent applications. The failure of our licensors to meet their obligations may lead to a loss of rights or the unenforceability of relevant patents. For example, the U.S. government could have certain rights in such in-licensed patents, including a non-exclusive license authorizing the U.S. government to use the invention or to have others use the invention on its behalf. If the U.S. government decides to exercise these rights, it is not required to engage us as its contractor in connection with doing so. The U.S. government’s rights may also permit it to disclose the funded inventions and technology to third parties and to exercise march-in rights to use or allow third parties to use the technology we have licensed that was developed using U.S. government funding. The U.S. government may also exercise its march-in rights if it determines that action is necessary because we or our licensors failed to achieve practical application of the U.S. government-funded technology, because action is necessary to alleviate health or safety needs, to meet requirements of federal regulations or to give preference to U.S. industry. In addition, our rights in such in-licensed U.S. government-funded inventions may be subject to certain requirements to manufacture product candidates embodying such inventions in the United States. Any of the foregoing could harm our business, financial condition, results of operations and prospects significantly.

In the event any of our third-party licensors determine that, in spite of our efforts, we have materially breached a license agreement or have failed to meet certain obligations thereunder, it may elect to terminate the applicable license agreement or, in some cases, one or more license(s) under the applicable license agreement, and such termination would result in us no longer having the ability to develop and commercialize product candidates and technology covered by that license agreement or license. In the event of such termination of a third-party in-license, or if the underlying patents under a third-party in-license fail to provide the intended exclusivity, competitors would have the freedom to seek regulatory approval of, and to market, products identical to ours. Any of these events could have a material adverse effect on our competitive position, business, financial conditions, results of operations and prospects.

Our owned patent applications and in-licensed patents and patent applications and other intellectual property may be subject to priority or inventorship disputes, interferences and similar proceedings. If we or our licensors are unsuccessful in any of these proceedings, we may be required to obtain licenses from third parties, which may not be available on commercially reasonable terms or at all, or to cease the development, manufacture, and commercialization of one or more of the product candidates we may develop, which could have a material adverse impact on our business.

Certain of the U.S. patents and one U.S. patent application to which we hold an option are co-owned by Broad and MIT, and in some cases co-owned by Broad, MIT and Harvard, which we refer to together as the Boston Licensing Parties, and were involved in U.S. Interference No. 106,048 with one U.S. patent application co-owned by the University of California, the University of Vienna, and Emmanuelle Charpentier, which we refer to together as CVC. On September 10, 2018, the Court of Appeals for the Federal Circuit, or the CAFC, affirmed the Patent Trial and Appeal Board of the USPTO's, or PTAB's, holding that there was no interference-in-fact. An interference is a proceeding within the USPTO to determine priority of invention of the subject matter of patent claims filed by different parties.

On June 24, 2019, the PTAB declared an interference (U.S. Interference No. 106,115) between 10 U.S. patent applications that are co-owned by CVC, and 13 U.S. patents and one U.S. patent application (that are co-owned by the Boston Licensing Parties). In the declared interference, CVC has been designated as the junior party and the Boston Licensing Parties have been designated as the senior party.

On December 20, 2020, the PTAB declared an interference (U.S. Interference No. 106,126) between one U.S. patent application owned by Toolgen, Inc. and 14 U.S. patents and two U.S. patent applications that are co-owned by the Boston Licensing Parties. In the declared interference, Boston Licensing Parties have been designated as the junior party and Toolgen, Inc. has been designated as the senior party.

As a result of the declaration of interference, an adversarial proceeding in the USPTO before the PTAB has been initiated, which is declared to ultimately determine priority, specifically and which party was first to invent the claimed subject matter. An interference is typically divided into two phases. The first phase is referred to as the motions or preliminary motions phase while the second is referred to as the priority phase. In the first phase, each party may raise issues including but not limited to those relating to the patentability of a party's claims based on prior art, written description, and enablement. A party also may seek an earlier priority benefit or may challenge whether the declaration of interference was proper in the first place. Priority, or a determination of who first invented the commonly claimed invention, is determined in the second phase of an interference. Although we cannot predict with any certainty how long each phase will actually take, each phase may take approximately a year or longer before a decision is made by the PTAB. It is possible for motions filed in the preliminary motions phase to be dispositive of the interference proceeding, such that the second priority phase is not reached.

There can be no assurance that the U.S. interference will be resolved in favor of the Boston Licensing Parties. If the 106,115 or 106,126 interference resolves in favor of CVC or Toolgen, Inc. respectively, or if the Boston Licensing Parties' patents and patent application are narrowed, invalidated, or held unenforceable, we will lose the ability to license the optioned patents and patent application and our ability to commercialize our product candidates may be adversely affected if we cannot obtain a license to relevant third-party patents that cover our product candidates. We may not be able to obtain any required license on commercially reasonable terms or at all. Even if we were able to obtain a license, it could be nonexclusive, thereby giving our competitors and other third parties access to the same technologies licensed to us, and it could require us to make substantial licensing and royalty payments. If we are unable to obtain a necessary license to a third-party patent on commercially reasonable terms, we may be unable to commercialize our gene editing technology or product candidates or such commercialization efforts may be significantly delayed, which could in turn significantly harm our business.

We or our licensors may also be subject to claims that former employees, collaborators, or other third parties have an interest in our owned patent applications or in-licensed patents or patent applications or other intellectual property as an inventor or co-inventor. If we are unable to obtain an exclusive license to any such third-party co-owners' interest in such patent applications, such co-owners rights may be subject, or in the future subject, to assignment or license to other third parties, including our competitors. In addition, we may need the cooperation of any such co-owners to enforce any patents that issue from such patent applications against third parties, and such cooperation may not be provided to us.

If we or our licensors are unsuccessful in any interference proceedings or other priority, validity (including any patent oppositions) or inventorship disputes to which we or they are subject, we may lose valuable intellectual property rights through the loss of one or more of our owned, licensed or optioned patents, or such patent claims may be narrowed, invalidated or held unenforceable, or through loss of exclusive ownership of or the exclusive right to use our owned or in-licensed patents. In the event of loss of patent rights as a result of any of these disputes, we may be required to obtain and maintain licenses from third parties, including parties involved in any such interference proceedings or other priority or inventorship disputes. Such licenses may not be available on commercially reasonable terms or at all, or may be non-exclusive. If we are unable to obtain and maintain such licenses, we may need to cease the development, manufacture and commercialization of one or more of the product candidates we may develop. The loss of exclusivity or the narrowing of our patent claims could limit our ability to stop others from using or commercializing similar or identical technology and product candidates. Even if we or our licensors are successful in an interference proceeding, other similar priority disputes, or inventorship or ownership disputes, it could result in substantial costs and be a distraction to management and other employees. Any of the foregoing could result in a material adverse effect on our business, financial condition, results of operations or prospects.

If we fail to comply with our obligations in our intellectual property licenses arrangements with third parties, or otherwise experience disruptions to our business relationships with our licensors, we could lose intellectual property rights that are important to our business.

We are party to agreements, and we may enter into additional arrangements, with third parties that may impose diligence, development and commercialization timelines, milestone payment, royalty, insurance and other obligations on us. We have existing agreements, pursuant to which we are obligated to pay royalties on net product sales of product candidates or related technologies to the extent they are covered by the agreements. If we fail to comply with such obligations under current or future agreements, our counterparties may have the right to terminate these agreements or require us to grant them certain rights. Such an occurrence could materially adversely affect the value of any product candidate being developed under any such agreement. Termination of these agreements or reduction or elimination of our rights under these agreements may result in our having to negotiate new or reinstated agreements with less favorable terms, or cause us to lose our rights under these agreements, including our rights to important intellectual property or technology, which would have a material adverse effect on our business, financial condition, results of operations and prospects. While we still face all of the risks described herein with respect to those agreements, we cannot prevent third parties from also accessing those technologies. In addition, our licenses may place restrictions on our future business opportunities.

Disputes may arise regarding intellectual property subject to a licensing agreement, including:

- the scope of rights granted under the agreement and other interpretation related issues;
- the extent to which our technology and processes infringe on intellectual property of the licensor that is not subject to the licensing agreement;
- the sublicensing of patent and other rights under our collaborative development relationships;

- our diligence obligations under the agreement and what activities satisfy those diligence obligations;
- the inventorship and ownership of inventions and know-how resulting from the joint creation or use of intellectual property by our licensors and us and our partners; and
- the priority of invention of patented technology.

In addition, the agreements under which we currently license intellectual property or technology from third parties are complex, and certain provisions in such agreements may be susceptible to multiple interpretations. The resolution of any contract interpretation disagreement that may arise could narrow what we believe to be the scope of our rights to the relevant intellectual property or technology, or increase what we believe to be our financial or other obligations under the relevant agreement, either of which could have a material adverse effect on our business, financial condition, results of operations and prospects. Moreover, if disputes over intellectual property that we have licensed prevent or impair our ability to maintain our current licensing arrangements on commercially acceptable terms, we may be unable to successfully develop and commercialize the affected technology and product candidates, which could have a material adverse effect on our business, financial conditions, results of operations and prospects.

Our current or future licensors may have relied on third-party consultants or collaborators or on funds from third parties such that our licensors are not the sole and exclusive owners of the intellectual property or intellectual property rights we in-license. If other third parties have ownership rights to intellectual property or intellectual property rights we in-license, they may be able to license such intellectual property or intellectual property rights to our competitors, and our competitors could market competing products and technology. This could have a material adverse effect on our competitive position, business, financial conditions, results of operations and prospects.

In spite of our best efforts, our licensors might conclude that we have materially breached our license agreements and might therefore terminate the license agreements, thereby removing our ability to develop and commercialize product candidates and technology covered by these license agreements. If these in-licenses are terminated, or if the underlying intellectual property fails to provide the intended exclusivity, competitors would have the freedom to seek regulatory approval of, and to market, products and technologies identical to ours. This could have a material adverse effect on our competitive position, business, financial condition, results of operations and prospects.

If we are unable to obtain licenses from third parties on commercially reasonable terms or fail to comply with our obligations under such agreements, our business could be harmed.

We currently have rights to intellectual property, through licenses from third parties, to identify and develop product candidates, and we expect to seek to expand our product candidate pipeline in part by in-licensing the rights to key technologies. Although we have succeeded in licensing technologies from third-party licensors including Harvard, Broad, Beam, and Acuitas in the past, we cannot assure you that we will be able to in-license or acquire the rights to any product candidates or technologies from third parties on acceptable terms or at all.

Various third parties practice in competitive technology areas and may have issued patents or patent applications that will issue as patents in the future, which could impede or preclude our ability to commercialize our product candidates. For any third-party patents that could be relevant to our product candidates, we rely in part on the “safe harbor” or research exemption under 35 U.S.C. § 271(e)(1), which exempts from patent infringement activities related to pursuing FDA approval for a drug product. However, while U.S. patent law provides such a “safe harbor” to our clinical product candidates under this provision, that exemption expires when an IND or BLA is submitted. Given the uncertainty of clinical trials, we cannot be certain of the timing of their completion and it is possible that we may submit a BLA for one of our product candidates at a time when one or more relevant third-party patents is in force.

It may therefore be necessary for us to use the patented or proprietary technology of third parties to commercialize our products, in which case we would be required to obtain a license from these third parties. If we are unable to license such technology, or if we are forced to license such technology on unfavorable terms, our business could be materially harmed. If we are unable to obtain a necessary license, we may be unable to develop or commercialize the affected product candidates, which could materially harm our business and the third parties owning such intellectual property rights could seek either an injunction prohibiting our sales or an obligation on our part to pay royalties and/or other forms of compensation. Even if we are able to obtain a license, it may be non-exclusive, thereby giving our competitors access to the same technologies licensed to us.

Furthermore, there has been extensive patenting activity in the field of gene editing, and pharmaceutical companies, biotechnology companies, and academic institutions are competing with us or are expected to compete with us in the in the field of gene editing technology and filing patent applications potentially relevant to our business, and there may be third-party patent applications that, if issued, may allow the third party to circumvent our patent rights. Because of the large number of patents issued and patent applications filed in our field, these and other third parties could allege they have patent rights encompassing our product candidates, technologies or methods. In order to market our product candidates, we may find it necessary or prudent to obtain licenses from such third-party intellectual property holders. However, we may be unable to secure such licenses or otherwise acquire or in-license any compositions, methods of use, processes, or other intellectual property rights from third parties that we identify as necessary for product candidates and gene editing technology we may develop. We may also require licenses from third parties for certain gene editing technologies including certain delivery and gene editing compositions and methods that we are evaluating, or may in the future evaluate, for use with product candidates we may develop. In addition, some of our owned patent applications and in-licensed patents and patent applications may be determined to be co-owned with third parties. With respect to any patents co-owned with third parties, we may require licenses to such co-owners' interest to such patents. If we are unable to obtain an exclusive license to any such third-party co-owners' interest in such patents or patent applications, such co-owners may be able to license their rights to other third parties, including our competitors, and our competitors could market competing products and technology. In addition, we may need the cooperation of any such co-owners of our patents in order to enforce such patents against third parties, and such cooperation may not be provided to us.

Additionally, we may collaborate with academic institutions to accelerate our preclinical research or development under written agreements with these institutions. In certain cases, these institutions provide us with an option to negotiate a license to any of the institution's rights in technology resulting from the collaboration. Even if we hold such an option, we may be unable to negotiate a license from the institution within the specified timeframe or under terms that are acceptable to us. If we are unable to do so, the institution may offer the intellectual property rights to others, potentially blocking our ability to pursue our program.

In addition, the licensing or acquisition of third-party intellectual property rights is a highly competitive area, and a number of more established companies are also pursuing strategies to license or acquire third party intellectual property rights that we may consider attractive or necessary. These established companies may have a competitive advantage over us due to their size, capital resources and greater clinical development and commercialization capabilities. In addition, companies that perceive us to be a competitor may be unwilling to assign or license rights to us. We also may be unable to license or acquire third party intellectual property rights on terms that would allow us to make an appropriate return on our investment or at all. If we are unable to successfully obtain rights to required third party intellectual property rights or maintain the existing intellectual property rights we have, we may have to abandon development of the relevant program or product candidate, which could have a material adverse effect on our business, financial condition, results of operations, and prospects.

If we are unable to obtain rights to required third-party intellectual property rights or maintain the existing intellectual property rights we have, we may be required to expend significant time and resources to redesign our technology, product candidates, or the methods for manufacturing them or to develop or license replacement technology, all of which may not be feasible on a technical or commercial basis. If we are unable to do so, we may be unable to develop or commercialize the affected technology and product candidates, which could harm our business, financial condition, results of operations and prospects significantly.

Additionally, if we fail to comply with our obligations under license agreements, our counterparties may have the right to terminate these agreements, in which event we might not be able to develop, manufacture or market, or may be forced to cease developing, manufacturing or marketing, any product that is covered by these agreements or may face other penalties under such agreements. Such an occurrence could materially adversely affect the value of the product candidate being developed under any such agreement. Termination of these agreements or reduction or elimination of our rights under these agreements, or restrictions on our ability to freely assign or sublicense our rights under such agreements when it is in the interest of our business to do so, may result in our having to negotiate new or reinstated agreements with less favorable terms, cause us to lose our rights under these agreements, including our rights to important intellectual property or technology or impede, or delay or prohibit the further development or commercialization of one or more product candidates that rely on such agreements.

The intellectual property landscape around genome editing technology, including base editing, is highly dynamic, and third parties may initiate legal proceedings alleging that we are infringing, misappropriating, or otherwise violating their intellectual property rights, the outcome of which would be uncertain and may prevent, delay or otherwise interfere with our product discovery and development efforts.

Our commercial success depends upon our ability and the ability of our collaborators to research, develop, manufacture, market and sell our product candidates and use our proprietary technologies without infringing, misappropriating or otherwise violating the intellectual property rights of third parties. The field of genome editing, especially in the area of base editing technology, is still in its infancy, and no such product candidates have reached the market. Due to the intense research and development that is taking place by several companies, including us and our competitors, in this field, the intellectual property landscape is evolving and in flux, and it may remain uncertain for the coming years. The biotechnology and pharmaceutical industries are characterized by extensive and complex litigation regarding patents and other intellectual property rights as well as administrative proceedings for challenging patents, including interference, derivation, *inter partes* review, post grant review, and reexamination proceedings before the USPTO or oppositions and other comparable proceedings in foreign jurisdictions. There may be significant intellectual property related litigation and proceedings relating to our owned and in-licensed, and other third party, intellectual property and proprietary rights in the future. We may be subject to and may in the future become party to, or threatened with, adversarial proceedings or litigation regarding intellectual property rights with respect to our gene editing platform technology and any product candidates we may develop, including interference proceedings, post-grant review, *inter partes* review, and derivation proceedings before the USPTO and similar proceedings in foreign jurisdictions such as oppositions before the European Patent Office. Numerous U.S. and foreign issued patents and pending patent applications that are owned by third parties exist in the fields in which we are developing our product candidates and they may assert infringement claims against us based on existing patents or patents that may be granted in the future, regardless of their merit.

As the biotechnology and pharmaceutical industries expand and more patents are issued, the risk increases that our gene editing technology and product candidates may give rise to claims of infringement of the patent rights of others. Moreover, it is not always clear to industry participants, including us, which patents cover various types of therapies, products or their methods of use or manufacture. We are aware of certain third-party patent applications that, if issued, may be construed to cover our gene editing technology and product

candidates. There may also be third-party patents of which we are currently unaware with claims to technologies, methods of manufacture or methods for treatment related to the use or manufacture of our product candidates. Because patent applications can take many years to issue, there may be currently pending patent applications that may later result in issued patents that our product candidates may infringe. In addition, third parties may obtain patents in the future and claim that use of our technologies infringes upon these patents.

It is possible that we have failed to identify relevant third-party patents or applications that our product candidates and programs may infringe. Because patent applications can take many years to issue, may be confidential for 18 months or more after filing and can be revised before issuance, there may be applications now pending which may later result in issued patents that may be infringed by the manufacture, use, sale or importation of any product candidates we may develop or our technology, and we may not be aware of such patents. Furthermore, applications filed before November 29, 2000 and certain applications filed after that date that will not be filed outside the United States may remain confidential until a patent issues. Moreover, it is difficult for industry participants, including us, to identify all third-party patent rights that may be relevant to any product candidates we may develop and our technologies because patent searching is imperfect due to differences in terminology among patents, incomplete databases and the difficulty in assessing the meaning of patent claims. We may fail to identify relevant patents or patent applications or may identify pending patent applications of potential interest but incorrectly predict the likelihood that such patent applications may issue with claims of relevance to our technology. In addition, we may incorrectly conclude that a third-party patent is invalid, unenforceable or not infringed by our activities. Additionally, pending patent applications that have been published can, subject to certain limitations, be later amended in a manner that could cover our technologies, any product candidates we may develop or the use of any product candidates we may develop.

Third parties may assert infringement claims against us based on existing patents or patents that may be granted in the future, regardless of their merit. There is a risk that third parties may choose to engage in litigation with us to enforce or to otherwise assert their patent rights against us. Even if we believe such claims are without merit, a court of competent jurisdiction could hold that these third-party patents are valid, enforceable and infringed, which could adversely affect our ability to commercialize our product candidates or any other of our product candidates or technologies covered by the asserted third-party patents. In order to successfully challenge the validity of any such U.S. patent in federal court, we would need to overcome a presumption of validity. As this burden is a high one requiring us to present clear and convincing evidence as to the invalidity of any such U.S. patent claim, there is no assurance that a court of competent jurisdiction would invalidate the claims of any such U.S. patent.

Numerous third-party U.S. and foreign issued patents and pending patent applications exist in the fields in which we are developing product candidates. Our product candidates make use of CRISPR-based gene editing technology, which is a field that is highly active for patent filings. The extensive patent filings related to CRISPR and Cas make it difficult for us to assess the full extent of relevant patents and pending applications that may cover our gene editing technology and product candidates and their use or manufacture. There may be third-party patents or patent applications, including patents held or controlled by our competitors with claims to materials, formulations, methods of manufacture or methods for treatment related to the use or manufacture of our gene editing technology and product candidates.

If we are found to infringe, misappropriate or otherwise violate a third party's valid and enforceable intellectual property rights, we could be required to obtain a license from such third party to continue developing, manufacturing and marketing our product candidates and technology. However, we may not be able to obtain any required license on commercially reasonable terms or at all. Even if we were able to obtain a license, it could be non-exclusive, thereby giving our competitors and other third parties access to the same technologies licensed to us, and it could require us to make substantial licensing and royalty payments. We could be forced, including by

court order, to cease developing, manufacturing and commercializing the infringing technology or product candidates. In addition, we could be found liable for monetary damages, including treble damages and attorneys' fees, if we are found to have willfully infringed a patent or other intellectual property right indemnify our customers or collaborators. A finding of infringement could prevent us from manufacturing and commercializing our product candidates or force us to cease some of our business operations, which could harm our business. Claims that we have misappropriated the confidential information or trade secrets of third parties could have a similar negative impact on our business, financial condition, results of operations and prospects.

Patent terms may be inadequate to protect our competitive position on our product candidates for an adequate amount of time.

Patents have a limited lifespan. The terms of individual patents depend upon the legal term for patents in the countries in which they are granted. In most countries, including the United States, if all maintenance fees are timely paid, the natural expiration of a patent is generally 20 years from its earliest non-provisional filing date in the applicable country. However, the actual protection afforded by a patent varies from country to country, and depends upon many factors, including the type of patent, the scope of its coverage, the availability of regulatory-related extensions, the availability of legal remedies in a particular country and the validity and enforceability of the patent. Various extensions may be available, but the life of a patent, and the protection it affords, is limited. Even if patents covering our product candidates are obtained, once the patent life has expired, we may be open to competition from competitive products, including biosimilars. Given the amount of time required for the development, testing and regulatory review of new product candidates, patents protecting such candidates might expire before or shortly after such candidates are commercialized. As a result, our owned and licensed patent portfolio may not provide us with sufficient rights to exclude others from commercializing products similar or identical to ours.

Our product candidates may face competition from biosimilars approved through an abbreviated regulatory pathway.

The Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act of 2010, or collectively the ACA, includes a subtitle called the Biologics Price Competition and Innovation Act of 2009, or BPCIA, which created an abbreviated approval pathway for biological products that are biosimilar to or interchangeable with an FDA-approved reference biological product. Under the BPCIA, an application for a biosimilar product may not be submitted to the FDA until four years following the date that the reference product was first approved by the FDA. In addition, the approval of a biosimilar product may not be made effective by the FDA until 12 years from the date on which the reference product was first approved. During this 12-year period of exclusivity, another company may still market a competing version of the reference product if the FDA approves a full BLA for the competing product containing the sponsor's own preclinical data and data from adequate and well-controlled clinical trials to demonstrate the safety, purity and potency of the other company's product. The law is complex and is still being interpreted and implemented by the FDA. As a result, its ultimate impact, implementation, and meaning are subject to uncertainty.

We believe that any of our product candidates approved as a biological product under a BLA should qualify for the 12-year period of exclusivity. However, there is a risk that this exclusivity could be shortened due to Congressional action or otherwise, or that the FDA will not consider our product candidates to be reference products for competing products, potentially creating the opportunity for biosimilar competition sooner than anticipated. Other aspects of the BPCIA, some of which may impact the BPCIA exclusivity provisions, have also been the subject of recent litigation. Moreover, the extent to which a biosimilar, once approved, will be substituted for any one of our reference products in a way that is similar to traditional generic substitution for non-biological products is not yet clear, and will depend on a number of marketplace and regulatory factors that are still developing.

If we do not obtain patent term extension in the United States under the Hatch-Waxman Act and in foreign countries under similar legislation, thereby potentially extending the term of our marketing exclusivity for any product candidates we may develop, our business may be materially harmed.

In the United States, the patent term of a patent that covers an FDA-approved drug may be eligible for limited patent term extension, which permits patent term restoration as compensation for the patent term lost during the FDA regulatory review process. The Drug Price Competition and Patent Term Restoration Act of 1984, also known as the Hatch-Waxman Act, permits a patent term extension of up to five years beyond the expiration of the patent. The length of the patent term extension is related to the length of time the drug is under clinical development and regulatory review. Patent extension cannot extend the remaining term of a patent beyond a total of 14 years from the date of product approval, and only one patent applicable to and that covers an approved drug may be extended. Similar provisions are available in Europe, such as supplementary protection certificates, and certain other non-United States jurisdictions to extend the term of a patent that covers an approved drug. While, in the future, if and when our product candidates receive FDA approval, we expect to apply for patent term extensions on patents covering those product candidates, there is no guarantee that the applicable authorities will agree with our assessment of whether such extensions should be granted, and even if granted, the length of such extensions. We may not be granted patent term extension either in the United States or in any foreign country because of, for example, failing to exercise due diligence during the testing phase or regulatory review process, failing to apply within applicable deadlines, failing to apply prior to expiration of relevant patents or otherwise failing to satisfy applicable requirements. Moreover, the term of extension, as well as the scope of patent protection during any such extension, afforded by the governmental authority could be less than we request. If we are unable to obtain any patent term extension or the term of any such extension is less than we request, our competitors may obtain approval of competing products following the expiration of our patent rights, and our business, financial condition, results of operations and prospects could be materially harmed.

It is possible that we will not obtain patent term extension under the Hatch-Waxman Act for a U.S. patent covering any of our product candidates that we may identify even where that patent is eligible for patent term extension, or if we obtain such an extension, it may be for a shorter period than we had sought.

Changes to patent laws in the United States and other jurisdictions could diminish the value of patents in general, thereby impairing our ability to protect our gene editing platform technology and product candidates.

As is the case with other biotech and pharmaceutical companies, our success is heavily dependent on intellectual property, particularly patents. Obtaining and enforcing patents in the biopharmaceutical industry involve both technological and legal complexity, and is therefore costly, time-consuming and inherently uncertain.

Changes in either the patent laws or interpretation of patent laws in the United States, including patent reform legislation such as the Leahy-Smith America Invents Act, or the Leahy-Smith Act, could increase the uncertainties and costs surrounding the prosecution of our owned and in-licensed patent applications and the maintenance, enforcement or defense of our owned and in-licensed issued patents. The Leahy-Smith Act includes a number of significant changes to United States patent law. These changes include provisions that affect the way patent applications are prosecuted, redefine prior art, provide more efficient and cost-effective avenues for competitors to challenge the validity of patents, and enable third-party submission of prior art to the USPTO during patent prosecution and additional procedures to attack the validity of a patent at USPTO-administered post-grant proceedings, including post-grant review, *inter partes* review, and derivation proceedings. Because of a lower evidentiary standard in USPTO proceedings compared to the evidentiary standard in United States federal courts necessary to invalidate a patent claim, a third party could potentially provide evidence in a USPTO proceeding sufficient for the USPTO to hold a claim invalid even though the same

evidence would be insufficient to invalidate the claim if first presented in a district court action. Accordingly, a third party may attempt to use the USPTO procedures to invalidate our patent claims that would not have been invalidated if first challenged by the third party as a defendant in a district court action.

Assuming that other requirements for patentability are met, prior to March 2013, in the United States, the first to invent the claimed invention was entitled to the patent, while outside the United States, the first to file a patent application was entitled to the patent. After March 2013, under the Leahy-Smith Act, the United States transitioned to a first-to-file system in which, assuming that the other statutory requirements for patentability are met, the first inventor to file a patent application will be entitled to the patent on an invention regardless of whether a third party was the first to invent the claimed invention. As such, the Leahy-Smith Act and its implementation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents, all of which could have a material adverse effect on our business, financial condition, results of operations and prospects.

In addition, the patent positions of companies in the development and commercialization of biologics and pharmaceuticals are particularly uncertain. Recent U.S. Supreme Court rulings have narrowed the scope of patent protection available in certain circumstances and weakened the rights of patent owners in certain situations. This combination of events has created uncertainty with respect to the validity and enforceability of patents once obtained. Depending on future actions by the U.S. Congress, the federal courts, and the USPTO, the laws and regulations governing patents could change in unpredictable ways that could have a material adverse effect on our patent rights and our ability to protect, defend and enforce our patent rights in the future. For example, in the case, *Assoc. for Molecular Pathology v. Myriad Genetics, Inc.,* the U.S. Supreme Court held that claims to certain DNA molecules are not patentable. More recently, in *Amgen Inc. v. Sanofi*, the Federal Circuit held that claims with functional language may pose high hurdles in fulfilling the enablement requirement for claims with broad functional language. We cannot predict how this and future decisions by the courts, the U.S. Congress or the USPTO may impact the value of our patents. Any similar adverse changes in the patent laws of other jurisdictions could also have a material adverse effect on our business, financial condition, results of operations and prospects.

Issued patents covering our product candidates could be found invalid or unenforceable if challenged in court. We may not be able to protect our trade secrets in court.

If we or one of our licensing partners initiates legal proceedings against a third party to enforce a patent covering one of our product candidates, the defendant could counterclaim that the patent covering our product candidate is invalid or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity or unenforceability are commonplace. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, including lack of novelty, obviousness, written description or non-enablement. In addition, patent validity challenges may, under certain circumstances, be based upon non-statutory obviousness-type double patenting, which, if successful, could result in a finding that the claims are invalid for obviousness-type double patenting or the loss of patent term, including a patent term adjustment granted by the USPTO, if a terminal disclaimer is filed to obviate a finding of obviousness-type double patenting. Grounds for an unenforceability assertion could be an allegation that someone connected with prosecution of the patent withheld information material to patentability from the USPTO, or made a misleading statement, during prosecution. Third parties also may raise similar claims before administrative bodies in the United States or abroad, even outside the context of litigation. Such mechanisms include re-examination, post grant review, *inter partes* review and equivalent proceedings in foreign jurisdictions. Such proceedings could result in the revocation or cancellation of or amendment to our patents in such a way that they no longer cover our product candidates. The outcome following legal assertions of invalidity and unenforceability is unpredictable. With respect to the validity question, for example, we cannot be certain that there is no invalidating prior art of which the patent examiner and we or our licensing partners

were unaware during prosecution. If a defendant were to prevail on a legal assertion of invalidity or unenforceability, we could lose at least part, and perhaps all, of the patent protection on one or more of our product candidates. Such a loss of patent protection could have a material adverse impact on our business.

In addition to the protection afforded by patents, we rely on trade secret protection and confidentiality agreements to protect proprietary know-how that is not patentable or that we elect not to patent, processes for which patents are difficult to enforce and any other elements of our product candidate discovery and development processes that involve proprietary know-how, information or technology that is not covered by patents. However, trade secrets can be difficult to protect, and some courts inside and outside the United States are less willing or unwilling to protect trade secrets. We seek to protect our proprietary technology and processes, in part, by entering into confidentiality agreements with our employees, consultants, scientific advisors and contractors. We cannot guarantee that we have entered into such agreements with each party that may have or have had access to our trade secrets or proprietary technology and processes. We also seek to preserve the integrity and confidentiality of our data and trade secrets by maintaining physical security of our premises and physical and electronic security of our information technology systems. While we have confidence in these individuals, organizations and systems, agreements or security measures may be breached, and we may not have adequate remedies for any breach. In addition, our trade secrets may otherwise become known or be independently discovered by competitors.

Intellectual property litigation or other legal proceedings relating to intellectual property could cause us to spend substantial resources and distract our personnel from their normal responsibilities.

Even if resolved in our favor, litigation or other legal proceedings relating to intellectual property claims may cause us to incur significant expenses and could distract our technical and management personnel from their normal responsibilities. In addition, there could be public announcements of the results of hearings, motions or other interim proceedings or developments and if securities analysts or investors perceive these results to be negative, it could have a substantial adverse effect on the price of our common stock. Such litigation or proceedings could substantially increase our operating losses and reduce the resources available for development activities or any future sales, marketing or distribution activities. We may not have sufficient financial or other resources to conduct such litigation or proceedings adequately. Some of our competitors may be able to sustain the costs of such litigation or proceedings more effectively than we can because of their greater financial resources and may also have an advantage in such proceedings due to their more mature and developed intellectual property portfolios. Uncertainties resulting from the initiation and continuation of intellectual property litigation or other proceedings could compromise our ability to compete in the marketplace.

Obtaining and maintaining patent protection depends on compliance with various procedural, document submission, fee payment and other requirements imposed by governmental patent agencies, and our patent protection could be reduced or eliminated for non-compliance with these requirements.

Periodic maintenance, renewal and annuity fees and various other government fees on any issued patent and pending patent application must be paid to the USPTO and foreign patent agencies in several stages or annually over the lifetime of our owned and in-licensed patents and patent applications. The USPTO and various foreign governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other similar provisions during the patent application process. In certain circumstances, we may rely on our licensing partners to pay these fees to, or comply with the procedural and documentary rules of, the relevant patent agency. With respect to our patents, we rely on outside firms and outside counsel to remind us of the due dates and to make payment after we instruct them to do so. While an inadvertent lapse can in many cases be cured by payment of a late fee or by other means in accordance with the applicable rules, there are situations in which noncompliance can result in abandonment or lapse of the patent or patent application,

resulting in partial or complete loss of patent rights in the relevant jurisdiction. Non-compliance events that could result in abandonment or lapse of a patent or patent application include failure to respond to official actions within prescribed time limits, non-payment of fees and failure to properly legalize and submit formal documents. In such an event, potential competitors might be able to enter the market with similar or identical products or technology. If we or our licensors fail to maintain the patents and patent applications covering our product candidates, it would have a material adverse effect on our business, financial condition, results of operations and prospects.

We have limited foreign intellectual property rights and may not be able to protect our intellectual property and proprietary rights throughout the world.

We have limited intellectual property rights outside the United States. Filing, prosecuting and defending patents on product candidates in all countries throughout the world would be prohibitively expensive, and the laws of foreign countries may not protect our rights to the same extent as the laws of the United States. In addition, the laws of some foreign countries do not protect intellectual property rights to the same extent as federal and state laws in the United States, and even where such protection is nominally available, judicial and governmental enforcement of such intellectual property rights may be lacking. Consequently, we may not be able to prevent third parties from practicing our inventions in all countries outside the United States, or from selling or importing products made using our inventions in and into the United States or other jurisdictions. Competitors may use our technologies in jurisdictions where we have not obtained patent protection to develop their own products and, further, may export otherwise infringing products to territories where we have patent protection or licenses but enforcement is not as strong as that in the United States. These products may compete with our products, and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing.

Many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of patents, trade secrets, and other intellectual property protection, particularly those relating to biotechnology products, which could make it difficult for us to stop the infringement of our patents or marketing of competing products in violation of our intellectual property and proprietary rights generally. In addition, certain jurisdictions do not protect to the same extent or at all inventions that constitute new methods of treatment.

Proceedings to enforce our intellectual property and proprietary rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business, could put our patents at risk of being invalidated or interpreted narrowly, could put our patent applications at risk of not issuing, and could provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate, and the damages or other remedies awarded, if any, may not be commercially meaningful. Accordingly, our efforts to enforce our intellectual property and proprietary rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license.

Many countries have compulsory licensing laws under which a patent owner may be compelled to grant licenses to third parties. In addition, many countries limit the enforceability of patents against government agencies or government contractors. In these countries, the patent owner may have limited remedies, which could materially diminish the value of such patent. If we or any of our licensors are forced to grant a license to third parties with respect to any patents relevant to our business, our competitive position may be impaired, and our business, financial condition, results of operations and prospects may be adversely affected.

We may be subject to claims by third parties asserting that our employees, consultants or contractors have wrongfully used or disclosed confidential information of third parties, or we have wrongfully used or disclosed alleged trade secrets of their current or former employers or claims asserting we have misappropriated their intellectual property, or claiming ownership of what we regard as our own intellectual property.

Many of our employees, consultants and contractors were previously employed at universities or other pharmaceutical or biotechnology companies, including our competitors or potential competitors. Although we try to ensure that our employees, consultants and contractors do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that these individuals or we have used or disclosed intellectual property, including trade secrets or other proprietary information, of any such individual's current or former employer. Litigation may be necessary to defend against these claims.

In addition, while it is our policy to require our employees, consultants and contractors who may be involved in the development of intellectual property to execute agreements assigning such intellectual property to us, we may be unsuccessful in executing such an agreement with each party who in fact develops intellectual property that we regard as our own. Our intellectual property assignment agreements with them may not be self-executing or may be breached, and we may be forced to bring claims against third parties, or defend claims they may bring against us, to determine the ownership of what we regard as our intellectual property. Such claims could have a material adverse effect on our business, financial conditions, results of operations and prospects.

If we fail in prosecuting or defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel, which could have a material adverse effect on our competitive business position and prospects. Such intellectual property rights could be awarded to a third party, and we could be required to obtain a license from such third party to commercialize our technology or products, which license may not be available on commercially reasonable terms, or at all, or such license may be non-exclusive. Even if we are successful in prosecuting or defending against such claims, litigation could result in substantial costs and be a distraction to our management and employees.

If we are unable to protect the confidentiality of our trade secrets, our business and competitive position would be harmed.

In addition to seeking patents for our some of our technology and product candidates, we also rely on trade secrets and confidentiality agreements to protect our unpatented know-how, technology and other proprietary information, to maintain our competitive position. We seek to protect our trade secrets and other proprietary technology, in part, by entering into non-disclosure and confidentiality agreements with parties who have access to them, such as our employees, corporate collaborators, outside scientific collaborators, CROs, CMOs, consultants, advisors and other third parties. We also enter into confidentiality and invention or patent assignment agreements with our employees and consultants, but we cannot guarantee that we have entered into such agreements with each party that may have or has had access to our trade secrets or proprietary technology. Despite these efforts, any of these parties may breach the agreements and disclose our proprietary information, including our trade secrets, and we may not be able to obtain adequate remedies for such breaches. Detecting the disclosure or misappropriation of a trade secret and enforcing a claim that a party illegally disclosed or misappropriated a trade secret is difficult, expensive and time-consuming, and the outcome is unpredictable.

In addition to contractual measures, we try to protect the confidential nature of our proprietary information through other appropriate precautions, such as physical and technological security measures. However, trade secrets and know-how can be difficult to protect. These measures may not, for example, in the case of misappropriation of a trade secret by an employee or third party with authorized access, provide adequate protection for our proprietary information. Our security measures may not prevent an employee or consultant

from misappropriating our trade secrets and providing them to a competitor, and any recourse we might take against this type of misconduct may not provide an adequate remedy to protect our interests fully. In addition, trade secrets may be independently developed by others in a manner that could prevent us from receiving legal recourse. If any of our confidential or proprietary information, such as our trade secrets, were to be disclosed or misappropriated, or if any of that information was independently developed by a competitor, our competitive position could be harmed.

In addition, some courts inside and outside of the United States are less willing or unwilling to protect trade secrets. If any of our trade secrets were to be lawfully obtained or independently developed by a competitor or other third party, we would have no right to prevent them, or those to whom they communicate it, from using that technology or information to compete with us. If any of our trade secrets were to be disclosed to or independently developed by a competitor or other third party, our competitive position would be materially and adversely harmed.

If our trademarks and trade names are not adequately protected, then we may not be able to build name recognition in our markets of interest and our business may be adversely affected.

Any registered trademarks or trade names may be challenged, circumvented or declared generic or determined to be infringing on other marks. We may not be able to protect our rights to these trademarks and trade names, which we need to build name recognition among potential partners or customers in our markets of interest. At times, competitors may adopt trade names or trademarks similar to ours, thereby impeding our ability to build brand identity and possibly leading to market confusion. In addition, there could be potential trade name or trademark infringement claims brought by owners of other registered trademarks or trademarks that incorporate variations of our registered or unregistered trademarks or trade names. Over the long term, if we are unable to establish name recognition based on our trademarks and trade names, then we may not be able to compete effectively and our business may be adversely affected. Our efforts to enforce or protect our proprietary rights related to trademarks, trade secrets, domain names, copyrights or other intellectual property may be ineffective and could result in substantial costs and diversion of resources and could adversely impact our financial condition or results of operations.

Intellectual property rights do not necessarily address all potential threats.

The degree of future protection afforded by our intellectual property rights is uncertain because intellectual property rights have limitations and may not adequately protect our business or permit us to maintain our competitive advantage. For example:

- any product candidates we may develop will eventually become commercially available in generic or biosimilar product forms;
- others may be able to make gene editing product that are similar to ours but that are not covered by the claims of the patents that we own;
- we, or our license partners or current or future collaborators, might not have been the first to make the inventions covered by the issued patent or pending patent applications that we license or may own in the future;
- we, or our license partners or current or future collaborators, might not have been the first to file patent applications covering certain of our or their inventions;
- others may independently develop similar or alternative technologies or duplicate any of our technologies without infringing our owned or in-licensed intellectual property rights;

- it is possible that our pending owned and in-licensed patent applications or those we may own or in-license in the future will not lead to issued patents;
- it is possible that there are prior public disclosures that could invalidate our owned or in-licensed patents, or parts of our owned or in-licensed patents;
- it is possible that there are unpublished applications or patent applications maintained in secrecy that may later issue with claims covering our product candidates or technology similar to ours;
- it is possible that our owned or in-licensed patents or patent applications omit individual(s) that should be listed as inventor(s) or include individual(s) that should not be listed as inventor(s), which may cause these patents or patents issuing from these patent applications to be held invalid or unenforceable;
- issued patents that we hold rights to may be held invalid or unenforceable, including as a result of legal challenges by our competitors;
- the laws of foreign countries may not protect our proprietary rights or the proprietary rights of license partners or current or future collaborators to the same extent as the laws of the United States;
- the inventors of our owned or in-licensed patents or patent applications may become involved with competitors, develop products or processes that design around our patents, or become hostile to us or the patents or patent applications on which they are named as inventors;
- our competitors might conduct research and development activities in countries where we do not have patent rights and then use the information learned from such activities to develop competitive products for sale in our major commercial markets;
- we have engaged in scientific collaborations in the past and will continue to do so in the future and our collaborators may develop adjacent or competing products that are outside the scope of our patent rights;
- we cannot ensure that any of our patents, or any of our pending patent applications, if issued, or those of our licensors, will include claims having a scope sufficient to protect our product candidates;
- we cannot ensure that any patents issued to us or our licensors will provide a basis for an exclusive market for our commercially viable product candidates or will provide us with any competitive advantages;
- we cannot ensure that our commercial activities or product candidates will not infringe upon the patents of others;
- we cannot ensure that we will be able to successfully commercialize our product candidates on a substantial scale, if approved, before our relevant patents that we own or license expire;
- we may not develop additional proprietary technologies that are patentable;
- the patents of others may harm our business; and
- we may choose not to file a patent in order to maintain certain trade secrets or know-how, and a third party may subsequently file a patent covering such intellectual property.

Should any of these events occur, they could have a material adverse effect on our business, financial condition, results of operations and prospects.

Risks related to commercialization

Even if any of our current or future product candidates receives marketing approval, it may fail to achieve the degree of market acceptance by physicians, patients, third-party payors and others in the medical community necessary for commercial success, and the market opportunity for any of such product candidates, if approved, may be smaller than we estimate.

If any of our current or future product candidates receives marketing approval, it may nonetheless fail to gain sufficient market acceptance by physicians, patients, third-party payors and others in the medical community. For example, current CVD treatments such as statins, ezetimibe, bempedoic acid, lomitapide, mipomersen and icosapent ethyl are well-established in the medical community, and physicians may continue to rely on these treatments. Efforts to educate the medical community and third-party payors on the benefits of our product candidates may require significant resources and may not be successful. If our current or future product candidates do not achieve an adequate level of acceptance, we may not generate significant product revenues and we may not become profitable. The degree of market acceptance of our current or future product candidates, if approved for commercial sale, will depend on a number of factors, including:

- the efficacy and potential advantages of such product candidates compared to the advantages and relative risks of alternative treatments;
- the effectiveness of sales and marketing efforts;
- the cost of treatment in relation to alternative treatments, including any similar biosimilar treatments;
- our ability to offer our products, if approved, for sale at competitive prices;
- the clinical indications for which the product is approved;
- the convenience and ease of administration compared to alternative treatments;
- the willingness of the target patient population to try new therapies and of physicians to prescribe these therapies;
- the strength of marketing and distribution support;
- the timing of market introduction of competitive products;
- the availability of third-party coverage and adequate reimbursement, and patients' willingness to pay out of pocket for required co-payments or in the absence of third-party coverage or adequate reimbursement;
- the prevalence and severity of any side effects; and
- any restrictions on the use of our products, if approved, together with other medications.

Our assessment of the potential market opportunity for our current or future product candidates is based on industry and market data that we obtained from industry publications, research, surveys and studies conducted by third parties and our analysis of these data, research, surveys and studies. Industry publications and third-party research, surveys and studies generally indicate that their information has been obtained from sources believed to be reliable, although they do not guarantee the accuracy or completeness of such information. While we believe these industry publications and third-party research, surveys and studies are reliable, we have not independently verified such data. Our estimates of the potential market opportunities for our product candidates include a number of key assumptions based on our industry knowledge, industry publications and third-party research, surveys and studies, which may be based on a small sample size and fail to accurately reflect market opportunities. While we believe that our internal assumptions are reasonable, no independent source has verified such assumptions. If any of our assumptions or estimates, or these publications, research,

surveys or studies prove to be inaccurate, then the actual market for any of our product candidates may be smaller than we expect, and as a result our revenues from product sales may be limited and it may be more difficult for us to achieve or maintain profitability.

We face substantial competition, which may result in others discovering, developing or commercializing products before us or more successfully than we do.

The development and commercialization of new drug or biologic products is highly competitive. It is particularly competitive with respect to new products for CVD, for which the standard of care is well-established. We face competition with respect to our current product candidates, and will face competition with respect to any product candidates that we may seek to develop or commercialize in the future, from major pharmaceutical companies, specialty pharmaceutical companies and biotechnology companies worldwide. There are a number of large pharmaceutical and biotechnology companies that currently market and sell products or are pursuing the development of products for the treatment of many of the disease indications for which we are developing our product candidates. Some of these competitive products and therapies are based on scientific approaches that are similar to our approach, and others are based on entirely different approaches. Potential competitors also include academic institutions, government agencies and other public and private research organizations that conduct research, seek patent protection and establish collaborative arrangements for research, development, manufacturing and commercialization.

There are several approved products for LDL-C lowering or cardiovascular risk reduction, such as statins, ezetimibe, bempedoic acid, lomitapide, mipomersen and icosapent ethyl.

There are several approved products that target PCSK9 protein as a mechanism to lower LDL-C and reduce the risk of ASCVD. Evolocumab, a monoclonal antibody, or mAb, marketed as Repatha by Amgen, is approved by the FDA for the treatment of patients with heterozygous familial hypercholesterolemia, or HeFH, patients with HoFH and in patients with ASCVD. Alirocumab, a mAb marketed as Praulent by Sanofi and Regeneron, is approved by the FDA for the treatment of patients with ASCVD and for the treatment of patients with primary hyperlipidemia, including HeFH. Regeneron has sole U.S. rights to alirocumab and Sanofi has sole ex-U.S. rights to alirocumab. The approved mAb treatments act through extracellular inhibition of PCSK9 protein. Inclisiran, a siRNA marketed as Leqvio by Novartis AG, is approved in Europe for the treatment of patients with hypercholesterolemia, including HeFH, or mixed dyslipidemia. Inclisiran acts by inhibiting the synthesis of PCKS9 within liver cells, which is distinct from extracellular protein inhibition.

We are aware of several product candidates in clinical development that target PCSK9 protein as a mechanism to lower LDL-C and reduce the risk of ASCVD, including peptide-based anti PCSK9 vaccination, small molecule oral PCSK9 inhibitors, small binding proteins, and antisense oligonucleotides. In 2021, Esperion in-licensed an oral small molecule PCSK9 inhibitor from Serometrix LLC for which it plans to submit an IND in 2021.

We are aware of one other gene editing program targeting the PCKS9 gene in preclinical development. Precision Biosciences, Inc. has published preclinical data showing long-term stable reduction of low-density lipoprotein cholesterol, or LDL-C, levels in non-human primates following *in vivo* gene editing of the PCSK9 gene using its gene editing platform.

Evinacumab, a mAb targeting ANGPTL3 protein that is marketed by Regeneron, is approved by the FDA for the treatment of patients with HoFH. Evinacumab is also being evaluated by Regeneron in Phase 2 development for severe hypertriglyceridemia.

We are aware of several product candidates in clinical development that target ANGPTL3 protein as a mechanism to lower LDL-C and reduce the risk of ASCVD, including vupanorsen, an antisense oligonucleotide therapy being evaluated in a Phase 2 clinical trial by Ionis and Pfizer for the treatment of patients with elevated non-HDL-C and triglycerides. In addition, ARO-ANG3, a siRNA targeting ANGPTL3 protein, is being evaluated in a Phase 1/2 clinical trial by Arrowhead. In 2021, Arrowhead filed an IND for a Phase 2b trial of ARO-ANG3 for the treatment of patients with mixed dyslipidemia.

Our commercial opportunity could be reduced or eliminated if our competitors develop and commercialize products that are safer, more effective, have fewer or less severe side effects, are more convenient or are less expensive than any products that we may develop. Our competitors also may obtain FDA or other regulatory approval for their products more rapidly than we may obtain approval for ours, which could result in our competitors establishing a strong market position before we are able to enter the market. In addition, our ability to compete may be affected in many cases by insurers or other third-party payors seeking to encourage the use of biosimilar products. If our product candidates achieve marketing approval, we expect that they will be priced at a significant premium over competitive biosimilar products.

Many of the companies against which we are competing or against which we may compete in the future have significantly greater financial resources and expertise in research and development, manufacturing, preclinical testing, conducting clinical trials, obtaining regulatory approvals and marketing approved products than we do.

Mergers and acquisitions in the pharmaceutical and biotechnology industries may result in even more resources being concentrated among a smaller number of our competitors. Smaller and other early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies. These third parties compete with us in recruiting and retaining qualified scientific and management personnel, establishing clinical trial sites and patient registration for clinical trials, as well as in acquiring technologies complementary to, or necessary for, our programs.

If we are unable to establish sales, marketing and distribution capabilities or enter into sales, marketing and distribution agreements with third parties, we may not be successful in commercializing our current and future product candidates if and when they are approved.

We do not have a sales or marketing infrastructure and have no experience as a company with the commercialization of products. To achieve commercial success for any product for which we have obtained marketing approval, we will need to establish a sales, marketing and distribution organization, either ourselves or through collaborations or other arrangements with third parties.

In the future, we expect to build a sales and marketing infrastructure to market some of our product candidates in the United States, if and when they are approved. There are risks involved with establishing our own sales, marketing and distribution capabilities. For example, recruiting and training a sales force is expensive and time-consuming and could delay any product launch. If the commercial launch of a product candidate for which we recruit a sales force and establish marketing capabilities is delayed or does not occur for any reason, we would have prematurely or unnecessarily incurred these commercialization expenses. These efforts may be costly, and our investment would be lost if we cannot retain or reposition our sales and marketing personnel.

Factors that may inhibit our efforts to commercialize our products on our own include:

- our inability to recruit, train and retain adequate numbers of effective sales, marketing, coverage or reimbursement, customer service, medical affairs and other support personnel;
- the inability of sales personnel to obtain access to physicians or persuade adequate numbers of physicians to prescribe any future products;

- the inability of reimbursement professionals to negotiate arrangements for coverage, formulary access, reimbursement and other acceptance by payors;
- the inability to price our products at a sufficient price point to ensure an adequate and attractive level of profitability;
- restricted or closed distribution channels that make it difficult to distribute our products to segments of the patient population;
- the lack of complementary products to be offered by sales personnel, which may put us at a competitive disadvantage relative to companies with more extensive product lines; and
- unforeseen costs and expenses associated with creating an independent sales and marketing organization.

If we are unable to establish our own sales, marketing and distribution capabilities and we enter into arrangements with third parties to perform these services, our product revenues and our profitability, if any, are likely to be lower than if we were to market, sell and distribute any products that we develop ourselves. In addition, we may not be successful in entering into arrangements with third parties to sell, market and distribute our product candidates or may be unable to do so on terms that are acceptable to us. We likely will have little control over such third parties, and any of them may fail to devote the necessary resources and attention to sell and market our products effectively. If we do not establish sales, marketing and distribution capabilities successfully, either on our own or in collaboration with third parties, we will not be successful in commercializing our product candidates.

We expect to rely on CMOs to manufacture our product candidates. If we are unable to enter into such arrangements as expected or if such organizations do not meet our supply requirements, development and/or commercialization of our product candidates may be delayed.

We expect to rely on third parties to manufacture clinical supplies of our product candidates and commercial supplies of our products, if and when approved for marketing by applicable regulatory authorities, as well as for packaging, sterilization, storage, distribution and other production logistics. If we are unable to enter into such arrangements on the terms or timeline we expect, development and/or commercialization of our product candidates may be delayed. If these third parties do not successfully carry out their contractual duties, meet expected deadlines or manufacture our product candidates in accordance with regulatory requirements, if there are disagreements between us and such parties or if such parties are unable to expand capacities to support commercialization of any of our product candidates for which we obtain marketing approval, we may not be able to fulfill, or may be delayed in producing sufficient product candidates to meet, our supply requirements. These facilities may also be affected by pandemics, including the ongoing COVID-19 pandemic, natural disasters, such as floods or fire, or such facilities could face manufacturing issues, such as contamination or regulatory concerns following a regulatory inspection of such facility. In such instances, we may need to locate an appropriate replacement third-party facility and establish a contractual relationship, which may not be readily available or on acceptable terms, which would cause additional delay and increased expense, including as a result of additional required FDA approvals, and may have a material adverse effect on our business.

Our third-party manufacturers will be subject to inspection and approval by the FDA before we can commence the manufacture and sale of any of our product candidates, and thereafter subject to FDA inspection from time to time. Failure by our third-party manufacturers to pass such inspections and otherwise satisfactorily complete the FDA approval regimen with respect to our product candidates may result in regulatory actions such as the issuance of FDA Form 483 notices of observations, warning letters or injunctions or the loss of operating licenses.

We or our third-party manufacturers may also encounter shortages in the raw materials or active pharmaceutical ingredient, or API, necessary to produce our product candidates in the quantities needed for our clinical trials or, if our product candidates are approved, in sufficient quantities for commercialization or to meet an increase in demand, as a result of capacity constraints or delays or disruptions in the market for the raw materials or API, including shortages caused by the purchase of such raw materials or API by our competitors or others. The failure of us or our third-party manufacturers to obtain the raw materials or API necessary to manufacture sufficient quantities of our product candidates may have a material adverse effect on our business.

Even if we are able to commercialize any product candidates, the products may become subject to unfavorable pricing regulations, third-party coverage or reimbursement practices or healthcare reform initiatives, which could harm our business.

The regulations that govern marketing approvals, pricing, coverage and reimbursement for new drug products vary widely from country to country. Current and future legislation may significantly change the approval requirements in ways that could involve additional costs and cause delays in obtaining approvals. Some countries require approval of the sale price of a drug before it can be marketed. In many countries, the pricing review period begins after marketing or product licensing approval is granted. In some foreign markets, prescription pharmaceutical pricing remains subject to continuing governmental control even after initial approval is granted. As a result, we might obtain marketing approval for a product in a particular country, but then be subject to price regulations that delay our commercial launch of the product, possibly for lengthy time periods, and negatively impact the revenues we are able to generate from the sale of the product in that country. Adverse pricing limitations may hinder our ability to recoup our investment in one or more product candidates, even if our product candidates obtain marketing approval.

Our ability to commercialize any product candidates successfully also will depend in part on the extent to which coverage and adequate reimbursement for these products and related treatments will be available from government health administration authorities, private health insurers and other organizations. Government authorities and other third-party payors, such as private health insurers and health maintenance organizations, decide which medications they will pay for and establish reimbursement levels. Coverage and reimbursement by a third-party payor may depend upon a number of factors, including the third-party payor’s determination that use of a product is:

- a covered benefit under its health plan;
- safe, effective and medically necessary;
- appropriate for the specific patient;
- cost-effective; and
- neither experimental nor investigational.

In the United States, there is no uniform policy of coverage and reimbursement for products exists among third-party payors. As a result, obtaining coverage and reimbursement approval of a product from a government or other third-party payor is a time-consuming and costly process that could require us to provide to each payor supporting scientific, clinical and cost-effectiveness data for the use of our products on a payor-by-payor basis, with no assurance that coverage and adequate reimbursement will be obtained. The availability and adequacy of coverage and reimbursement by governmental healthcare programs such as Medicare and Medicaid, private health insurers and other third-party payors are essential for most patients to be able to afford our product candidates, if approved. Our ability to achieve acceptable levels of coverage and reimbursement for our product candidates, if approved, by governmental authorities, private health insurers and other organizations

will have an effect on our ability to successfully commercialize, our product candidates. Assuming we obtain coverage for a given product by a third-party payor, the resulting reimbursement payment rates may not be adequate or may require patient out-of-pocket costs that patients find unacceptably high.

A primary trend in the U.S. healthcare industry and elsewhere is cost containment. Government authorities and third-party payors have attempted to control costs by limiting coverage and the amount of reimbursement for particular medications. Increasingly, third-party payors are requiring that drug companies provide them with predetermined discounts from list prices and are challenging the prices charged for medical products. Coverage and reimbursement may not be available for any product that we commercialize and, even if these are available, the level of reimbursement may not be satisfactory. Reimbursement may affect the demand for, or the price of, any product candidate for which we obtain marketing approval. Obtaining and maintaining adequate reimbursement for our products may be difficult. We may be required to conduct expensive pharmacoeconomic studies to justify coverage and reimbursement or the level of reimbursement relative to other therapies. If coverage and adequate reimbursement are not available or reimbursement is available only to limited levels, we may not be able to successfully commercialize any product candidate for which we obtain marketing approval.

There may be significant delays in obtaining coverage and reimbursement for newly approved drugs, and coverage may be more limited than the purposes for which the drug is approved by the FDA or similar regulatory authorities outside of the United States. Moreover, eligibility for coverage and reimbursement does not imply that a drug will be paid for in all cases or at a rate that covers our costs, including research, development, manufacture, sale and distribution expenses. Interim reimbursement levels for new drugs, if applicable, may also not be sufficient to cover our costs and may not be made permanent. Reimbursement rates may vary according to the use of the drug and the clinical setting in which it is used, may be based on reimbursement levels already set for lower cost drugs and may be incorporated into existing payments for other services. Net prices for drugs may be reduced by mandatory discounts or rebates required by government healthcare programs or private payors and by any future relaxation of laws that presently restrict imports of drugs from countries where they may be sold at lower prices than in the United States. Third-party payors often rely upon Medicare coverage policy and payment limitations in setting their own reimbursement policies. Our inability to promptly obtain coverage and adequate reimbursement rates from both government-funded and private payors for any approved products that we develop could have a material adverse effect on our operating results, our ability to raise capital needed to commercialize products and our overall financial condition.

There can be no assurance that our product candidates, even if they are approved for sale in the United States or in other countries, will be considered medically reasonable and necessary for a specific indication or cost-effective by third-party payors, or that coverage and an adequate level of reimbursement will be available or that third-party payors' reimbursement policies will not adversely affect our ability to sell our product candidates profitably.

Our future growth depends, in part, on our ability to penetrate foreign markets, where we would be subject to additional regulatory burdens and other risks and uncertainties that, if they materialize, could harm our business.

Our future profitability will depend, in part, on our ability to commercialize our product candidates in markets outside of the United States. If we commercialize our product candidates in foreign markets, we will be subject to additional risks and uncertainties, including:

- economic weakness, including inflation, or political instability in particular economies and markets;
- the burden of complying with complex and changing foreign regulatory, tax, accounting and legal requirements, many of which vary between countries;

- different medical practices and customs in foreign countries affecting acceptance in the marketplace;
- tariffs and trade barriers, as well as other governmental controls and trade restrictions;
- other trade protection measures, import or export licensing requirements or other restrictive actions by U.S. or foreign governments;
- longer accounts receivable collection times;
- longer lead times for shipping;
- compliance with tax, employment, immigration and labor laws for employees living or traveling abroad;
- workforce uncertainty in countries where labor unrest is common;
- language barriers for technical training;
- reduced protection of intellectual property rights in some foreign countries, and related prevalence of biosimilar alternatives to therapeutics;
- foreign currency exchange rate fluctuations and currency controls;
- differing foreign reimbursement landscapes;
- uncertain and potentially inadequate reimbursement of our products; and
- the interpretation of contractual provisions governed by foreign laws in the event of a contract dispute.

If risks related to any of these uncertainties materializes, it could have a material adverse effect on our business.

Clinical trial and product liability lawsuits against us could divert our resources and could cause us to incur substantial liabilities and to limit commercialization of any products that we may develop.

We will face an inherent risk of clinical trial and product liability exposure related to the testing of our product candidates in human clinical trials, and we will face an even greater risk if we commercially sell any products that we may develop. While we currently have no products in clinical trials or that have been approved for commercial sale, the future use of product candidates by us in clinical trials, and the sale of any approved products in the future, may expose us to liability claims. These claims might be made by patients that use the product, healthcare providers, pharmaceutical companies or others selling such products. If we cannot successfully defend ourselves against claims that our product candidates or products caused injuries, we will incur substantial liabilities. Regardless of merit or eventual outcome, liability claims may result in:

- decreased demand for any product candidates or products that we may develop;
- termination of clinical trials;
- injury to our reputation and significant negative media attention;
- withdrawal of clinical trial participants;
- significant costs to defend any related litigation;
- substantial monetary awards to trial participants or patients;
- loss of revenue;

- reduced resources of our management to pursue our business strategy; and
- the inability to commercialize any products that we may develop.

We currently do not hold any clinical trial liability insurance coverage. We may need to obtain insurance coverage as we expand our clinical trials or if we commence commercialization of our product candidates. Insurance coverage is increasingly expensive. We may not be able to obtain and maintain insurance coverage at a reasonable cost or in an amount adequate to satisfy any liability that may arise. If a successful clinical trial or product liability claim or series of claims is brought against us for uninsured liabilities or in excess of insured liabilities, our assets may not be sufficient to cover such claims and our business operations could be impaired.

Risks related to regulatory approval and other legal compliance matters

Gene editing is novel and the regulatory landscape that will govern any product candidates we may develop is uncertain and may change. As a result, we cannot predict the time and cost of obtaining regulatory approval, if we receive it at all, for any product candidates we may develop.

The regulatory requirements that will govern any novel gene editing product candidates we develop are not entirely clear and may change. Within the broader genetic medicines field, we are aware of a limited number of gene therapy products that have received marketing authorization from the FDA and the EMA. Even with respect to more established products that fit into the categories of gene therapies or cell therapies, the regulatory landscape is still developing. Regulatory requirements governing gene therapy products and cell therapy products have changed frequently and will likely continue to change in the future. Moreover, there is substantial, and sometimes uncoordinated, overlap in those responsible for regulation of existing gene therapy products and cell therapy products. For example, in the United States, the FDA has established the Office of Tissues and Advanced Therapies within its Center for Biologics Evaluation and Research, or CBER, to consolidate the review of gene therapy and related products, and the Cellular, Tissue and Gene Therapies Advisory Committee to advise CBER on its review. Gene therapy clinical trials may also be subject to review and oversight by an institutional biosafety committee, or IBC, a local institutional committee that reviews and oversees basic and clinical research conducted at the institution participating in the clinical trial. Although the FDA decides whether individual gene therapy protocols may proceed, the review process and determinations of other reviewing bodies can impede or delay the initiation of a clinical trial, even if the FDA has reviewed the trial and approved its initiation.

The same applies in the EU. The EMA's Committee for Advanced Therapies, or CAT, is responsible for assessing the quality, safety, and efficacy of advanced-therapy medicinal products. The role of the CAT is to prepare a draft opinion on an application for marketing authorization for a gene therapy medicinal candidate that is submitted to the Committee for Medicinal Products for Human Use, or CHMP, before CHMP adopts its final opinion. In the EU, the development and evaluation of a gene therapy medicinal product must be considered in the context of the relevant EU guidelines. The EMA may issue new guidelines concerning the development and marketing authorization for gene therapy medicinal products and require that we comply with these new guidelines. As a result, the procedures and standards applied to gene therapy products and cell therapy products may be applied to any product candidates we may develop, but that remains uncertain at this point.

Adverse developments in post-marketing experience or in clinical trials conducted by others of gene therapy products, cell therapy products, or products developed through the application of a base editing or other gene editing technology may cause the FDA, the EMA, and other regulatory bodies to revise the requirements for development or approval of any product candidates we may develop or limit the use of products utilizing base editing technologies, either of which could materially harm our business. In addition, the clinical trial requirements of the FDA, the EMA, and other regulatory authorities and the criteria these regulators use to

determine the safety and efficacy of a product candidate vary substantially according to the type, complexity, novelty, and intended use and market of the potential products. The regulatory approval process for novel product candidates such as the product candidates we may develop can be more expensive and take longer than for other, better known, or more extensively studied pharmaceutical or other product candidates. Regulatory agencies administering existing or future regulations or legislation may not allow production and marketing of products utilizing base editing technology in a timely manner or under technically or commercially feasible conditions. In addition, regulatory action or private litigation could result in expenses, delays, or other impediments to our research programs or the commercialization of resulting products.

The regulatory review committees and advisory groups described above and the new guidelines they promulgate may lengthen the regulatory review process, require us to perform additional studies or trials, increase our development costs, lead to changes in regulatory positions and interpretations, delay or prevent approval and commercialization of these treatment candidates, or lead to significant post-approval limitations or restrictions. As we advance our research programs and develop future product candidates, we will be required to consult with these regulatory and advisory groups and to comply with applicable guidelines. If we fail to do so, we may be required to delay or discontinue development of any product candidates we identify and develop.

Because we are developing product candidates in the field of genetic medicines, a field that includes gene therapy and gene editing, in which there is little clinical experience, there is increased risk that the FDA, the EMA, or other regulatory authorities may not consider the endpoints of our clinical trials to provide clinically meaningful results and that these results may be difficult to analyze.

During the regulatory review process, we will need to identify success criteria and endpoints such that the FDA, the EMA, or other regulatory authorities will be able to determine the clinical efficacy and safety profile of any product candidates we may develop. As we are seeking to identify and develop product candidates to treat diseases in which there is no clinical experience using a gene editing approach, there is heightened risk that the FDA, the EMA, or other regulatory authorities may not consider the clinical trial endpoints that we propose to provide clinically meaningful results (reflecting a tangible benefit to patients). In addition, the resulting clinical data and results may be difficult to analyze. Even if the FDA does find our success criteria to be sufficiently validated and clinically meaningful, we may not achieve the pre-specified endpoints to a degree of statistical significance. Further, even if we do achieve the pre-specified criteria, we may produce results that are unpredictable or inconsistent with the results of the non-primary endpoints or other relevant data. The FDA also weighs the benefits of a product against its risks, and the FDA may view the efficacy results in the context of safety as not being supportive of regulatory approval. Other regulatory authorities in the EU and other countries may make similar comments with respect to these endpoints and data. Any product candidates we may develop will be based on a novel technology that makes it difficult to predict the time and cost of development and of subsequently obtaining regulatory approval. No gene editing therapeutic product has been approved in the United States or in Europe.

Even if we complete the necessary preclinical studies and clinical trials, the marketing approval process is expensive, time-consuming and uncertain and may prevent us from obtaining approvals for the commercialization of any product candidates we develop. If we are not able to obtain, or if there are delays in obtaining, required regulatory approvals, we will not be able to commercialize, or will be delayed in commercializing, product candidates we develop, and our ability to generate revenue will be materially impaired.

Any product candidates we develop and the activities associated with their development and commercialization, including their design, testing, manufacture, safety, efficacy, recordkeeping, labeling, storage, approval, advertising, promotion, sale and distribution, are subject to comprehensive regulation by the FDA and other regulatory authorities in the United States and by comparable authorities in other countries.

Failure to obtain marketing approval for a product candidate will prevent us from commercializing the product candidate in a given jurisdiction. We have not received approval to market any product candidates from regulatory authorities in any jurisdiction. We have no experience as a company in filing and supporting the applications necessary to gain marketing approvals and expect to rely on third-party CROs to assist us in this process. Securing regulatory approval requires the submission of extensive preclinical and clinical data and supporting information, including manufacturing information, to the various regulatory authorities for each therapeutic indication to establish the biologic product candidate's safety, purity and potency. Securing regulatory approval also requires the submission of information about the product manufacturing process to, and inspection of manufacturing facilities by, the relevant regulatory authority. Any product candidates we develop may not be effective, may be only moderately effective or may prove to have undesirable or unintended side effects, toxicities or other characteristics that may preclude our obtaining marketing approval or prevent or limit commercial use.

The process of obtaining marketing approvals, both in the United States and abroad, is expensive, may take many years if additional clinical trials are required, if approval is obtained at all, and can vary substantially based upon a variety of factors, including the type, complexity and novelty of the product candidates involved. Of the large number of products in development, only a small percentage successfully complete the FDA or foreign regulatory approval processes and are commercialized. Even if any product candidates we may develop demonstrate safety and efficacy in clinical trials, the regulatory agencies may not complete their review processes in a timely manner, or we may not be able to obtain regulatory approval. Additional delays may result if an FDA Advisory Committee or other regulatory authority recommends non-approval or restrictions on approval. Changes in marketing approval policies during the development period, changes in or the enactment of additional statutes or regulations, or changes in regulatory review for each submitted product application, may cause delays in the approval or rejection of an application. The FDA and comparable authorities in other countries have substantial discretion in the approval process and may refuse to accept any application or may decide that our data is insufficient for approval and require additional preclinical, clinical or other studies. In addition, varying interpretations of the data obtained from preclinical and clinical testing could delay, limit or prevent marketing approval of a product candidate. Any marketing approval we ultimately obtain may be limited or subject to restrictions or post-approval commitments that render the approved product not commercially viable.

Finally, disruptions at the FDA and other agencies may prolong the time necessary for new drugs to be reviewed and/or approved by necessary government agencies, which would adversely affect our business. For example, over the last several years, the U.S. government has shut down several times and certain regulatory agencies, such as the FDA, have had to furlough critical employees and stop critical activities. If a prolonged government shutdown occurs, it could significantly impact the ability of the FDA to timely review and process our regulatory submissions, which could have a material adverse effect on our business.

If we experience delays in obtaining approval or if we fail to obtain approval of any product candidates we develop, the commercial prospects for those product candidates may be harmed and our ability to generate revenues will be materially impaired.

Obtaining and maintaining marketing approval or commercialization of our product candidates in the United States does not mean that we will be successful in obtaining marketing approval of our product candidates in other jurisdictions. Failure to obtain marketing approval in foreign jurisdictions would prevent any product candidates we develop from being marketed in such jurisdictions, which, in turn, would materially impair our ability to generate revenue.

In order to market and sell any product candidates we may develop in the European Union and many other foreign jurisdictions, we or our collaborators must obtain separate marketing approvals and comply with

numerous and varying regulatory requirements. The approval procedure varies among countries and can involve additional testing. The time required to obtain approval may differ substantially from that required to obtain FDA approval. The regulatory approval process outside the United States generally includes all of the risks associated with obtaining FDA approval. In addition, in many countries outside the United States, it is required that the product be approved for reimbursement before the product can be approved for sale in that country. We or these third parties may not obtain approvals from regulatory authorities outside the United States on a timely basis, if at all. Approval by the FDA does not ensure approval by regulatory authorities in other countries or jurisdictions, and approval by one regulatory authority outside the United States does not ensure approval by regulatory authorities in other countries or jurisdictions or by the FDA. We may not be able to file for marketing approvals and may not receive necessary approvals to commercialize our product candidates in any jurisdiction, which would materially impair our ability to generate revenue.

Additionally, we could face heightened risks with respect to seeking marketing approval in the United Kingdom as a result of the recent withdrawal of the United Kingdom from the European Union, commonly referred to as Brexit. Pursuant to the formal withdrawal arrangements agreed between the United Kingdom and the European Union, the United Kingdom withdrew from the European Union, effective December 31, 2020. On December 24, 2020, the United Kingdom and the European Union entered into a Trade and Cooperation Agreement. The agreement sets out certain procedures for approval and recognition of medical products in each jurisdiction.

Any delay in obtaining, or an inability to obtain, any marketing approvals, as a result of the Trade and Cooperation Agreement or otherwise, would prevent us from commercializing any product candidates in the United Kingdom and/or the European Union and restrict our ability to generate revenue and achieve and sustain profitability. If any of these outcomes occur, we may be forced to restrict or delay efforts to seek regulatory approval in the United Kingdom and/or the European Union for any product candidates we may develop, which could significantly and materially harm our business.

A fast track, breakthrough therapy or priority review designation by the FDA may not lead to a faster development or regulatory review or approval process and does not assure FDA approval of our product candidates.

If a product candidate is intended for the treatment of a serious or life-threatening condition and the product candidate demonstrates the potential to address unmet medical need for this condition, the sponsor may apply to the FDA for fast track designation. For fast track products, sponsors may have greater interactions with the FDA and the FDA may initiate review of sections of a fast track product's application before the application is complete. This rolling review may be available if the FDA determines, after preliminary evaluation of clinical data submitted by the sponsor, that a fast track product may be effective.

In addition, an applicant may seek designation of its product as a breakthrough therapy, which is a drug that is intended, alone or in combination with one or more other drugs, to treat a serious or life-threatening disease or condition, and preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. For drugs and biologics that have been designated as breakthrough therapies, interaction and communication between the FDA and the sponsor of the trial can help to identify the most efficient path for clinical development while minimizing the number of patients placed in ineffective control regimens.

Further, if the FDA determines that a product candidate offers major advances in treatment or provides a treatment where no adequate therapy exists, the FDA may designate the product candidate for priority review. Significant improvement may be illustrated by evidence of increased effectiveness in the treatment of a condition, elimination or substantial reduction of a treatment-limiting product reaction, documented

enhancement of patient compliance that may lead to improvement in serious outcomes, and evidence of safety and effectiveness in a new subpopulation. A priority review designation means that the goal for the FDA to review an application is six months, rather than the standard review period of ten months.

We may seek these and other designations for our product candidates. The FDA has broad discretion with respect to whether or not to grant these designations to a product candidate, so even if we believe a particular product candidate is eligible for such designation or status, the FDA may decide not to grant it. Moreover, a fast track or breakthrough therapy designation does not necessarily mean a faster regulatory review process or necessarily confer any advantage with respect to approval compared to conventional FDA procedures. As a result, while we may seek and receive these designations for our product candidates, we may not experience a faster development process, review or approval compared to conventional FDA procedures. In addition, the FDA may withdraw these designations if it believes that the designation is no longer supported by data from our clinical development program.

We may not be able to obtain orphan drug exclusivity for any product candidates we may develop, and even if we do, that exclusivity may not prevent the FDA or the EMA from approving other competing products.

Under the Orphan Drug Act, the FDA may designate a product as an orphan drug if it is a drug or biologic intended to treat a rare disease or condition. A similar regulatory scheme governs approval of orphan products by the EMA in the European Union. Generally, if a product candidate with an orphan drug designation subsequently receives the first marketing approval for the indication for which it has such designation, the product is entitled to a period of marketing exclusivity, which precludes the FDA or the EMA from approving another marketing application for the same product for the same therapeutic indication for that time period. The applicable period is seven years in the United States and ten years in the European Union. The exclusivity period in the European Union can be reduced to six years if a product no longer meets the criteria for orphan drug designation, in particular if the product is sufficiently profitable so that market exclusivity is no longer justified.

In order for the FDA to grant orphan drug exclusivity to one of our products, the agency must find that the product is indicated for the treatment of a condition or disease with a patient population of fewer than 200,000 individuals annually in the United States. The FDA may conclude that the condition or disease for which we seek orphan drug exclusivity does not meet this standard. Even if we obtain orphan drug exclusivity for a product, that exclusivity may not effectively protect the product from competition because different products can be approved for the same condition. In particular, the concept of what constitutes the “same drug” for purposes of orphan drug exclusivity remains in flux in the context of gene therapies, and the FDA has issued recent draft guidance suggesting that it would not consider two genetic medicine products to be different drugs solely based on minor differences in the transgenes or vectors. In addition, even after an orphan drug is approved, the FDA can subsequently approve the same product for the same condition if the FDA concludes that the later product is clinically superior in that it is shown to be safer, more effective or makes a major contribution to patient care. Orphan drug exclusivity may also be lost if the FDA or EMA determines that the request for designation was materially defective or if the manufacturer is unable to assure sufficient quantity of the product to meet the needs of the patients with the rare disease or condition.

In 2017, the Congress passed the FDA Reauthorization Act of 2017, or the FDARA. FDARA, among other things, codified the FDA’s pre-existing regulatory interpretation, to require that a drug sponsor demonstrate the clinical superiority of an orphan drug that is otherwise the same as a previously approved drug for the same rare disease in order to receive orphan drug exclusivity. Under Omnibus legislation signed by President Trump on December 27, 2020, the requirement for a product to show clinical superiority applies to drugs and biologics that received orphan drug designation before enactment of FDARA in 2017, but have not yet been approved or licensed by FDA. We do not know if, when, or how the FDA may change the orphan drug regulations and policies

in the future, and it is uncertain how any changes might affect our business. Depending on what changes the FDA may make to its orphan drug regulations and policies, our business could be adversely impacted.

Negative public opinion of gene editing and increased regulatory scrutiny of gene editing and genetic research may adversely impact public perception of our future product candidates.

Our potential therapeutic products involve introducing genetic material into patients' cells. The clinical and commercial success of our potential products will depend in part on public acceptance of the use of gene editing and gene regulation for the prevention or treatment of human diseases. Public attitudes may be influenced by claims that gene editing and gene regulation are unsafe, unethical or immoral, and, consequently, our products may not gain the acceptance of the public or the medical community. Adverse public attitudes may adversely impact our ability to enroll clinical trials. Moreover, our success will depend upon physicians prescribing, and their patients being willing to receive, treatments that involve the use of product candidates we may develop in lieu of, or in addition to, existing treatments with which they are already familiar and for which greater clinical data may be available.

More restrictive government regulations or negative public opinion would have a negative effect on our business or financial condition and may delay or impair the development and commercialization of our product candidates or demand for any products once approved. For example, in 2003, trials using early versions of murine gamma-retroviral vectors, which integrate with, and thereby alter, the host cell's DNA, have led to several well-publicized adverse events, including reported cases of leukemia. Adverse events in our clinical trials, even if not ultimately attributable to our product candidates, and the resulting publicity could result in increased governmental regulation, unfavorable public perception, potential regulatory delays in the testing or approval of our product candidates, stricter labeling requirements for those product candidates that are approved and a decrease in demand for any such product candidates. The risk of cancer remains a concern for gene editing and we cannot assure that it will not occur in any of our planned or future clinical trials. If any such adverse events occur, commercialization of our product candidates or further advancement of our clinical trials could be halted or delayed, which would have a negative impact on our business and operations.

Even if we, or any collaborators we may have, obtain marketing approvals for any product candidates we develop, the terms of approvals and ongoing regulation of our products could require the substantial expenditure of resources and may limit how we, or they, manufacture and market our products, which could materially impair our ability to generate revenue.

Any product candidate for which we obtain marketing approval, along with the manufacturing processes, post-approval clinical data, labeling, advertising, and promotional activities for such product, will be subject to continual requirements of and review by the FDA and other regulatory authorities. These requirements include submissions of safety and other post-marketing information and reports, registration and listing requirements, cGMP requirements relating to quality control, quality assurance and corresponding maintenance of records and documents, and requirements regarding the distribution of samples to physicians and recordkeeping. Even if marketing approval of a product candidate is granted, the approval may be subject to limitations on the indicated uses for which the product may be marketed or to the conditions of approval, or contain requirements for costly post-marketing testing and surveillance to monitor the safety or efficacy of the product.

Accordingly, assuming we, or any collaborators we may have, receive marketing approval for one or more product candidates we develop, we, and such collaborators, and our and their contract manufacturers will continue to expend time, money, and effort in all areas of regulatory compliance, including manufacturing, production, product surveillance, and quality control. If we and such collaborators are not able to comply with post-approval regulatory requirements, we and such collaborators could have the marketing approvals for our products withdrawn by regulatory authorities and our, or such collaborators', ability to market any future

products could be limited, which could adversely affect our ability to achieve or sustain profitability. Further, the cost of compliance with post-approval regulations may have a negative effect on our business, operating results, financial condition, and prospects.

Any product candidate for which we obtain marketing approval could be subject to restrictions or withdrawal from the market, and we may be subject to substantial penalties if we fail to comply with regulatory requirements or if we experience unanticipated problems with our products, when and if any of them are approved.

The FDA and other regulatory agencies closely regulate the post-approval marketing and promotion of medicines to ensure that they are marketed only for the approved indications and in accordance with the provisions of the approved labeling. Although physicians may prescribe products for uses not described in the product's labeling, known as off-label uses, in their professional medical judgement, the FDA and other regulatory agencies impose stringent restrictions on manufacturers' communications regarding off-label use, and if we market our products, if approved, in a manner inconsistent with their approved labeling, we may be subject to enforcement action for off-label marketing by the FDA and other federal and state enforcement agencies, including the Department of Justice, or DOJ. Violation of the Federal Food, Product, and Cosmetic Act and other statutes, including the False Claims Act, relating to the promotion and advertising of prescription products may also lead to investigations or allegations of violations of federal and state health care fraud and abuse laws and state consumer protection laws.

In addition, later discovery of previously unknown problems with our product candidates, manufacturers, or manufacturing processes, or failure to comply with regulatory requirements, may yield various results, including:

- restrictions on such products, manufacturers, or manufacturing processes;
- restrictions on the labeling or marketing of a medicine;
- restrictions on the distribution or use of a medicine;
- requirements to conduct post-marketing clinical trials;
- receipt of warning or untitled letters;
- withdrawal of the medicines from the market;
- refusal to approve pending applications or supplements to approved applications that we submit;
- recall of medicines;
- fines, restitution, or disgorgement of profits or revenue;
- suspension or withdrawal of marketing approvals;
- suspension of any ongoing clinical trials;
- refusal to permit the import or export of our medicines;
- product seizure; and
- injunctions or the imposition of civil or criminal penalties.

Any government investigation of alleged violations of law could require us to expend significant time and resources in response and could generate negative publicity. The occurrence of any event or penalty described

above may inhibit our ability to commercialize any product candidates we develop and adversely affect our business, financial condition, results of operations, and prospects.

Any relationships we may have with customers, healthcare providers and professionals, and third-party payors, among others, will be subject to applicable anti-kickback, fraud and abuse and other healthcare laws and regulations, which could expose us to penalties, including criminal sanctions, civil penalties, contractual damages, reputational harm, fines, disgorgement, exclusion from participation in government healthcare programs, curtailment or restricting of our operations, and diminished profits and future earnings.

Healthcare providers, physicians and third-party payors will play a primary role in the recommendation and prescription of any products for which we are able to obtain marketing approval. Any arrangements we have with healthcare providers, third-party payors and customers will subject us to broadly applicable fraud and abuse and other healthcare laws and regulations. The laws and regulations may constrain the business or financial arrangements and relationships through which we conduct clinical research, market, sell and distribute any products for which we obtain marketing approval. These include the following:

- the federal healthcare anti-kickback statute prohibits, among other things, persons from knowingly and willfully soliciting, offering, receiving or providing remuneration, directly or indirectly, in cash or in kind, to induce or reward either the referral of an individual for, or the purchase, order, or recommendation of, any good or service, for which payment may be made under federal and state healthcare programs such as Medicare and Medicaid;
- the federal civil and criminal false claims laws, including the federal False Claims Act, which can be enforced through civil whistleblower or qui tam actions, and civil monetary penalty laws impose civil and criminal penalties against individuals or entities for knowingly presenting or causing to be presented, to the federal government, claims for payment or approval from Medicare, Medicaid or other government payers that are false or fraudulent or making a false statement to avoid, decrease or conceal an obligation to pay money to the federal government, with potential liability including mandatory treble damages and significant per-claim penalties;
- the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, which prohibits, among other things, knowingly and willfully executing, or attempting to execute, a scheme or artifice to defraud any healthcare benefit program or obtain, by means of false or fraudulent pretenses, representations, or promises, any of the money or property owned by, or under the custody or control of, any healthcare benefit program, regardless of the payor (e.g., public or private), and knowingly and willfully falsifying, concealing or covering up by any trick or device a material fact or making any materially false, fictitious or fraudulent statements in connection with the delivery of, or payment for, healthcare benefits, items or services relating to healthcare matters;
- HIPAA, as further amended by the Health Information Technology for Economic and Clinical Health Act, or HITECH, which imposes certain requirements, including mandatory contractual terms, on covered entities subject to the rule, such as health plans, healthcare clearinghouses and certain healthcare providers, as well as their respective business associates and their subcontractors that perform services for them that involve the use, or disclosure of, individually identifiable health information, relating to the privacy, security, and transmission of such individually identifiable health information;
- the federal transparency requirements under the federal Physician Payments Sunshine Act, which requires certain manufacturers of drugs, devices, biologics and medical supplies to report to the Department of Health and Human Services, or HHS, information related to payments and other transfers of value to physicians, as defined by such law, and teaching hospitals and ownership and investment interests held by physicians (as defined by such law) and their immediate family members and applicable group purchasing

organizations, and, beginning in 2022, will require applicable manufacturers to report information regarding payments and other transfers of value provided during the previous year to physician assistants, nurse practitioners, clinical nurse specialists, certified registered nurse anesthetists, anesthesiologist assistants, and certified nurse midwives; and

- analogous state laws and regulations, such as state anti-kickback and false claims laws, which may apply to sales or marketing arrangements and claims involving healthcare items or services reimbursed by non-governmental third-party payers, including private insurers, and certain state laws that require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government in addition to requiring drug manufacturers to report information related to drug pricing and payments to physicians and other healthcare providers or marketing expenditures and state and local laws that require the registration of sales representatives; and state and foreign laws governing the privacy and security of health information in some circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

Efforts to ensure that any business arrangements we have with third parties, and our business generally, will comply with applicable healthcare laws and regulations will involve substantial costs. It is possible that governmental authorities will conclude that our business practices may not comply with current or future statutes, regulations or case law involving applicable fraud and abuse or other healthcare laws and regulations. If our operations are found to be in violation of any of these laws or any other governmental regulations that may apply to us, we may be subject to significant civil, criminal and administrative penalties, damages, fines, individual imprisonment, additional reporting requirements and oversight if we become subject to a corporate integrity agreement or similar agreement to resolve allegations of non-compliance with these laws, exclusion of products from government funded healthcare programs, such as Medicare and Medicaid, disgorgement, contractual damages, reputational harm, and the curtailment or restructuring of our operations. Defending against any such actions can be costly, time-consuming and may require significant financial and personnel resources. Therefore, even if we are successful in defending against any such actions that may be brought against us, our business may be impaired. Further, if any of the physicians or other healthcare providers or entities with whom we expect to do business is found to be not in compliance with applicable laws, they may be subject to criminal, civil or administrative sanctions, including exclusions from government funded healthcare programs.

Current and future legislation may increase the difficulty and cost for us and any collaborators to obtain marketing approval and commercialize our product candidates and affect the prices we, or they, may obtain.

In the United States and some foreign jurisdictions, there have been a number of legislative and regulatory changes and proposed changes regarding the healthcare system that could, among other things, prevent or delay marketing approval of our product candidates, restrict or regulate post-approval activities and affect our ability, or the ability of any collaborators, to profitably sell or commercialize any product candidate for which we, or they, obtain marketing approval. We expect that current laws, as well as other healthcare reform measures that may be adopted in the future, may result in more rigorous coverage criteria and in additional downward pressure on the price that we, or any collaborators, may receive for any approved products.

In March 2010, President Obama signed into law the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act of 2010, or collectively the ACA. In addition, other legislative changes have been proposed and adopted since the ACA was enacted. In August 2011, the Budget Control Act of 2011, among other things, created measures for spending reductions by Congress. A Joint Select Committee on Deficit Reduction, tasked with recommending a targeted deficit reduction of at least $1.2 trillion for the years 2013 through 2021, was unable to reach required goals, thereby triggering the legislation's automatic reduction

to several government programs. These changes included aggregate reductions to Medicare payments to providers of up to 2% per fiscal year, which went into effect in April 2013 and will remain in effect through 2030, with the exception of a temporary suspension from May 1, 2020 through December 31, 2021, unless additional Congressional action is taken. The American Taxpayer Relief Act of 2012, among other things, reduced Medicare payments to several providers and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. These new laws may result in additional reductions in Medicare and other healthcare funding and otherwise affect the prices we may obtain for any of our product candidates for which we may obtain regulatory approval or the frequency with which any such product candidate is prescribed or used.

Since enactment of the ACA, there have been, and continue to be, numerous legal challenges and Congressional actions to repeal and replace provisions of the law. For example, with enactment of the Tax Act, Congress repealed the “individual mandate.” The repeal of this provision, which requires most Americans to carry a minimal level of health insurance, became effective in 2019. Further, on December 14, 2018, a U.S. District Court judge in the Northern District of Texas ruled that the individual mandate portion of the ACA is an essential and inseverable feature of the ACA, and therefore because the mandate was repealed as part of the Tax Cuts and Jobs Act, the remaining provisions of the ACA are invalid as well. On December 18, 2019, the Court of Appeals for the Fifth Circuit court affirmed the lower court’s ruling that the individual mandate portion of the ACA is unconstitutional and it remanded the case to the district court for reconsideration of the severability question and additional analysis of the provisions of the ACA. Thereafter, the U.S. Supreme Court agreed to hear this case. Oral argument in the case took place on November 10, 2020. On February 10, 2021, the Biden administration withdrew the federal government’s support for overturning the ACA. A ruling by the Court is expected sometime this year. Litigation and legislation over the ACA are likely to continue, with unpredictable and uncertain results.

The former Trump presidential administration also took executive actions to undermine or delay implementation of the ACA, including directing federal agencies with authorities and responsibilities under the ACA to waive, defer, grant exemptions from, or delay the implementation of any provision of the ACA that would impose a fiscal or regulatory burden on states, individuals, healthcare providers, health insurers, or manufacturers of pharmaceuticals or medical devices. On January 28, 2021, however, President Biden revoked those orders and issued a new Executive Order which directs federal agencies to reconsider rules and other policies that limit Americans’ access to health care, and consider actions that will protect and strengthen that access. Under this Order, federal agencies are directed to re-examine: policies that undermine protections for people with pre-existing conditions, including complications related to COVID-19; demonstrations and waivers under Medicaid and the ACA that may reduce coverage or undermine the programs, including work requirements; policies that undermine the Health Insurance Marketplace or other markets for health insurance; policies that make it more difficult to enroll in Medicaid and the ACA; and policies that reduce affordability of coverage or financial assistance, including for dependents. This Executive Order also directs the U.S. Department of Health and Human Services to create a special enrollment period for the Health Insurance Marketplace in response to the COVID-19 pandemic.

We expect that these healthcare reform measures, as well as other healthcare reform measures that may be adopted in the future, may result in additional reductions in Medicare and other healthcare funding, more rigorous coverage criteria, new payment methodologies and additional downward pressure on the price that we receive for any approved product and/or the level of reimbursement physicians receive for administering any approved product we might bring to market. Reductions in reimbursement levels may negatively impact the prices we receive or the frequency with which our products are prescribed or administered. Any reduction in reimbursement from Medicare or other government programs may result in a similar reduction in payments from private payors. Accordingly, such reforms, if enacted, could have an adverse effect on anticipated revenue

from product candidates that we may successfully develop and for which we may obtain marketing approval and may affect our overall financial condition and ability to develop or commercialize product candidates. It is also possible that additional governmental action will be taken in response to the COVID-19 pandemic.

The prices of prescription pharmaceuticals in the United States and foreign jurisdictions is subject to considerable legislative and executive actions and could impact the prices we obtain for our products, if and when licensed.

The prices of prescription pharmaceuticals have also been the subject of considerable discussion in the United States. To date, there have been several recent U.S. Congressional inquiries, as well as proposed and enacted state and federal legislation designed to, among other things, bring more transparency to drug pricing, review the relationship between pricing and manufacturer patient programs, reduce the costs of drugs under Medicare and reform government program reimbursement methodologies for products. To those ends, President Trump issued several executive orders intended to lower the costs of prescription drug products. Certain of these orders are reflected in recently promulgated regulations, including an interim final rule implementing President Trump's most favored nation model, but such final rule is currently subject to a nationwide preliminary injunction. It remains to be seen whether these orders and resulting regulations will remain in force during the Biden administration. Further, on September 24, 2020, the former Trump presidential administration finalized a rule allowing states or certain other non-federal government entities to submit importation program proposals to the FDA for review and approval. Applicants are required to demonstrate that their importation plans pose no additional risk to public health and safety and will result in significant cost savings for consumers. The FDA has issued draft guidance that would allow manufacturers to import their own FDA-approved drugs that are authorized for sale in other countries (multi-market approved products).

At the state level, individual states are increasingly aggressive in passing legislation and implementing regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. In addition, regional health care organizations and individual hospitals are increasingly using bidding procedures to determine what pharmaceutical products and which suppliers will be included in their prescription drug and other health care programs. These measures could reduce the ultimate demand for our products, once approved, or put pressure on our product pricing. We expect that additional state and federal healthcare reform measures will be adopted in the future, any of which could limit the amounts that federal and state governments will pay for healthcare products and services, which could result in reduced demand for our product candidates or additional pricing pressures.

In the European Union, similar political, economic and regulatory developments may affect our ability to profitably commercialize our product candidates, if approved. In markets outside of the United States and the European Union, reimbursement and healthcare payment systems vary significantly by country, and many countries have instituted price ceilings on specific products and therapies. In some countries, particularly the countries of the European Union, the pricing of prescription pharmaceuticals is subject to governmental control. In these countries, pricing negotiations with governmental authorities can take considerable time after the receipt of marketing approval for a product. To obtain reimbursement or pricing approval in some countries, we may be required to conduct a clinical trial that compares the cost-effectiveness of our product candidate to other available therapies. If reimbursement of our products is unavailable or limited in scope or amount, or if pricing is set at unsatisfactory levels, our business could be harmed, possibly materially.

Compliance with global privacy and data security requirements could result in additional costs and liabilities to us or inhibit our ability to collect and process data globally or transfer such data across borders, and the failure to comply with such requirements could subject us to significant fines and penalties, which may have a material adverse effect on our business, financial condition or results of operations.

The regulatory framework for the collection, use, safeguarding, sharing, transfer and other processing of information worldwide is rapidly evolving and is likely to remain uncertain for the foreseeable future. Globally, virtually every jurisdiction in which we operate has established its own data security and privacy frameworks with which we must comply. For example, the collection, use, disclosure, transfer, or other processing of personal data regarding individuals in the European Union, including personal health data, is subject to the EU General Data Protection Regulation, or the GDPR, which took effect across all member states of the European Economic Area, or EEA, in May 2018. The GDPR is wide-ranging in scope and imposes numerous requirements on companies that process personal data, including requirements relating to processing health and other sensitive data, obtaining consent of the individuals to whom the personal data relates, providing information to individuals regarding data processing activities, implementing safeguards to protect the security and confidentiality of personal data, providing notification of data breaches, and taking certain measures when engaging third-party processors. The GDPR would increase our obligations with respect to clinical trials conducted in the EEA by expanding the definition of personal data to include coded data and requiring changes to informed consent practices and more detailed notices for clinical trial subjects and investigators. In addition, the GDPR also imposes strict rules on the transfer of personal data to countries outside the European Union and, as a result, increases the scrutiny that clinical trial sites located in the EEA should apply to transfers of personal data from such sites. The GDPR also permits data protection authorities to require destruction of improperly gathered or used personal information and/or impose substantial fines for violations of the GDPR, which can be up to four percent of global revenues or 20 million Euros, whichever is greater, and it also confers a private right of action on data subjects and consumer associations to lodge complaints with supervisory authorities, seek judicial remedies, and obtain compensation for damages resulting from certain violations of the GDPR. In addition, the GDPR provides that European Union member states may make their own further laws and regulations limiting the processing of personal data, including genetic, biometric or health data.

The GDPR also imposes strict rules on the transfer of personal data to countries outside EEA, including the United States, unless the parties to the transfer have implemented safeguards to protect the transferred personal information. The Court of Justice of the European Union, or CJEU, recently raised questions in a decision that has been dubbed Schrems II about whether the European Commission's Standard Contractual Clauses, one of the primary mechanisms used by companies to import personal information from Europe, complies with the GDPR. The Schrems II decision also invalidated the EU-U.S. Privacy Shield, a mechanism used by numerous companies to transfer personal data from the EU to the U.S. While the CJEU upheld the validity of the Standard Contractual Clauses, the CJEU ruled that the underlying data transfers must be assessed on a case-by-case basis by the data controller to determine whether the personal information will be adequately protected. Further, the European Commission recently proposed updates to the Standard Contractual Clauses. At present, there are few if any viable alternatives to the Standard Contractual Clauses and, therefore, there is uncertainty regarding how to ensure that transfers of personal information from Europe to the United States comply with the GDPR. As such, any transfers by us, or our vendors, of personal information from Europe may not comply with European data protection laws and may increase our exposure to the GDPR's heightened sanctions for violations of its cross-border data transfer restrictions. Loss of our ability to transfer personal information from Europe may also require us to increase our data processing capabilities in those jurisdictions at significant expense.

Further, the UK's withdrawal from the EU and EEA on January 31, 2020 has created uncertainty with regard to data protection regulation in the UK. As of January 1, 2021, companies are subject to the UK GDPR and UK Data

Protection Act of 2018, which retains the GDPR in the UK's national law. In particular, the collection, use, storage, disclosure, transfer, or other processing of personal data (including health data processed in the context of clinical trials) regarding data subjects in the U.K. and/or carried out in the context of the activities of our establishment in the U.K. is subject to the UK GDPR and the UK Data Protection Act of 2018. However, it is still unclear whether the transfer of personal information from the EEA to the UK will remain lawful under the GDPR.

There are a broad variety of data protection laws that are applicable to our activities, and a wide range of enforcement agencies at both the state and federal levels that can review companies for privacy and data security concerns based on general consumer protection laws. The Federal Trade Commission and state Attorneys General all are aggressive in reviewing privacy and data security protections for consumers. New laws also are being considered at both the state and federal levels. For example, the California Consumer Privacy Act, or CCPA—which went into effect on January 1, 2020—is creating similar risks and obligations as those created by GDPR, though the Act does exempt certain information collected as part of a clinical trial subject to the Federal Policy for the Protection of Human Subjects (the Common Rule). In addition, California voters approved a new privacy law, the California Privacy Rights Act, or CPRA, in the November 3, 2020 election. Effective starting on January 1, 2023, the CPRA will significantly modify the CCPA, including by expanding consumers' rights with respect to certain sensitive personal information. The CPRA also creates a new state agency that will be vested with authority to implement and enforce the CCPA and the CPRA. It remains unclear, however, how the CCPA and CPRA will be interpreted.

New legislation proposed or enacted in Illinois, Massachusetts, Nevada, New Jersey, New York, Rhode Island, Virginia, Washington and other states, and a proposed right to privacy amendment to the Vermont Constitution, imposes, or has the potential to impose, additional obligations on companies that collect, store, use, retain, disclose, transfer and otherwise process confidential, sensitive and personal information, and will continue to shape the data privacy environment nationally. For example, Virginia became the second state to enact a comprehensive privacy law when it recently passed the Consumer Data Protection Act, or CDPA, which will take effect on January 1, 2023. The CDPA contains provisions that require businesses subject to the legislation to conduct data protection assessments in certain circumstances and that require opt-in consent from Virginia consumers to process certain sensitive personal information.

Overall, state laws are changing rapidly and may be more stringent or broader in scope, or offer greater individual rights, with respect to confidential, sensitive and personal information than federal, international or other state laws, and such laws may differ from each other, which may complicate compliance efforts. There is also discussion in Congress of a new federal data protection and privacy law to which we would become subject if it is enacted. All of these evolving compliance and operational requirements impose significant costs that are likely to increase over time, may require us to modify our data processing practices and policies, divert resources from other initiatives and projects, and could restrict the way products and services involving data are offered, all of which could significantly harm our business, financial condition, results of operations and prospects.

Many other states are considering similar legislation. A broad range of legislative measures also have been introduced at the federal level. Accordingly, failure to comply with federal and state laws (both those currently in effect and future legislation) regarding privacy and security of personal information could expose us to fines and penalties under such laws. There also is the threat of consumer class actions related to these laws and the overall protection of personal data. Even if we are not determined to have violated these laws, government investigations into these issues typically require the expenditure of significant resources and generate negative publicity, which could harm our reputation and our business.

Given the breadth and depth of changes in data protection obligations, preparing for and complying with these requirements is rigorous and time intensive and requires significant resources and a review of our technologies,

systems and practices, as well as those of any third-party collaborators, service providers, contractors or consultants that process or transfer personal data collected in the European Union. The GDPR and other changes in laws or regulations associated with the enhanced protection of certain types of sensitive data, such as healthcare data or other personal information from our clinical trials, could require us to change our business practices and put in place additional compliance mechanisms, may interrupt or delay our development, regulatory and commercialization activities and increase our cost of doing business, and could lead to government enforcement actions, private litigation and significant fines and penalties against us and could have a material adverse effect on our business, financial condition or results of operations.

In addition, any breach of privacy laws or data security laws, particularly resulting in a significant security incident or breach involving the misappropriation, loss or other unauthorized use or disclosure of sensitive or confidential patient or consumer information, could have a material adverse effect on our business, reputation and financial condition. As a data controller, we will be accountable for any third-party service providers we engage to process personal data on our behalf, including our CROs. We attempt to mitigate the associated risks but there is no assurance that privacy and security-related safeguards will protect us from all risks associated with the third-party processing, storage and transmission of such information.

Our employees, principal investigators, consultants and commercial partners may engage in misconduct or other improper activities, including non-compliance with regulatory standards and requirements and insider trading.

We are exposed to the risk of fraud or other misconduct by our employees, vendors, consultants and partners, and, if we commence clinical trials, our principal investigators and CROs. Misconduct by these parties could include intentional failures to comply with FDA regulations or the regulations applicable in the European Union and other jurisdictions, provide accurate information to the FDA, the European Commission, and other regulatory authorities, comply with healthcare fraud and abuse laws and regulations in the United States and abroad, report financial information or data accurately, or disclose unauthorized activities to us. In particular, sales, marketing, and business arrangements in the healthcare industry are subject to extensive laws and regulations intended to prevent fraud, misconduct, kickbacks, self-dealing and other abusive practices. These laws and regulations restrict or prohibit a wide range of pricing, discounting, marketing and promotion, sales commission, customer incentive programs, and other business arrangements. Such misconduct also could involve the improper use of information obtained in the course of clinical trials or interactions with the FDA or other regulatory authorities, which could result in regulatory sanctions and cause serious harm to our reputation. We have adopted a code of conduct applicable to all of our employees, but it is not always possible to identify and deter employee misconduct, and the precautions we take to detect and prevent this activity may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from government investigations or other actions or lawsuits stemming from a failure to comply with these laws or regulations. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business, financial condition, results of operations and prospects, including the imposition of significant fines or other sanctions.

Laws and regulations governing any international operations we may have in the future may preclude us from developing, manufacturing and selling certain product candidates outside of the United States and require us to develop and implement costly compliance programs.

We are subject to numerous laws and regulations in each jurisdiction outside the United States in which we operate. The creation, implementation and maintenance of international business practices compliance programs is costly and such programs are difficult to enforce, particularly where reliance on third parties is required.

The Foreign Corrupt Practices Act, or FCPA, prohibits any U.S. individual or business from paying, offering, authorizing payment or offering of anything of value, directly or indirectly, to any foreign official, political party, or candidate for the purpose of influencing any act or decision of the foreign entity in order to assist the individual or business in obtaining or retaining business. The FCPA also obligates companies whose securities are listed in the United States to comply with certain accounting provisions requiring the company to maintain books and records that accurately and fairly reflect all transactions of the corporation, including international subsidiaries, and to devise and maintain an adequate system of internal accounting controls for international operations. The anti-bribery provisions of the FCPA are enforced primarily by the DOJ. The Securities and Exchange Commission, or SEC, is involved with enforcement of the books and records provisions of the FCPA.

Compliance with the FCPA and other anti-corruption laws potentially applicable to our business is expensive and difficult, particularly in countries in which corruption is a recognized problem. In addition, the compliance with the FCPA and other anti-corruption laws presents particular challenges in the pharmaceutical industry, because, in many countries, hospitals are operated by the government, and doctors and other hospital employees are considered foreign officials. Certain payments to hospitals in connection with clinical trials and other work have been deemed to be improper payments to government officials and have led to FCPA enforcement actions.

We are also subject to other laws and regulations governing our international operations, including applicable export control laws, economic sanctions on countries and persons, and customs requirements. In addition, various laws, regulations and executive orders also restrict the use and dissemination outside of the United States, or the sharing with certain non-U.S. nationals, of information classified for national security purposes, as well as certain products and technical data relating to those products. Our expansion outside of the United States has required, and will continue to require, us to dedicate additional resources to comply with these laws, and these laws may preclude us from developing, manufacturing, or selling certain drugs and drug candidates outside of the United States, which could limit our growth potential and increase our development costs.

There is no assurance that we will be completely effective in ensuring our compliance with the FCPA and other applicable anti-corruption, export, sanctions, and customs laws. The failure to comply with laws governing international business practices may result in substantial penalties, including suspension or debarment from government contracting. Violations of these laws, including the FCPA, can result in significant civil and criminal penalties. Indictment alone under the FCPA can lead to suspension of the right to do business with the U.S. government until the pending claims are resolved. Conviction of a violation of the FCPA can result in long-term disqualification as a government contractor. The termination of a government contract or relationship as a result of our failure to satisfy any of our obligations under laws governing international business practices would have a negative impact on our operations and harm our reputation and ability to procure government contracts. The SEC also may suspend or bar issuers from trading securities on U.S. exchanges for violations of the FCPA's accounting provisions.

If we or any third-party manufacturer we engage now or in the future fail to comply with environmental, health and safety laws and regulations, we could become subject to fines or penalties or incur costs or liabilities that could have a material adverse effect on our business.

We and third-party manufacturers we engage now are, and any third-party manufacturer we may engage in the future will be, subject to numerous environmental, health and safety laws and regulations, including those governing laboratory procedures and the handling, use, storage, treatment and disposal of hazardous materials and wastes. Our operations involve the use of hazardous and flammable materials, including chemicals and biological materials. Our operations also produce hazardous waste products. We generally contract with third parties for the disposal of these materials and wastes. We cannot eliminate the risk of contamination or injury from these materials. In the event of contamination or injury resulting from our use of hazardous materials, we

could be held liable for any resulting damages, and any liability could exceed our resources. We also could incur significant costs associated with civil or criminal fines and penalties.

Although we maintain general liability insurance as well as workers' compensation insurance to cover us for costs and expenses we may incur due to injuries to our employees resulting from the use of hazardous materials, this insurance may not provide adequate coverage against potential liabilities. We do not maintain insurance for environmental liability or toxic tort claims that may be asserted against us in connection with our storage or disposal of biological, hazardous or radioactive materials.

In addition, we may incur substantial costs in order to comply with current or future environmental, health and safety laws and regulations. These current or future laws and regulations may impair our research, development or commercialization efforts. Failure to comply with these laws and regulations also may result in substantial fines, penalties or other sanctions.

Further, with respect to the operations of our current and any future third-party contract manufacturers, it is possible that if they fail to operate in compliance with applicable environmental, health and safety laws and regulations or properly dispose of wastes associated with our products, we could be held liable for any resulting damages, suffer reputational harm or experience a disruption in the manufacture and supply of our product candidates or products. In addition, our supply chain may be adversely impacted if any of our third-party contract manufacturers become subject to injunctions or other sanctions as a result of their non-compliance with environmental, health and safety laws and regulations.

Risks related to employee matters and managing growth

Our future success depends on our ability to retain key executives and to attract, retain and motivate qualified personnel.

We are highly dependent on the research and development, clinical, financial, operational and other business expertise of Sekar Kathiresan, M.D., our chief executive officer, Andrew Ashe, J.D., our president, chief operating officer and general counsel, and Andrew Bellinger, M.D., Ph.D., our chief scientific officer, as well as the other principal members of our management, scientific and clinical teams. Although we have entered into employment agreements with our executive officers, each of them may terminate their employment with us at any time. We do not maintain "key person" insurance for any of our executives or other employees. Recruiting and retaining qualified scientific, clinical, manufacturing, accounting, legal and sales and marketing personnel will also be critical to our success.

The loss of the services of our executive officers or other key employees could impede the achievement of our research, development and commercialization objectives and seriously harm our ability to successfully implement our business strategy. Furthermore, replacing executive officers and key employees may be difficult and may take an extended period of time because of the limited number of individuals in our industry with the breadth of skills and experience required to successfully develop, gain marketing approval of and commercialize products. Competition to hire from this limited pool is intense, and we may be unable to hire, train, retain or motivate these key personnel on acceptable terms given the competition among numerous pharmaceutical and biotechnology companies for similar personnel. We also experience competition for the hiring of scientific and clinical personnel from universities and research institutions. In addition, we rely on consultants and advisors, including scientific and clinical advisors, to assist us in formulating our research and development and commercialization strategy. Our consultants and advisors may be employed by employers other than us and may have commitments under consulting or advisory contracts with other entities that may limit their availability to us. Our success as a public company also depends on implementing and maintaining internal controls and the accuracy and timeliness of our financial reporting. If we are unable to continue to attract and retain high quality personnel, our ability to pursue our growth strategy will be limited.

We expect to expand our development and regulatory capabilities and potentially implement sales, marketing and distribution capabilities, and as a result, we may encounter difficulties in managing our growth, which could disrupt our operations.

As our development progresses, we expect to experience significant growth in the number of our employees and the scope of our operations, particularly in the areas of drug development, clinical, regulatory affairs, manufacturing and quality control and, if any of our product candidates receive marketing approval, sales, marketing and distribution. To manage our anticipated future growth, we must continue to implement and improve our managerial, operational and financial systems, expand our facilities and continue to recruit and train additional qualified personnel. Due to our limited financial resources and the limited experience of our management team in managing a company with such anticipated growth, we may not be able to effectively manage the expansion of our operations or recruit and train additional qualified personnel. The expansion of our operations may lead to significant costs and may divert our management and business development resources. Any inability to manage growth could delay the execution of our business plans or disrupt our operations.

Future acquisitions or strategic alliances could disrupt our business and harm our financial condition and results of operations.

We may acquire additional businesses, technologies or assets, form strategic alliances or create joint ventures with third parties that we believe will complement or augment our existing business. If we acquire businesses with promising markets or technologies, we may not be able to realize the benefit of acquiring such businesses if we are unable to successfully integrate them with our existing operations and company culture. We may encounter numerous difficulties in developing, manufacturing and marketing any new products or product candidates resulting from a strategic alliance or acquisition that may delay or prevent us from realizing their expected benefits or enhancing our business. We cannot assure you that, following any such acquisition, we will achieve the expected synergies to justify the transaction. The risks we face in connection with acquisitions include:

- diversion of management time and focus from operating our business to addressing acquisition integration challenges;
- coordination of research and development efforts;
- retention of key employees from the acquired company;
- changes in relationships with collaborators as a result of product acquisitions or strategic positioning resulting from the acquisition;
- cultural challenges associated with integrating employees from the acquired company into our organization;
- the need to implement or improve controls, procedures and policies at a business that prior to the acquisition may have lacked sufficiently effective controls, procedures and policies;
- liability for activities of the acquired company before the acquisition, including intellectual property infringement claims, violation of laws, commercial disputes, tax liabilities and other known liabilities;
- unanticipated write-offs or charges; and
- litigation or other claims in connection with the acquired company, including claims from terminated employees, customers, former stockholders or other third parties.

Our failure to address these risks or other problems encountered in connection with our past or future acquisitions or strategic alliances could cause us to fail to realize the anticipated benefits of these transactions,

cause us to incur unanticipated liabilities and harm the business generally. There is also a risk that future acquisitions will result in the incurrence of debt, contingent liabilities, amortization expenses or incremental operating expenses, any of which could harm our financial condition or results of operations.

Our internal computer systems, or those of our collaborators or other contractors or consultants, may fail or suffer security breaches, which could result in a material disruption of our product development programs.

Our internal computer systems and those of any collaborators, contractors or consultants are vulnerable to damage from computer viruses, unauthorized access, natural disasters, terrorism, war and telecommunication and electrical failures. If our privacy protection, data protection, or information security measures (or those of any third parties that handle our sensitive information) are inadequate or are breached as a result of third-party action, employee or contractor error, malfeasance, malware, system error, software bugs or defects in our products, trickery, process failure or otherwise, third parties gaining access to employee accounts using stolen or inferred credentials, computer malware, viruses, spamming, phishing attacks or other means, and deliberate attacks and attempts to gain unauthorized access to computer systems and networks, and, as a result, there is improper disclosure of, or someone obtains unauthorized access to sensitive information, including personally identifiable information or protected health information, or if we suffer a ransomware or advanced persistent threat attack, or if any of the foregoing is reported or perceived to have occurred, our reputation and business could be damaged, we could incur significant costs associated with remediation and the implementation of additional security measures, we may incur significant liability and financial loss, and be subject to regulatory scrutiny, investigations, proceedings, lawsuits and penalties.

Cyber-attacks are increasing in their frequency, sophistication and intensity, and have become increasingly difficult to detect. Cyber-attacks could include the deployment of harmful malware, ransomware, denial-of-service attacks, unauthorized access to or deletion of files, social engineering and other means to affect service reliability and threaten the confidentiality, integrity and availability of information. We cannot guarantee that the measures we have taken to date, and actions we may take in the future, will be sufficient to remediate any future breaches. Cyber-attacks also could include phishing attempts or e-mail fraud to cause payments or information to be transmitted to an unintended recipient.

To the extent we experience a material system failure, accident, cyber-attack or security breach, it could result in a material disruption of our development programs and our business operations, whether due to a loss of our trade secrets or other proprietary information or other similar disruptions. For example, the loss of clinical trial data from completed or future clinical trials could result in delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data. To the extent that any disruption or security breach were to result in a loss of, or damage to, our data or applications, or inappropriate disclosure of confidential or proprietary information, we could incur liability, our competitive position could be harmed and the further development and commercialization of our product candidates could be delayed.

While we have not experienced any material system failures, accidents or security breaches to date, if such an event were to occur and cause interruptions in our operations, it could result in a disruption of our drug development programs. These threats pose a risk to the security of our, our collaborators', our CROs', third-party logistics and service providers', distributors' and other contractors' and consultants' systems and networks, and the confidentiality, availability and integrity of our data. There can be no assurance that we will be successful in preventing cyber-attacks or successfully mitigating their effects. Any cyber-attack, data breach or destruction, inaccessibility, or loss of data could result in a violation of applicable U.S. and international privacy, data protection and other laws, and subject us to litigation and governmental investigations and proceedings by federal, state and local regulatory entities in the United States and by international regulatory entities, resulting in exposure to material civil and/or criminal liability. Further, our general liability insurance and corporate risk program may not cover all potential claims to which we are exposed and may not be

adequate to indemnify us for all liability that may be imposed; and could have a material adverse effect on our business and prospects. For example, the loss of clinical trial data from completed, ongoing or planned clinical trials for any of our product candidates could result in delays in our development and regulatory approval efforts and significantly increase our costs to recover or reproduce the data. In addition, we may suffer reputational harm or face litigation or adverse regulatory action as a result of cyber-attacks or other data security breaches and may incur significant additional expense to implement further data protection measures.

Risks related to our common stock and this offering

After this offering, our executive officers, directors and principal stockholders, if they choose to act together, will continue to have the ability to control all matters submitted to stockholders for approval.

Upon the closing of this offering, our executive officers and directors and our stockholders who owned more than 5% of our outstanding common stock before this offering will, in the aggregate, beneficially own shares representing approximately % of our capital stock (or % if the underwriters exercise their option to purchase additional shares in full). As a result, if these stockholders were to choose to act together, they would be able to control all matters submitted to our stockholders for approval, as well as our management and affairs. For example, these persons, if they choose to act together, would control the election of directors and approval of any merger, consolidation or sale of all or substantially all of our assets.

This concentration of ownership control may:

- delay, defer or prevent a change in control;
- entrench our management and board of directors; or
- delay or prevent a merger, consolidation, takeover or other business combination involving us that other stockholders may desire.

Provisions in our corporate charter documents and under Delaware law could make an acquisition of our company, which may be beneficial to our stockholders, more difficult and may prevent attempts by our stockholders to replace or remove our current directors and members of management.

Provisions in our certificate of incorporation and our bylaws that will become effective upon the closing of this offering may discourage, delay or prevent a merger, acquisition or other change in control of our company that stockholders may consider favorable, including transactions in which you might otherwise receive a premium for your shares. These provisions could also limit the price that investors might be willing to pay in the future for shares of our common stock, thereby depressing the market price of our common stock. In addition, because our board of directors is responsible for appointing the members of our management team, these provisions may frustrate or prevent any attempts by our stockholders to replace or remove our current management by making it more difficult for stockholders to replace members of our board of directors. Among other things, these provisions:

- establish a classified board of directors such that only one of three classes of directors is elected each year;
- allow the authorized number of our directors to be changed only by resolution of our board of directors;
- limit the manner in which stockholders can remove directors from our board of directors;
- establish advance notice requirements for stockholder proposals that can be acted on at stockholder meetings and nominations to our board of directors;

- require that stockholder actions must be effected at a duly called stockholder meeting and prohibit actions by our stockholders by written consent;
- limit who may call stockholder meetings;
- authorize our board of directors to issue preferred stock without stockholder approval, which could be used to institute a “poison pill” that would work to dilute the stock ownership of a potential hostile acquirer, effectively preventing acquisitions that have not been approved by our board of directors; and
- require the approval of the holders of at least 75% of the votes that all our stockholders would be entitled to cast to amend or repeal specified provisions of our certificate of incorporation or bylaws that will become effective upon the closing of this offering.

Moreover, because we are incorporated in Delaware, we are governed by the provisions of Section 203 of the Delaware General Corporation Law, or the DGCL, which prohibits a person who owns in excess of 15% of our outstanding voting stock from merging or combining with us for a period of three years after the date of the transaction in which the person acquired in excess of 15% of our outstanding voting stock, unless the merger or combination is approved in a prescribed manner.

If you purchase shares of common stock in this offering, you will suffer immediate dilution of your investment.

The initial public offering price of our common stock will be substantially higher than the pro forma as adjusted net tangible book value per share of our common stock. Therefore, if you purchase shares of our common stock in this offering, you will pay a price per share that substantially exceeds our pro forma as adjusted net tangible book value per share after this offering. To the extent outstanding options are exercised, you will incur further dilution. Based on an assumed initial public offering price of $ per share, which is the midpoint of the estimated price range set forth on the cover page of this prospectus, you will experience immediate dilution of $ per share, representing the difference between our pro forma as adjusted net tangible book value per share, after giving effect to this offering, and the assumed initial public offering price.

An active trading market for our common stock may not develop and, as a result, it may be difficult for you to sell your shares of our common stock.

Prior to this offering, there has been no public market for our common stock. The initial public offering price for our common stock will be determined through negotiations with the underwriters. Although we intend to apply to have our common stock approved for listing on the Nasdaq Global Market, an active trading market for our shares may never develop or be sustained following this offering. If an active market for our common stock does not develop, it may be difficult for you to sell shares you purchase in this offering without depressing the market price for the shares or at all.

If securities analysts do not publish or cease publishing research or reports or publish misleading, inaccurate or unfavorable research about our business or if they publish negative evaluations of our stock, the price and trading volume of our stock could decline.

The trading market for our common stock will rely, in part, on the research and reports that industry or financial analysts publish about us or our business. We do not currently have, and may never obtain, research coverage by industry or financial analysts. If no, or few, analysts commence coverage of us, the trading price of our stock would likely decrease. Even if we do obtain analyst coverage, if one or more of the analysts covering our business downgrade their evaluations of our stock or publish inaccurate or unfavorable research about our business, or provides more favorable relative recommendations about our competitors, the price of our stock could decline. If one or more of these analysts cease to cover our stock, we could lose visibility in the market for our stock, which in turn could cause our stock price and trading volume to decline.

The price of our common stock may be volatile and fluctuate substantially, which could result in substantial losses for purchasers of our common stock in this offering.

Our stock price is likely to be volatile. The stock market in general and the market for smaller biopharmaceutical companies in particular have experienced extreme volatility that has often been unrelated to the operating performance of particular companies. As a result of this volatility, you may not be able to sell your common stock at or above the initial public offering price. The market price for our common stock may be influenced by many factors, including:

- timing and results of or developments in preclinical studies and clinical trials of our product candidates or those of our competitors or potential collaborators;
- adverse regulatory decisions, including failure to receive regulatory approvals for any of our product candidates;
- our success in commercializing our product candidates, if and when approved;
- developments with respect to competitive products or technologies;
- regulatory or legal developments in the United States and other countries;
- developments or disputes concerning patent applications, issued patents or other intellectual property or proprietary rights;
- the recruitment or departure of key personnel;
- the level of expenses related to any of our product candidates or clinical development programs;
- the results of our efforts to discover, develop, acquire or in-license products, product candidates, technologies, the costs of commercializing any such products and the costs of development of any such product candidates or technologies;
- actual or anticipated changes in estimates as to financial results, development timelines or recommendations by securities analysts;
- variations in our financial results or the financial results of companies that are perceived to be similar to us;
- sales of common stock by us, our executive officers, directors or principal stockholders, or others;
- changes in the structure of healthcare payment systems;
- market conditions in the pharmaceutical and biotechnology sectors;
- general economic, industry and market conditions, such as the impact of the COVID-19 pandemic on our industry and market conditions; and
- the other factors described in this “Risk Factors” section.

In the past, following periods of volatility in the market price of a company’s securities, securities class-action litigation has often been instituted against that company. Any lawsuit to which we are a party, with or without merit, may result in an unfavorable judgment. We also may decide to settle lawsuits on unfavorable terms. Any such negative outcome could result in payments of substantial damages or fines, damage to our reputation or adverse changes to our offerings or business practices. Such litigation may also cause us to incur other substantial costs to defend such claims and divert management’s attention and resources. Furthermore, negative public announcements of the results of hearings, motions or other interim proceedings or developments could have a negative effect on the market price of our common stock.

We have broad discretion in the use of the net proceeds from this offering and may not use them effectively.

Our management will have broad discretion in the application of the net proceeds from this offering and could spend the proceeds in ways that do not improve our results of operations or enhance the value of our common stock. The failure by our management to apply these funds effectively could result in financial losses that could have a material adverse effect on our business, cause the price of our common stock to decline and delay the development of our product candidates. Pending their use, we may invest the net proceeds from this offering in a manner that does not produce income or that loses value.

A significant portion of our total outstanding shares are eligible to be sold into the market in the near future, which could cause the market price of our common stock to drop significantly, even if our business is doing well.

Sales of a substantial number of shares of our common stock in the public market, or the perception in the market that the holders of a large number of shares intend to sell shares, could reduce the market price of our common stock. After this offering, we will have shares of common stock outstanding based on the number of shares outstanding as of , 2021. This includes the shares that we are selling in this offering, which may be resold in the public market immediately without restriction, unless purchased by our affiliates or existing stockholders. The remaining shares are currently restricted as a result of securities laws or lock-up agreements but will become eligible to be sold at various times after the offering. Moreover, beginning 180 days after the completion of this offering, holders of an aggregate of shares of our common stock will have rights, subject to specified conditions, to require us to file registration statements covering their shares or to include their shares in registration statements that we may file for ourselves or other stockholders. We also intend to register all shares of common stock that we may issue under our equity compensation plans. Once we register these shares, they can be freely sold in the public market upon issuance, subject to volume limitations applicable to affiliates and the lock-up agreements described in the “Underwriting” section of this prospectus.

We are an “emerging growth company,” and the reduced disclosure requirements applicable to emerging growth companies may make our common stock less attractive to investors.

We are an “emerging growth company,” or EGC, as defined in the Jumpstart Our Business Startups Act of 2012, or the JOBS Act. We may remain an EGC until the end of the fiscal year in which the fifth anniversary of this offering occurs, although if the market value of our common stock that is held by non-affiliates exceeds $700 million as of any June 30 before that time or if we have annual gross revenues of $1.07 billion or more in any fiscal year, we would cease to be an EGC as of December 31 of the applicable year. We also would cease to be an EGC if we issue more than $1 billion of non-convertible debt over a three-year period. For so long as we remain an EGC, we are permitted and intend to rely on exemptions from certain disclosure requirements that are applicable to other public companies that are not EGCs. These exemptions include:

- being permitted to provide only two years of audited financial statements in this prospectus, in addition to any required unaudited interim financial statements, with correspondingly reduced “Management’s Discussion and Analysis of Financial Condition and Results of Operations” disclosure;
- not being required to comply with the auditor attestation requirements in the assessment of our internal control over financial reporting;
- not being required to comply with any requirement that may be adopted by the Public Company Accounting Oversight Board regarding mandatory audit firm rotation or a supplement to the auditor’s report providing additional information about the audit and the financial statements;
- reduced disclosure obligations regarding executive compensation; and

- exemptions from the requirements of holding a nonbinding advisory vote on executive compensation and stockholder approval of any golden parachute payments not previously approved.

We may choose to take advantage of some, but not all, of the available exemptions. We have taken advantage of reduced reporting obligations in this prospectus. In particular, in this prospectus, we have provided only two years of audited financial statements and have not included all of the executive compensation related information that would be required if we were not an EGC.

We cannot predict whether investors will find our common stock less attractive if we rely on certain or all of these exemptions. If some investors find our common stock less attractive as a result, there may be a less active trading market for our common stock and our stock price may be more volatile.

In addition, the JOBS Act permits an EGC to take advantage of an extended transition period to comply with new or revised accounting standards applicable to public companies until those standards would otherwise apply to private companies. We have elected not to “opt out” of such extended transition period, which means that when a standard is issued or revised and it has different application dates for public or private companies, we will adopt the new or revised standard at the time private companies adopt the new or revised standard and will do so until such time that we either (i) irrevocably elect to “opt out” of such extended transition period or (ii) no longer qualify as an EGC.

We will incur increased costs as a result of operating as a public company, and our management will be required to devote substantial time to new compliance initiatives and corporate governance practices.

As a public company, and particularly after we are no longer an EGC, we will incur significant legal, accounting and other expenses that we did not incur as a private company. The Sarbanes-Oxley Act of 2002, the Dodd-Frank Wall Street Reform and Consumer Protection Act, the listing requirements of the Nasdaq Global Market and other applicable securities rules and regulations impose various requirements on public companies, including establishment and maintenance of effective disclosure and financial controls and corporate governance practices. Our management and other personnel will need to devote a substantial amount of time to these compliance initiatives. Moreover, these rules and regulations will increase our legal and financial compliance costs, particularly as we hire additional financial and accounting employees to meet public company internal control and financial reporting requirements, and will make some activities more time-consuming and costly. For example, we expect that these rules and regulations may make it more difficult and more expensive for us to obtain director and officer liability insurance, which in turn could make it more difficult for us to attract and retain qualified members of our board of directors.

We are evaluating these rules and regulations and cannot predict or estimate the amount of additional costs we may incur or the timing of such costs. These rules and regulations are often subject to varying interpretations, in many cases due to their lack of specificity, and, as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. This could result in continuing uncertainty regarding compliance matters and higher costs necessitated by ongoing revisions to disclosure and governance practices.

Pursuant to Section 404 of the Sarbanes-Oxley Act of 2002, or Section 404, we will be required to furnish a report by our management on our internal control over financial reporting. However, while we remain an EGC, we will not be required to include an attestation report on internal control over financial reporting issued by our independent registered public accounting firm. To achieve compliance with Section 404 within the prescribed period, we will be engaged in a process to document and evaluate our internal control over financial reporting, which is both costly and challenging. In this regard, we will need to continue to dedicate internal resources, including through hiring additional financial and accounting personnel, potentially engage outside consultants and adopt a detailed work plan to assess and document the adequacy of internal control over

financial reporting, continue steps to improve control processes as appropriate, validate through testing that controls are functioning as documented and implement a continuous reporting and improvement process for internal control over financial reporting. Despite our efforts, there is a risk that we will not be able to conclude, within the prescribed timeframe or at all, that our internal control over financial reporting is effective as required by Section 404. If we identify one or more material weaknesses in our internal control over financial reporting, it could result in an adverse reaction in the financial markets due to a loss of confidence in the reliability of our financial statements.

Because we do not anticipate paying any cash dividends on our capital stock in the foreseeable future, capital appreciation, if any, will be your sole source of gain.

We have never declared or paid cash dividends on our capital stock. We currently intend to retain all of our future earnings, if any, to finance the growth and development of our business. As a result, capital appreciation, if any, of our common stock will be your sole source of gain for the foreseeable future.

Our certificate of incorporation that will become effective upon the closing of this offering designates the Court of Chancery of the State of Delaware and the federal district courts of the United States of America as the sole and exclusive forum for certain types of actions and proceedings that may be initiated by our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us or our directors, officers and employees.

Our certificate of incorporation that will become effective upon the closing of this offering provides that, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware (or, if the Court of Chancery of the State of Delaware does not have jurisdiction, the federal district court for the District of Delaware) will be the sole and exclusive forum for the following types of actions or proceedings under Delaware statutory or common law:

- any derivative action or proceeding brought on our behalf;
- any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers, employees or stockholders to our company or our stockholders;
- any action asserting a claim arising pursuant to any provision of the DGCL or as to which the DGCL confers jurisdiction on the Court of Chancery of the State of Delaware; or
- any action asserting a claim arising pursuant to any provision of our certificate of incorporation or bylaws (in each case, as they may be amended from time to time) or governed by the internal affairs doctrine.

These choice of forum provisions will not apply to suits brought to enforce a duty or liability created by the Securities Exchange Act of 1934, as amended, or the Exchange Act. Furthermore, Section 22 of the Securities Act creates concurrent jurisdiction for federal and state courts over all such Securities Act actions. Accordingly, both state and federal courts have jurisdiction to entertain such claims. To prevent having to litigate claims in multiple jurisdictions and the threat of inconsistent or contrary rulings by different courts, among other considerations, our certificate of incorporation that will become effective upon the closing of this offering provides that, unless we consent in writing to the selection of an alternative forum, the federal district courts of the United States of America shall, to the fullest extent permitted by law, be the sole and exclusive forum for the resolution of any claims arising under the Securities Act. While the Delaware courts have determined that such choice of forum provisions are facially valid, a stockholder may nevertheless seek to bring a claim in a venue other than those designated in the exclusive forum provisions. In such instance, we would expect to vigorously assert the validity and enforceability of the exclusive forum provisions of our certificate of incorporation. This may require significant additional costs associated with resolving such action in other jurisdictions and there can be no assurance that the provisions will be enforced by a court in those other jurisdictions.

These exclusive forum provisions may limit the ability of our stockholders to bring a claim in a judicial forum that such stockholders find favorable for disputes with us or our directors, officers or employees, which may discourage such lawsuits against us and our directors, officers and employees. If a court were to find either exclusive forum provision contained in our certificate of incorporation to be inapplicable or unenforceable in an action, we may incur further significant additional costs associated with resolving such action in other jurisdictions, all of which could materially adversely affect our business, financial condition and results of operations.

General risk factors

Our disclosure controls and procedures may not prevent or detect all errors or acts of fraud.

Upon completion of this offering, we will become subject to certain reporting requirements of the Exchange Act. Our disclosure controls and procedures are designed to reasonably assure that information required to be disclosed by us in reports we file or submit under the Exchange Act is accumulated and communicated to management, recorded, processed, summarized, and reported within the time periods specified in the rules and forms of the SEC. We believe that any disclosure controls and procedures or internal controls and procedures, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met. These inherent limitations include the realities that judgments in decision-making can be faulty, and that breakdowns can occur because of simple error or mistake. Additionally, controls can be circumvented by the individual acts of some persons, by collusion of two or more people, or by an unauthorized override of the controls. Accordingly, because of the inherent limitations in our control system, misstatements or insufficient disclosures due to error or fraud may occur and not be detected.

Changes in tax laws or in their implementation or interpretation may adversely affect our business and financial condition.

Recent changes in tax law may adversely affect our business or financial condition. On December 22, 2017, the U.S. government enacted the Tax Act, which significantly reformed the Code. The Tax Act, among other things, contains significant changes to corporate taxation, including reducing the corporate tax rate from a top marginal rate of 35% to a flat rate of 21%, limiting the tax deduction for net interest expense to 30% of adjusted taxable income (except for certain small businesses), limiting the deduction for NOLs arising in taxable years beginning after December 31, 2017 to 80% of current year taxable income and elimination of NOL carrybacks for losses arising in taxable years ending after December 31, 2017 (though any such NOLs may be carried forward indefinitely), imposing a one-time taxation of offshore earnings at reduced rates regardless of whether they are repatriated, eliminating U.S. tax on foreign earnings (subject to certain important exceptions), allowing immediate deductions for certain new investments instead of deductions for depreciation expense over time, and modifying or repealing many business deductions and credits.

As part of Congress' response to the COVID-19 pandemic, the Families First Coronavirus Response Act, or FFCR Act, was enacted on March 18, 2020, and the CARES Act was enacted on March 27, 2020. Both contain numerous tax provisions. In particular, the CARES Act retroactively and temporarily (for taxable years beginning before January 1, 2021) suspends application of the 80%-of-income limitation on the use of NOLs, which was enacted as part of the Tax Act. It also provides that NOLs arising in any taxable year beginning after December 31, 2017, and before January 1, 2021 are generally eligible to be carried back up to five years. The CARES Act also temporarily (for taxable years beginning in 2019 or 2020) relaxes the limitation of the tax deductibility for net interest expense by increasing the limitation from 30% to 50% of adjusted taxable income.

Regulatory guidance under the Tax Act, the FFCR Act and the CARES Act is and continues to be forthcoming, and such guidance could ultimately increase or lessen their impact on our business and financial condition. It is also

likely that Congress will enact additional legislation in connection with the COVID-19 pandemic, some of which could have an impact on us. In addition, it is uncertain if and to what extent various states will conform to the Tax Act, the FFCR Act or the CARES Act. We urge prospective investors in our common stock to consult with their legal and tax advisors with respect to any recently enacted tax legislation, or proposed changes in law, and the potential tax consequences of investing in or holding our common stock.

Unfavorable global economic conditions could adversely affect our business, financial condition, stock price and results of operations.

Our results of operations could be adversely affected by general conditions in the global economy and in the global financial markets. For example, the 2008 global financial crisis caused extreme volatility and disruptions in the capital and credit markets. A severe or prolonged economic downturn resulting from the COVID-19 pandemic could result in a variety of risks to our business, including weakened demand for any product candidates we may develop and our ability to raise additional capital when needed on acceptable terms, if at all. A weak or declining economy could also strain our suppliers, possibly resulting in supply disruption. If the current equity and credit markets deteriorate, it may make any necessary debt or equity financing more difficult, more costly, and more dilutive. Failure to secure any necessary financing in a timely manner and on favorable terms could impair our ability to achieve our growth strategy, could harm our financial performance and stock price and could require us to delay or abandon clinical development plans. In addition, there is a risk that our current or future service providers, manufacturers or other collaborators may not survive such difficult economic times, which could directly affect our ability to attain our operating goals on schedule and on budget. We cannot anticipate all of the ways in which the current economic climate and financial market conditions could adversely impact our business.

Cautionary note regarding forward-looking statements and industry data

This prospectus contains forward-looking statements that involve substantial risks and uncertainties. All statements, other than statements of historical fact, contained in this prospectus, including statements regarding our strategy, future operations, future financial position, future revenue, projected costs, prospects, plans and objectives of management, are forward-looking statements. The words “anticipate,” “believe,” “contemplate,” “continue” “could,” “estimate,” “expect,” “intend,” “may,” “might,” “plan,” “potential,” “predict,” “project,” “should,” “target,” “will,” “would,” or the negative of these words or other similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words.

The forward-looking statements in this prospectus include, among other things, statements about:

- the initiation, timing, progress and results of our research and development programs and preclinical studies and clinical trials;
- the impact of the COVID-19 pandemic and our response to the pandemic;
- our estimates regarding expenses, future revenue, capital requirements, need for additional financing and the period over which we believe that the net proceeds from this offering, together with our existing cash, cash equivalents and marketable securities, will be sufficient to fund our operating expenses and capital expenditure requirements;
- the timing of and our ability to submit applications for and obtain and maintain regulatory approvals for our current and future product candidates;
- the potential therapeutic attributes and advantages of our current and future product candidates;
- our expectations about the translatability of NHP results into humans;
- our plans to develop and, if approved, subsequently commercialize any product candidates we may develop;
- the rate and degree of market acceptance and clinical utility of our products, if approved;
- our estimates regarding the addressable patient population and potential market opportunity for our current and future product candidates;
- our commercialization, marketing and manufacturing capabilities and strategy;
- our expectations regarding our ability to obtain and maintain intellectual property protection;
- our ability to identify additional products, product candidates or technologies with significant commercial potential that are consistent with our commercial objectives;
- our expectations related to the use of proceeds from this offering;
- the impact of government laws and regulations;
- our competitive position and expectations regarding developments and projections relating to our competitors and any competing therapies that are or become available;
- developments relating to our competitors and our industry; and

- our ability to establish and maintain collaborations or obtain additional funding.

We may not actually achieve the plans, intentions or expectations disclosed in our forward-looking statements, and you should not place undue reliance on our forward-looking statements. Actual results or events could differ materially from the plans, intentions and expectations disclosed in the forward-looking statements we make. We have included important factors in the cautionary statements included in this prospectus, particularly in the “Risk factors” section, that we believe could cause actual results or events to differ materially from the forward-looking statements that we make. Moreover, we operate in a competitive and rapidly changing environment. New risk factors and uncertainties may emerge from time to time, and it is not possible for management to predict all risk factors and uncertainties. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, collaborations, joint ventures or investments we may make or enter into.

You should read this prospectus and the documents that we reference in this prospectus and have filed as exhibits to the registration statement of which this prospectus is a part completely and with the understanding that our actual future results may be materially different from what we expect. The forward-looking statements contained in this prospectus are made as of the date of this prospectus, and we do not assume any obligation to update any forward-looking statements, whether as a result of new information, future events or otherwise, except as required by applicable law.

This prospectus includes statistical and other industry and market data that we obtained from independent industry publications and research, surveys and studies conducted by independent third parties as well as our own estimates of the prevalence of certain diseases and conditions. The market data used in this prospectus involves a number of assumptions and limitations, and you are cautioned not to give undue weight to such data. Industry publications and third-party research, surveys and studies generally indicate that their information has been obtained from sources believed to be reliable, although they do not guarantee the accuracy or completeness of such information. Our estimates of the patient population with the potential to benefit from treatment with any product candidates we may develop include several key assumptions based on our industry knowledge, industry publications, third-party research and other surveys, which may be based on a small sample size and may fail to accurately reflect the addressable patient population. While we believe that our internal assumptions are reasonable, no independent source has verified such assumptions.

Use of proceeds

We estimate that the net proceeds from our issuance and sale of shares of our common stock in this offering will be approximately $ million, assuming an initial public offering price of $ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. If the underwriters exercise their option to purchase additional shares of our common stock in full, we estimate that the net proceeds from this offering will be approximately $ million.

A $1.00 increase (decrease) in the assumed initial public offering price of $ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, would increase (decrease) the net proceeds to us from this offering by approximately $ million, assuming the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. An increase (decrease) of 1,000,000 shares in the number of shares offered by us, as set forth on the cover page of this prospectus, would increase (decrease) the net proceeds to us from this offering by approximately $ million, assuming no change in the assumed initial public offering price per share and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

As of December 31, 2020, we had cash, cash equivalents and marketable securities of $72.1 million, which does not include $94.0 million of gross proceeds received from the sale of 77,163,022 shares of our Series B preferred stock in January 2021. We currently estimate that we will use the net proceeds from this offering, together with our existing cash, cash equivalents and marketable securities, as follows:

- approximately $ million for continued research and development of VERVE-101, including completion of IND-enabling studies and initiation of Phase 1b clinical trials;
- approximately $ million for continued research and development of our ANGPTL3 program, including preclinical research, completion of IND-enabling studies and initiation of Phase 1b clinical trials;
- approximately $ million for research and development to support new programs and optimization of existing technology, including new targets, novel LNP delivery technology and novel process development to enable manufacturing at scale; and
- the remainder for working capital and other general corporate purposes.

We believe opportunities may exist from time to time to expand our current business through acquisitions of complementary companies, products or technologies. While we have no current agreements, commitments or understandings for any specific acquisitions at this time, we may also use a portion of the net proceeds for these purposes.

Our expected use of net proceeds from this offering and our existing cash, cash equivalents and marketable securities represents our intentions based upon our current plans and business conditions, which could change in the future as our plans and business conditions evolve. As a result, we cannot predict with any certainty our use of the net proceeds from this offering or the amounts that we will actually spend on each area of use set forth above. The amounts and timing of our actual expenditures may vary significantly depending on numerous factors, including results from our research and development efforts, the timing and success of our preclinical studies and clinical trials and the timing and outcome of regulatory submissions, as well as any collaborations that we may enter into with third parties for our product candidates, and any unforeseen cash needs.

Based on our current plans, we estimate that the anticipated net proceeds from this offering, together with our existing cash, cash equivalents and marketable securities, will enable us to fund our operating expenses and capital expenditure requirements into . In particular, we expect we that the anticipated net proceeds

from this offering, together with our existing cash, cash equivalents and marketable securities, will enable us to . However, we do not expect these funds will be sufficient to complete the clinical development of, or commercialize, any of our product candidates or programs. We have based our estimates on assumptions that may prove to be wrong. We could use our available capital resources sooner than we currently expect, in which case we would need to obtain additional funding, which may not be available to us on acceptable terms, or at all. Our failure to raise capital as and when needed would have a negative impact on our financial condition and our ability to pursue our business strategy.

Our management will retain broad discretion over the allocation of the net proceeds from this offering. Pending our use of the net proceeds from this offering, we intend to invest the net proceeds in a variety of capital preservation investments, including short-term, investment-grade, interest-bearing instruments and U.S. government securities.

Dividend policy

We have never declared or paid cash dividends on our common stock. We currently intend to retain all available funds and any future earnings to fund the development and expansion of our business, and we do not anticipate paying any cash dividends in the foreseeable future. Any future determination to declare and pay dividends will be made at the discretion of our board of directors and will depend on then-existing conditions, including our results of operations, financial condition, contractual restrictions, capital requirements, business prospects and other factors our board of directors may deem relevant.

Capitalization

The following table summarizes our cash, cash equivalents and marketable securities and capitalization as of December 31, 2020:

- on an actual basis;
- on a pro forma basis to give effect to (i) our issuance and sale of 77,163,022 shares of Series B preferred stock in January 2021 for gross proceeds of $94.0 million, (ii) our expected issuance of shares of common stock to The Broad Institute and the President and Fellows of Harvard College upon the closing of this offering pursuant to our Cas9 License Agreement, based on our issuance and sale of shares of our common stock in this offering and assuming our post-money valuation exceeds $500 million as further described under “Description of capital stock—License agreement with The Broad Institute and the President and Fellows of Harvard College,” and (iii) the automatic conversion of all outstanding shares of our convertible preferred stock into an aggregate of 256,682,054 shares of common stock upon the closing of this offering and (iv) the filing and effectiveness of our restated certificate of incorporation in connection with the closing of this offering; and
- on a pro forma as adjusted basis, to give further effect to our issuance and sale of shares of our common stock in this offering at an assumed initial public offering price of $ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

You should read the information in this table together with our consolidated financial statements and the related notes appearing elsewhere in this prospectus and the “Management’s discussion and analysis of financial condition and results of operations” sections of this prospectus.

	As of December 31, 2020		
	Actual	Pro forma	Pro forma as adjusted
	(in thousands, except per share data)		
Cash, cash equivalents and marketable securities	$ 72,112	$	$
Convertible preferred stock, $0.001 par value: 179,519,033 shares authorized and 179,519,032 shares issued and outstanding, actual; no shares authorized, issued or outstanding, pro forma and pro forma as adjusted	$125,160	$	$
Stockholders’ (deficit) equity:			
Preferred stock, $0.001 par value: no shares authorized, issued or outstanding, actual; shares authorized and no shares issued or outstanding, pro forma and pro forma as adjusted	—		
Common stock, $0.001 par value; 255,000,000 shares authorized, 28,921,345 shares issued and 23,943,120 outstanding, actual; shares authorized, shares issued and shares outstanding, pro forma; shares authorized, shares issued and shares outstanding, pro forma as adjusted	24		
Additional paid-in capital	2,595		
Accumulated other comprehensive income	8		
Accumulated deficit	(66,536)		
Total stockholders’ (deficit) equity	(63,909)		
Total capitalization	$ 61,251	$	$

The pro forma as adjusted information in the table above is illustrative only, and our capitalization following the completion of this offering will depend on the actual initial public offering price and other terms of this offering determined at pricing. A $1.00 increase (decrease) in the assumed initial public offering price of $ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, would increase (decrease) the pro forma as adjusted amount of each of cash, cash equivalents and marketable securities, additional paid-in capital, total stockholders' equity and total capitalization by $ million, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. An increase (decrease) of 1,000,000 shares in the number of shares offered by us, as set forth on the cover page of this prospectus, would increase (decrease) the pro forma as adjusted amount of each of cash, cash equivalents and marketable securities, additional paid-in capital, total stockholders' equity and total capitalization by $ million, assuming no change in the assumed initial public offering price per share and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

The table above excludes:

- 36,008,559 shares of common stock issuable upon the exercise of stock options outstanding as of December 31, 2020 under our 2018 Equity Incentive Plan, as amended, or the 2018 Plan, at a weighted average exercise price of $0.23 per share;
- an additional 16,292,500 shares of common stock issuable upon the exercise of stock options granted after December 31, 2020, at a weighted average exercise price of $0.91 per share;
- 10,740,485 shares of common stock available for future issuance as of December 31, 2020 under our 2018 Plan (which does not account for stock options to purchase an aggregate of 16,292,500 shares of common stock (due to an increase in shares reserved for issuance under the 2018 Plan to 63,757,710 in January 2021), at a weighted average exercise price of $0.91 per share, granted after December 31, 2020); and
- and additional shares of our common stock that will become available for future issuance under our 2021 Stock Incentive Plan and our 2021 Employee Stock Purchase Plan, respectively, each of which will become effective immediately prior to the effectiveness of the registration statement of which this prospectus is a part, as well as any automatic increases in the number of shares of common stock reserved for future issuance under these plans.

Dilution

If you invest in our common stock in this offering, your ownership interest will be diluted immediately to the extent of the difference between the initial public offering price per share of our common stock and the pro forma as adjusted net tangible book value per share of our common stock immediately after this offering.

Our historical net tangible book value (deficit) as of December 31, 2020 was $(63.9) million, or $(2.21) per share of our common stock. Our historical net tangible book value (deficit) is the amount of our total tangible assets less our total liabilities and the carrying value of our convertible preferred stock, which is not included within stockholders' deficit. Historical net tangible book value (deficit) per share represents historical net tangible book value (deficit) divided by the 28,921,345 shares of our common stock outstanding as of December 31, 2020, which includes 4,978,226 shares of unvested restricted stock subject to a repurchase option.

Our pro forma net tangible book value (deficit) as of December 31, 2020 was $ million, or $ per share of our common stock. Pro forma net tangible book value represents the amount of our total tangible assets less our total liabilities, and gives effect to (i) the sale by us of 77,163,022 shares of Series B preferred stock in January 2021 for gross proceeds of $94.0 million, (ii) our expected issuance of shares of common stock to The Broad Institute and the President and Fellows of Harvard College upon the closing of this offering pursuant to our Cas9 License Agreement, based on our issuance and sale of shares of our common stock in this offering and assuming the post-money valuation exceeds $500 million as further described under "Description of capital stock—License agreement with The Broad Institute and the President and Fellows of Harvard College " and (iii) the automatic conversion of all outstanding shares of our convertible preferred stock into an aggregate of 256,682,054 shares of common stock upon the closing of this offering. Pro forma net tangible book value per share represents pro forma net tangible book value divided by the total number of shares outstanding as of December 31, 2020, after giving effect to the pro forma adjustments described above.

After giving further effect to our issuance and sale of shares of our common stock in this offering at an assumed initial public offering price of $ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us, our pro forma as adjusted net tangible book value as of December 31, 2020 would have been $ million, or $ per share. This represents an immediate increase in pro forma as adjusted net tangible book value per share of $ to existing stockholders and an immediate dilution of $ in pro forma as adjusted net tangible book value per share to new investors purchasing common stock in this offering. Dilution per share to new investors is determined by subtracting pro forma as adjusted net tangible book value per share after this offering from the assumed initial public offering price per share paid by new investors. The following table illustrates this dilution on a per share basis:

Assumed initial public offering price per share		$
Historical net tangible book value (deficit) per share as of December 31, 2020	$(2.21)	
Increase per share attributable to the pro forma adjustments described above		
Pro forma net tangible book value (deficit) per share as of December 31, 2020		
Increase in pro forma as adjusted net tangible book value per share attributable to new investors purchasing shares of common stock in this offering		
Pro forma as adjusted net tangible book value per share immediately after this offering		
Dilution per share to new investors purchasing shares of common stock in this offering		$

The dilution information discussed above is illustrative only and will depend on the actual initial public offering price and other terms of this offering determined at pricing. A $1.00 increase (decrease) in the assumed initial

public offering price of $ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, would increase (decrease) our pro forma as adjusted net tangible book value per share after this offering by $ and dilution per share to new investors purchasing shares of common stock in this offering by $, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. An increase of 1,000,000 shares in the number of shares offered by us, as set forth on the cover page of this prospectus, would increase our pro forma as adjusted net tangible book value per share after this offering by $ and decrease the dilution per share to new investors purchasing shares of common stock in this offering by $, assuming no change in the assumed initial public offering price per share and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. A decrease of 1,000,000 shares in the number of shares offered by us, as set forth on the cover page of this prospectus, would decrease our pro forma as adjusted net tangible book value per share after this offering by $ and increase the dilution per share to new investors purchasing shares of common stock in this offering by $, assuming no change in the assumed initial public offering price and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

If the underwriters exercise their option to purchase additional shares in full, our pro forma as adjusted net tangible book value per share after this offering would be $, representing an immediate increase in pro forma as adjusted net tangible book value per share of $ to existing stockholders and immediate dilution in pro forma as adjusted net tangible book value per share of $ to new investors purchasing shares of common stock in this offering, assuming an initial public offering price of $ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, and after deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us.

The following table summarizes, as of December 31, 2020, on the pro forma as adjusted basis described above, the total number of shares of common stock purchased from us on an as converted to common stock basis, the total consideration paid or to be paid and the average price per share paid or to be paid by existing stockholders and by new investors in this offering at an assumed initial public offering price of $ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, before deducting estimated underwriting discounts and commissions and estimated offering expenses payable by us. As the table shows, new investors purchasing shares of common stock in this offering will pay an average price per share substantially higher than our existing stockholders paid.

	Shares Purchased		Total Consideration		Average Price Per Share
	Number	Percent	Amount	Percentage	
Existing stockholders		%	$	%	$
New investors					
Total		100%	$	100%	

A $1.00 increase (decrease) in the assumed initial public offering price of $ per share, which is the midpoint of the price range set forth on the cover page of this prospectus, would increase (decrease) the total consideration paid by new investors by $ million and, in the case of an increase, would increase the percentage of total consideration paid by new investors by percentage points and, in the case of a decrease, would decrease the percentage of total consideration paid by new investors by percentage points, assuming that the number of shares offered by us, as set forth on the cover page of this prospectus, remains the same. An increase (decrease) of 1,000,000 shares in the number of shares offered by us, as set forth on the cover page of this prospectus, would increase (decrease) the total consideration paid by new investors by $ million and, in the case of an increase, would increase the percentage of total

consideration paid by new investors by percentage points and, in the case of a decrease, would decrease the percentage of total consideration paid by new investors by percentage points, assuming no change in the assumed initial public offering price.

The table above assumes no exercise of the underwriters' option to purchase additional shares in this offering. If the underwriters exercise their option to purchase additional shares in full, the number of shares of our common stock held by existing stockholders would be reduced to % of the total number of shares of our common stock outstanding after this offering, and the number of shares of common stock held by new investors purchasing shares of common stock in this offering would be increased to % of the total number of shares of our common stock outstanding after this offering.

The tables and discussion above are based on the number of shares of our common stock outstanding as of December 31, 2020, which include 4,978,226 shares of unvested restricted stock subject to a repurchase option and exclude:

- 36,008,559 shares of common stock issuable upon the exercise of stock options outstanding as of December 31, 2020 under our 2018 Plan at a weighted average exercise price of $0.23 per share;
- an additional 16,292,500 shares of common stock issuable upon the exercise of stock options granted after December 31, 2020, at an exercise price of $0.91 per share;
- 10,740,485 shares of common stock available for future issuance as of December 31, 2020 under our 2018 Plan (which does not account for stock options to purchase an aggregate of 16,292,500 shares of common stock (due to an increase in shares reserved for issuance under the 2018 Plan to 63,757,710 in January 2021), at a weighted average exercise price of $0.91 per share, granted after December 31, 2020); and
- and additional shares of our common stock that will become available for future issuance under our 2021 Stock Incentive Plan and our 2021 Employee Stock Purchase Plan, respectively, each of which will become effective immediately prior to the effectiveness of the registration statement of which this prospectus is a part, as well as any automatic increases in the number of shares of common stock reserved for future issuance under these plans.

To the extent stock options are issued and exercised under our equity incentive plans, or we issue additional shares of common stock in the future, there will be further dilution to investors purchasing shares of common stock in this offering. In addition, we may choose to raise additional capital because of market conditions or strategic considerations, even if we believe that we have sufficient funds for our current or future operating plans. If we raise additional capital through the sale of equity or convertible debt securities, the issuance of these securities could result in further dilution to our stockholders.

Management's discussion and analysis of financial condition and results of operations

You should read the following discussion and analysis of our financial condition and results of operations together with our financial statements and related notes appearing elsewhere in this prospectus. Some of the information contained in this discussion and analysis or set forth elsewhere in this prospectus, including information with respect to our plans and strategy for our business and related financing, includes forward-looking statements that involve risks and uncertainties. As a result of many factors, including those factors set forth in the section entitled "Risk factors," our actual results could differ materially from the results described in or implied by the forward-looking statements contained in the following discussion and analysis. You should carefully read the section entitled "Risk factors" to gain an understanding of the important factors that could cause actual results to differ materially from our forward- looking statements. Please also see the section entitled "Cautionary note regarding forward-looking statements and industry data."

Overview

We are a genetic medicines company pioneering a new approach to the care of cardiovascular disease, or CVD, transforming treatment from chronic management to single-course gene editing medicines. We believe that single-course treatments could provide substantial health benefits that are sustained throughout the lifetimes of patients with or at risk for atherosclerotic cardiovascular disease, or ASCVD, the most common form of CVD.

We were incorporated in March 2018 and commenced operations shortly thereafter. Since our inception, we have devoted substantially all of our resources to building our base editing technology and advancing development of our portfolio of programs, establishing and protecting our intellectual property, conducting research and development activities, organizing and staffing our company, business planning, raising capital and providing general and administrative support for these operations. To date, we have financed our operations primarily through the sales of our Series A convertible preferred stock, or the Series A Preferred Stock, Series A-2 convertible preferred stock, or the Series A-2 Preferred Stock, and Series B convertible preferred stock, or the Series B Preferred Stock and, together with the Series A Preferred Stock and the Series A-2 Preferred Stock, the Preferred Stock. Through December 31, 2020, we had raised $122.5 million in gross proceeds and in January 2021 we raised an additional $94.0 million in gross proceeds from the sale of our Preferred Stock.

We are a development-stage company, and all of our programs are at a preclinical stage of development. To date, we have not generated any revenue and do not expect to generate revenue from the sale of products for the foreseeable future. Since our inception, we have incurred significant operating losses. Our net losses for the years ended December 31, 2020 and 2019 were $45.7 million and $19.3 million, respectively. As of December 31, 2020, we had an accumulated deficit of $66.5 million.

Our total operating expenses were $40.6 million and $13.6 million for the years ended December 31, 2020 and 2019, respectively. We expect to continue to incur significant expenses and increasing operating losses in connection with ongoing development activities related to our portfolio of programs as we continue our preclinical development of product candidates; advance these product candidates toward clinical development; further develop our base editing technology and manufacturing capabilities; seek to discover and develop additional product candidates; maintain, expand enforcement, defend, and protect our intellectual property portfolio; hire research and development and clinical personnel; ultimately establish a sales, marketing and distribution infrastructure to commercialize any products for which we may obtain marketing approval; establish a commercial manufacturing source and secure supply chain capacity sufficient to provide commercial quantities of any product candidates for which we may obtain regulatory approval; and add operational, legal,

compliance, financial and management information systems and personnel to support our research, product development, future commercialization efforts and operations as a public company.

As a result, we will need substantial additional funding to support our continuing operations and pursue our strategy. Until such time as we can generate significant revenue from product sales, if ever, we expect to finance our operations through a combination of equity offerings, debt financings and other sources of capital, which may include collaborations or licensing arrangements with other companies or other strategic transactions. If we are unable to raise capital or obtain adequate funds when needed or on acceptable terms, we may be required to delay, limit, reduce or terminate our research and development programs or any future commercialization efforts or grant rights to develop and market product candidates that we would otherwise prefer to develop and market ourselves.

Because of the numerous risks and uncertainties associated with product development, we are unable to predict the timing or amount of increased expenses or when or if we will be able to achieve profitability. Even if we are able to generate revenue from product sales, we may not become profitable. If we fail to become profitable or are unable to sustain profitability on a continuing basis, then we may be unable to continue our operations at planned levels and be forced to reduce or terminate our operations.

As of December 31, 2020, we had cash, cash equivalents and marketable securities of $72.1 million, which does not include $93.8 million of net proceeds received from the sale of shares of Series B preferred stock in January 2021. We believe that the net proceeds from this offering, together with our existing cash, cash equivalents and marketable securities, will enable us to fund our operating expenses and capital expenditure requirements into . We have based this estimate on assumptions that may prove to be wrong, and we could exhaust our available capital resources sooner than we expect. To finance our operations beyond that point we will need to raise additional capital, which cannot be assured. See “Liquidity and capital resources.”

Impact of COVID-19 on our business

In March 2020, COVID-19 was declared a global pandemic by the World Health Organization and to date, the COVID-19 pandemic continues to present a substantial public health and economic challenge around the world. The length of time and full extent to which the COVID-19 pandemic may directly or indirectly impact our business, results of operations and financial condition will depend on future developments that are highly uncertain, subject to change and difficult to predict. We, our contract manufacturing organizations, or CMOs, and our contract research organizations, or CROs, experienced temporary reductions in the capacity to undertake research-scale production and to execute some preclinical studies. While these operations have since normalized, we, together with our CMOs and CROs, are closely monitoring the impact of the COVID-19 pandemic on these operations.

We also plan to continue to closely monitor the ongoing impact of the COVID-19 pandemic on our employees and our other business operations. In an effort to provide a safe work environment for our employees, we have, among other things, limited employees in our office and lab facilities to those where on-site presence is needed for their job activities, increased the cadence of sanitization of our office and lab facilities, implemented various social distancing measures in our offices and labs including replacing all in-person meetings with virtual interactions, and are providing personal protective equipment for our employees present in our office and lab facilities. We are continuing to monitor the impact and effects of the COVID-19 pandemic and our response to it, and we expect to continue to take actions as may be required or recommended by government authorities or as we determine are in the best interests of our employees and other business partners in light of the pandemic.

License and collaboration agreements

We have obligations under various license and collaboration agreements to make potentially significant milestone and success payments in the future and to pay royalties on sales of any product candidates covered by those agreements that eventually achieve regulatory approval and commercialization. For information regarding these agreements, See “Business—License and collaboration agreements.”

Components of our results of operations

Revenue

To date, we have not generated any revenue. We do not expect to generate any revenue from the sale of products in the near future and unless and until we successfully complete development and obtain regulatory approval for one or more of our product candidates. If our development efforts for our product candidates are successful and result in regulatory approval or we successfully enter into license or collaboration agreements with third parties, we may generate revenue in the future from product sales, payments from third-party collaboration or license agreements, or any combination thereof.

Operating expenses

Research and development expenses

Research and development expenses consist of costs incurred in performing research and development activities, which include:

- the cost to obtain and maintain licenses to intellectual property, such as those with the President and Fellows of Harvard College, or Harvard, The Broad Institute, Inc., or Broad, Beam Therapeutics Inc., or Beam, Verily Life Sciences LLC and Acuitas Therapeutics, Inc., or Acuitas, and related future payments should certain development and regulatory milestones be achieved;
- personnel-related expenses, including salaries, bonuses, benefits and stock-based compensation for employees engaged in research and development functions;
- expenses incurred in connection with the discovery and preclinical development of our research programs, including under agreements with third parties, such as consultants, contractors and CROs;
- the cost of developing and validating our manufacturing process for use in our preclinical studies and future clinical trials, including the cost of raw materials used in our research and development activities;
- the cost of laboratory supplies and research materials; and
- facilities, depreciation and other expenses, which include direct and allocated expenses for rent and maintenance of facilities and insurance.

We expense research and development costs as incurred. Nonrefundable advance payments that we make for goods or services to be received in the future for use in research and development activities are recorded as prepaid expenses. The prepaid amounts are expensed as the benefits are consumed.

In the early phases of development, our research and development costs are often devoted to proof-of-concept studies that are not necessarily allocable to a specific target; therefore, we have not yet begun tracking our expenses on a program-by-program basis.

Research and development activities are central to our business model. We expect that our research and development expenses will continue to increase for the foreseeable future as we advance our programs and product candidates into and through clinical development, and as we continue to develop additional product

candidates. We also expect our discovery research efforts and our related personnel costs will increase and, as a result, we expect our research and development expenses, including costs associated with stock-based compensation, will increase above historical levels. In addition, we may incur additional expenses related to milestone and royalty payments payable to third parties with whom we may enter into license, acquisition and option agreements to acquire the rights to future product candidates.

At this time, we cannot reasonably estimate or know the nature, timing and costs of the efforts that will be necessary to complete the preclinical and clinical development of, and obtain regulatory approval for, any of our product candidates or programs. The successful development of our product candidates is highly uncertain. This is due to the numerous risks and uncertainties associated with product development, including the following:

- the timing and progress of preclinical and clinical development activities;
- the number and scope of preclinical and clinical programs we decide to pursue;
- raising additional funds necessary to complete preclinical and clinical development of our product candidates;
- the timing of filing and acceptance of investigational new drug applications, or INDs, or comparable foreign applications that allow commencement of future clinical trials for our product candidates;
- the successful initiation, enrollment and completion of clinical trials;
- our ability to achieve positive results from our future clinical programs that support a finding of safety and effectiveness and an acceptable risk-benefit profile in the intended patient populations of any product candidates we may develop;
- our ability to successfully develop, obtain regulatory approval for, and then successfully commercialize, our product candidates for the expected indications and patient populations;
- our ability to hire and retain key research and development personnel;
- the costs associated with the development of any additional product candidates we develop or acquire through collaborations;
- our ability to establish and maintain agreements with third-party manufacturers for clinical supply for our clinical trials and commercial manufacturing, if our product candidates are approved;
- the terms and timing of any existing or future collaboration, license or other arrangement, including the terms and timing of any milestone payments thereunder;
- our ability to establish and obtain intellectual property protection and regulatory exclusivity for our product candidates and enforce and defend our intellectual property rights and claims;
- our ability to commercialize products, if and when approved, whether alone or in collaboration with others;
- our ability to maintain a continued acceptable safety, tolerability and efficacy profile of our product candidates following approval; and
- the effects of the COVID-19 pandemic.

A change in any of these variables with respect to any of our current or future product candidates could significantly change the costs, timing and viability associated with the development of that product candidate. We may never succeed in obtaining regulatory approval for any product candidate we may develop.

General and administrative expenses

General and administrative expenses consist primarily of personnel-related costs, including salaries, benefits and stock-based compensation, for personnel in our executive, intellectual property, business development, and administrative functions. General and administrative expenses also include legal fees relating to intellectual property and corporate matters, professional fees for accounting, auditing, tax and consulting services, insurance costs, travel, and direct and allocated facility-related expenses and other operating costs.

We anticipate that our general and administrative expenses will increase in the future to support increased research and development activities. We also expect to incur increased costs associated with being a public company, including costs of accounting, audit, legal, regulatory and tax-related services associated with maintaining compliance with Nasdaq and SEC requirements, director and officer insurance costs, and investor and public relations costs.

Other income (expense)

Change in fair value of preferred stock tranche liability

Change in fair value of preferred stock tranche liability consists primarily of remeasurement gains or losses associated with changes in the fair value of the tranche rights associated with our Series A Preferred Stock. The preferred stock tranche liability was settled as of December 31, 2020, and therefore, there will be no further remeasurement.

Change in fair value of antidilution rights liability

Change in fair value of antidilution rights liability consists of remeasurement gains or losses associated with changes in the antidilution rights liability associated with our license agreements with Harvard and Broad, or the Harvard/Broad License Agreement, and Broad, or the Broad License Agreement.

The antidilution rights represent the obligation to issue additional shares of common stock to Harvard and Broad following the completion of preferred stock financings and other equity financings, which is expected to be fully satisfied upon the closing of this offering. At the inception of the agreements, the liability for the antidilution rights was recorded at fair value with the cost recorded as research and development expense and will be remeasured at each reporting period with changes recorded in other income (expense) while the instruments are outstanding.

The antidilution rights liability was partially satisfied in 2019 and 2020 and we expect that it will be satisfied in full upon the issuance of an aggregate of an additional shares of common stock upon the closing of this offering, based on our issuance and sale of shares of our common stock in this offering and assuming our post-money valuation exceeds $500 million as further described under “Description of capital stock—License agreement with The Broad Institute and the President and Fellows of Harvard College.”

Change in fair value of success payment liability

We are also obligated to pay to Harvard and Broad tiered success payments in the event our average market capitalization, following the filing of our first Quarterly Report on Form 10-Q, exceeds specified thresholds ascending from a high nine digit dollar amount to $10.0 billion, or sale of our company for consideration in excess of those thresholds. In the event of a change of control of our company or a sale of our company, we are required to pay any related success payment in cash within a specified period following such event. Otherwise, the success payments may be settled at our option in either cash or shares of our common stock, or a combination of cash and shares of our common stock. The maximum aggregate success payments that could be payable by us is $31.3 million. At inception of the agreements, the success payment liabilities were recorded at

fair value with the cost recorded as research and development expense and will be remeasured at each reporting period with charges recorded in other income (expense) while the instrument is outstanding.

Depending on our valuation, the fair value of the antidilution rights and success payment liabilities, and the corresponding changes in fair value that we record in our statements of operations, could fluctuate significantly from period to period.

Interest and other income (expense), net

Interest and other income primarily consisted of interest earned on our marketable securities and other miscellaneous income and expenses unrelated to our core operations.

Income tax

As of December 31, 2020, we had federal net operating loss, or NOL, carryforwards of $49.2 million and state NOL carryforwards of $41.6 million. The federal NOL carryforwards have an indefinite life and the state NOL carryforwards will start to expire in 2038. We have recorded a full valuation allowance against our net deferred tax assets due to uncertainties as to their ultimate realization. We currently anticipate that there will be no change in our unrecognized tax benefits in the next twelve months. As of December 31, 2020, we had no unrecognized tax benefits.

Results of operations

Comparison of years ended December 31, 2020 and December 31, 2019

The following table summarizes our results of operations for the years ended December 31, 2020 and 2019:

	Year ended December 31,		
	2020	2019	Change
	(in thousands)		
Operating expenses:			
Research and development	$ 35,371	$ 11,144	$ 24,227
General and administrative	5,256	2,498	2,758
Total operating expenses	40,627	13,642	26,985
Other income (expense):			
Change in fair value of preferred stock tranche liability	2,507	(4,883)	7,390
Change in fair value of antidilution rights liability	(5,359)	(982)	(4,377)
Change in fair value of success payment liability	(2,387)	(68)	(2,319)
Interest income and other income (expense), net	162	278	(116)
Total other income (expense)	(5,077)	(5,655)	578
Net loss	$(45,704)	$(19,297)	$(26,407)

Research and development expenses

The following table summarizes our research and development expenses for the years ended December 31, 2020 and 2019:

	Year ended December 31,	
	2020	2019
	(in thousands)	
Employee-related expenses	$ 7,294	$ 2,602
Raw material costs and external expenses associated with manufacturing activities, including third-party CMOs	5,881	12
External expenses associated with preclinical studies performed by outside consulting services, including third-party CROs	9,269	1,341
Lab supplies used in research and development activities	4,535	1,266
Facility-related costs (including depreciation)	2,542	307
License and milestone payments	3,938	4,613
Other research and development costs	1,912	1,003
Total research and development expenses	$35,371	$11,144

Research and development expenses were $35.4 million for the year ended December 31, 2020, compared to $11.1 million for the year ended December 31, 2019. The increase of $24.2 million was primarily due to the following:

- an increase in external expenses associated with preclinical studies (primarily animal-study costs) performed by outside consulting services, including third-party CROs of $7.9 million;
- an increase in external expenses associated with developing and validating our manufacturing process for use in our preclinical studies and future clinical trials of $5.9 million, including the cost of raw materials used in our research and development activities of $3.9 million;
- an increase in personnel-related costs of $4.7 million driven by an increase in headcount of employees involved in research and development activities;
- an increase in lab supplies of $3.3 million due to the increased investment in research and development activities in 2020;
- an increase in facility-related costs (including depreciation) and other allocated miscellaneous expenses of $2.2 million due to the increased investment in research and development activities in 2020;
- an increase in other research and development costs of $0.9 million, primarily due to an increase in professional fees and consulting fees in support of increased investment in research and development activities in 2020; and
- a decrease in research and development expense attributed to license and milestone payments of $0.7 million, primarily due to fewer licensing transactions in 2020 (and therefore reduced upfront licensing payments).

We expect our research and development expenses will continue to increase as we continue our current research programs, initiate new research programs, continue our preclinical development of product candidates and conduct future clinical trials for any of our product candidates.

General and administrative expenses

General and administrative expenses were $5.3 million for the year ended December 31, 2020, compared to $2.5 million for the year ended December 31, 2019. The increase of $2.8 million was primarily attributable to the following:

- an increase of $2.0 million in personnel, facility, and other expenses stemming from an increase in headcount to support our growth; and
- an increase of $0.4 million in legal and professional service fees, primarily due to increased professional fees for audit, tax and consulting services.

Other income (expense)

Change in fair value of preferred stock tranche liability

The change in fair value of the preferred stock tranche liability was primarily due to an increase in 2019 of the probability of the tranche milestones being met, followed by the settlement of the preferred stock tranche liability in March 2020 and issuance of Series A Preferred Stock.

Change in fair value of antidilution rights liability

The change in fair value of the antidilution rights liability was primarily attributable to a higher cumulative probability in 2020 of the respective triggering events being met.

Change in fair value of success payments liability

The change in fair value of the success payments liability was primarily attributable to a higher cumulative probability in 2020 of the respective triggering events being met.

Interest and other income (expense), net

The decrease of $0.1 million in 2020 was attributable to lower interest rates on our investments in 2020 compared to 2019.

Liquidity and capital resources

Sources of liquidity and capital

Since our inception in 2018, we have incurred significant operating losses. Our net losses for the years ended December 31, 2020 and 2019 were $45.7 million and $19.3 million, respectively. As of December 31, 2020, we have an accumulated deficit of $66.5 million. We expect to incur significant expenses and operating losses for the foreseeable future as we advance the preclinical and, if successful, the clinical development of our programs. To date, we have funded our operations primarily with proceeds from the sales of Preferred Stock. Through December 31, 2020, we raised an aggregate of $122.5 million in gross proceeds from sales of our Preferred Stock. As of December 31, 2020, we had $9.0 million in cash and cash equivalents, $63.1 million in marketable securities, and $0.5 million in restricted cash. In January 2021, we issued and sold 77,163,022 shares of our Series B preferred stock for $94.0 million of gross proceeds.

Cash flows

The following table summarizes our sources and uses of cash for the years ended December 31, 2020 and 2019:

	Year ended December 31,	
	2020	2019
	(in thousands)	
Cash used in operating activities	$ (35,265)	$ (7,442)
Cash used in investing activities	(51,127)	(12,758)
Cash provided by financing activities	92,627	17,954
Net increase (decrease) in cash, cash equivalents and restricted cash	$ 6,235	$ (2,246)

Operating activities

For the year ended December 31, 2020, net cash used in operating activities was $35.3 million, consisting primarily of our net loss of $45.7 million and a decrease attributable to non-cash items of $2.5 million associated with the fair value change in the preferred stock tranche liability. These amounts were partially offset by the following non-cash changes: change in fair value of antidilution rights and success payment liabilities of $7.7 million, depreciation expense of $1.3 million, stock-based compensation of $0.9 million, and amortization of premiums on marketable securities of $0.4 million, as well as a net increase in our operating assets and liabilities of $2.6 million (primarily driven by an increase in accrued expenses and other liabilities of $6.1 million).

For the year ended December 31, 2019, net cash used in operating activities was $7.4 million, consisting primarily of our net loss of $19.3 million, which was partially offset by the following non-cash charges; change in fair value of preferred stock tranche liability of $4.9 million, non-cash research and development license expense of $2.8 million (primarily associated with our Harvard/ Broad License Agreement and Broad License Agreement), change in fair value of antidilution rights and success payment liabilities of $1.1 million, stock-based compensation of $0.4 million, and a net increase in our operating assets and liabilities of $2.7 million (primarily driven by increases in accounts payable and accrued expenses and other liabilities of $1.7 million and $0.9 million, respectively).

Investing activities

For the year ended December 31, 2020, net cash used in investing activities was $51.1 million and consisted of purchases of property and equipment of $3.4 million, primarily related to lab equipment, and purchases of marketable securities of $98.5 million, which amounts were offset partially by maturities of marketable securities of $50.8 million.

For the year ended December 31, 2019, net cash used in investing activities was $12.8 million and consisted of purchases of property and equipment of $1.9 million, primarily related to lab equipment, and purchases of marketable securities of $22.0 million, which amounts were offset partially by maturities of marketable securities of $11.1 million.

Financing activities

For the year ended December 31, 2020, net cash provided by financing activities was $92.6 million, consisting of the net proceeds from the issuance of Series A Preferred Stock of $29.7 million and net proceeds from the issuance of Series A-2 Preferred Stock of $62.9 million.

For the year ended December 31, 2019, net cash provided by financing activities was $18.0 million consisting primarily of net proceeds from the issuance of Series A Preferred Stock.

Funding requirements

Our operating expenses and future funding requirements are expected to increase substantially as we continue to advance our portfolio of programs.

Specifically, our expenses will increase if and as we:

- continue our current research programs and our preclinical development of product candidates from our current research programs;
- seek to identify additional research programs and additional product candidates;
- advance our existing and future product candidates into clinical development;
- initiate preclinical studies and clinical trials for any additional product candidates we identify and develop or expand development of existing programs into additional patient populations;
- maintain, expand, enforce, defend and protect our intellectual property portfolio and provide reimbursement of third-party expenses related to our patent portfolio;
- seek regulatory and marketing approvals for any of our product candidates that we develop;
- seek to identify, establish and maintain additional collaborations and license agreements, and the success of those collaborations and license agreements;
- make milestone payments to Beam under our collaboration and license agreement with Beam, to Acuitas under our non-exclusive license agreement with Acuitas, under the Harvard/ Broad License Agreements, and under any additional future collaboration or license agreements that we obtain;
- ultimately establish a sales, marketing, and distribution infrastructure to commercialize any drug products for which we may obtain marketing approval, either by ourselves or in collaboration with others;
- generate revenue from commercial sales of product candidates we may develop for which we receive marketing approval;
- further develop our base editing technology;
- hire additional personnel including research and development, clinical and commercial personnel;
- add operational, financial and management information systems and personnel, including personnel to support our product development;
- acquire or in-license products, intellectual property, medicines and technologies;
- satisfy any post-marketing requirements, such as a cardiovascular outcomes trial;
- establish commercial-scale current good manufacturing practices, or cGMP, capabilities through a third-party or our own manufacturing facility; and
- operate as a public company.

As of December 31, 2020, we had cash, cash equivalents and marketable securities of $72.1 million. In January 2021, we raised an additional $93.8 million of aggregate cash proceeds, net of issuance costs, from the sale and issuance of 77,163,022 shares of our Series B preferred stock. We believe that the net proceeds from this offering, together with our existing cash, cash equivalents and marketable securities, will enable us to fund our operating expenses and capital expenditure requirements into . We have based this estimate on assumptions that may prove to be wrong, and we could exhaust our available capital resources sooner than we expect.

Identifying potential product candidates and conducting preclinical testing and clinical trials is a time consuming, expensive and uncertain process that takes years to complete, and we may never generate the necessary data or results required to obtain marketing approval and achieve product sales. In addition, our product candidates, if approved, may not achieve commercial success. Our commercial revenues, if any, will be derived from sales of products that we do not expect to be commercially available for several years, if ever. Accordingly, we will need to obtain substantial additional funds to achieve our business objectives.

Our expectation with respect to our ability to fund current planned operations is based on estimates that are subject to risks and uncertainties. Our operating plan may change as a result of many factors currently unknown to management and there can be no assurance that the current operating plan will be achieved in the time frame anticipated by us, and we may need to seek additional funds sooner than planned.

Adequate additional funds may not be available to us on acceptable terms, or at all. We do not have any source of committed external funds. Market volatility resulting from the COVID-19 pandemic or other factors could also adversely impact our ability to access capital as and when needed. To the extent that we raise additional capital through the sale of equity or convertible debt securities, your ownership interest will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect your rights as a common stockholder. Debt financing and preferred equity financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, selling or licensing our assets, making capital expenditures or declaring dividends and may require the issuance of warrants, which could potentially dilute your ownership interest.

If we raise additional funds through collaborations, strategic alliances or marketing, distribution or licensing arrangements with third parties, we may have to relinquish valuable rights to our technologies, future revenue streams, research programs or product candidates or grant licenses on terms that may not be favorable to us. If we are unable to raise additional funds through equity or debt financings or other arrangements when needed or on terms acceptable to us, we may be required to delay, limit, reduce or terminate our product development or future commercialization efforts or grant rights to develop and market product candidates that we would otherwise prefer to develop and market ourselves.

For additional information on risks associated with our substantial capital requirements, please see “Risk factors—Even if we consummate this offering, we will need substantial additional funding. If we are unable to raise capital when needed, we could be forced to delay, reduce or eliminate our product development programs or commercialization efforts.”

Contractual obligations

The following table is a summary of our significant contractual obligations as of December 31, 2020:

		Payments due by period			
Contractual obligation	**Total**	**Less than 1 year**	**More than 1 year and less than 3**	**More than 3 years and less than 5**	**More than 5 years**
			(in thousands)		
Operating lease obligation(1)	$2,663	$ 1,671	$ 992	$ —	$ —

(1) Represents future minimum lease payments under our operating lease for office and lab space in Cambridge, Massachusetts that expires in August 2022.

We enter into contracts in the normal course of business with CROs, CMOs and other third parties for preclinical research studies and manufacturing services. These contracts do not contain minimum purchase commitments and are cancelable by us upon prior written notice. Payments due upon cancellation consist only of payments for services provided or expenses incurred, including noncancelable obligations of our service providers, up to

the date of cancellation. These payments are not included in the table of contractual obligations above as the amount and timing of such payments are not known.

We have also entered into license agreements under which we may be obligated to make certain payments. The table above does not include potential success payments, sublicense fees, royalty fees, licensing maintenance fees and reimbursement of patent maintenance costs that we may be required to pay under license agreements. Our agreements to license intellectual property include potential milestone payments that are dependent upon the development of products using the intellectual property licensed under the agreements and contingent upon the achievement of development or regulatory approval milestones, as well as commercial and success payment milestones. We have not included such potential obligations in the table above because they are contingent upon the occurrence of future events and the timing and likelihood of such potential obligations are not known. For additional information about our license agreements and amounts that could become payable in the future under such agreements, see “Business—License and collaboration agreements” and Note 8, License agreements, to our consolidated financial statements appearing elsewhere in this prospectus.

Emerging growth company status

As an emerging growth company, or EGC, under the Jumpstart Our Business Startups Act of 2012, or JOBS Act, we may delay the adoption of certain accounting standards until such time as those standards apply to private companies. Other exemptions and reduced reporting requirements under the JOBS Act for EGCs include presentation of only two years of audited financial statements in a registration statement for an initial public offering, or IPO, an exemption from the requirement to provide an auditor’s report on internal controls over financial reporting pursuant to Section 404(b) of the Sarbanes-Oxley Act of 2002, an exemption from any requirement that may be adopted by the Public Company Accounting Oversight Board regarding mandatory audit firm rotation, and less extensive disclosure about our executive compensation arrangements.

In addition, the JOBS Act provides that an EGC can take advantage of an extended transition period for complying with new or revised accounting standards. This provision allows an EGC to delay the adoption of some accounting standards until those standards would otherwise apply to private companies. We have elected to use this extended transition period for complying with new or revised accounting standards that have different effective dates for public and private companies until the earlier of the date we (i) are no longer an emerging growth company or (ii) affirmatively and irrevocably opt out of the extended transition period provided in the JOBS Act. As a result, our consolidated financial statements may not be comparable to companies that comply with new or revised accounting pronouncements as of public company effective dates.

We may remain classified as an EGC until the end of the fiscal year in which the fifth anniversary of this offering occurs, although if the market value of our common stock that is held by non-affiliates exceeds $700 million as of any June 30 before that time or if we have annual gross revenues of $1.07 billion or more in any fiscal year, we would cease to be an emerging growth company as of December 31 of the applicable year. We also would cease to be an EGC if we issue more than $1 billion of non-convertible debt over a three-year period.

Critical accounting policies and significant judgments

This management’s discussion and analysis of our financial condition and results of operations is based on our consolidated financial statements, which we have prepared in accordance with U.S. generally accepted accounting principles. The preparation of these financial statements and related disclosures requires us to make estimates, judgments and assumptions that affect the reported amounts of assets, liabilities, and expenses and the disclosure of contingent assets and liabilities in our consolidated financial statements. We

base our estimates on historical experience, known trends and events and various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. We evaluate our estimates and assumptions on an ongoing basis. Our actual results may differ from these estimates under different assumptions or conditions.

While our significant accounting policies are described in more detail in Note 2 to our consolidated financial statements appearing elsewhere in this prospectus, we believe that the following accounting policies are those most critical to the judgments and estimates used in the preparation of our consolidated financial statements:

- accrued research and development expenses;
- stock-based compensation and common stock valuation; and
- fair value measurements.

Accrued research and development expenses

As part of the process of preparing our consolidated financial statements, we are required to estimate certain accrued research and development expenses. This process involves estimating the level of service performed and the associated cost incurred for the service when we have not yet been invoiced or otherwise notified of actual costs. We make estimates of our accrued expenses as of each balance sheet date in our consolidated financial statements based on facts and circumstances known to us at that time. We periodically confirm the accuracy of the estimates with the service providers and make adjustments if necessary. Examples of estimated accrued research and development expenses include those related to fees paid to:

- vendors in connection with discovery and preclinical development activities;
- CROs in connection with preclinical studies and testing; and
- CMOs in connection with the process development and scale up activities and the production of materials.

We base the expense recorded related to contract research and manufacturing on our estimates of the services received and efforts expended pursuant to quotes and contracts with multiple CROs and CMOs that conduct services and supply materials. The financial terms of these agreements are subject to negotiation, vary from contract to contract and may result in uneven payment flows. In accruing service fees, we estimate the time period over which services will be performed and the level of effort to be expended in each period. If the actual timing of the performance of services or the level of effort varies from the estimate, we adjust the accrual accordingly. Although we do not expect our estimates to be materially different from amounts actually incurred, our understanding of the status and timing of services performed relative to the actual status and timing of services performed may vary and may result in reporting amounts that are too high or too low in any particular period. To date, there have not been any material adjustments to our prior estimates of accrued research and development expenses. While the majority of our service providers invoice us in arrears for services performed, on a pre-determined schedule or when contractual milestones are met; some require advance payments. There may be instances in which payments made to our vendors will exceed the level of services provided and result in a prepayment of the expense. We record these as prepaid expenses on our consolidated balance sheet.

Stock-based compensation

We measure stock options and other stock-based awards granted to employees, directors, consultants or founders based upon their fair value on the date of the grant and recognize stock-based compensation expense over the requisite service period, which is generally the vesting period of the respective award. We recognize forfeitures as they occur.

The stock-based compensation awards are subject to either service or performance-based vesting conditions. We apply the straight-line method of expense recognition to all awards with service-based vesting and recognize stock-based compensation for performance awards based on grant date fair value over the service period using the accelerated attribution method to the extent achievement of the performance condition is probable.

We estimate the fair value of each stock option grant on the date of grant using the Black-Scholes option-pricing model, which uses inputs such as the fair value of our common stock, assumptions we make for the volatility of our common stock, the expected term of our stock options, the risk-fee interest rate for a period that approximates the expected term of our stock options and our expected dividend yield. The fair value of our common stock is used to determine the fair value of restricted stock awards.

The Black-Scholes option pricing model requires inputs based on certain subjective assumptions, including (i) the expected stock price volatility, (ii) the expected term of the award, (iii) the risk-free interest rate and (iv) expected dividends. Due to the lack of a public market for our common stock and lack of company-specific historical and implied volatility data, we have based our computation of expected volatility on the historical volatility of a representative group of public companies with similar characteristics to us, including stage of product development and life science industry focus. The historical volatility is calculated based on a period of time commensurate with expected term assumption. We use the simplified method as prescribed by the SEC Staff Accounting Bulletin No. 107, *Share-Based Payment*, to calculate the expected term for options granted to employees and non-employees whereby the expected term equals the arithmetic average of the vesting term and the original contractual term of the options due to its lack of sufficient historical data. The risk-free interest rate is based on U.S. Treasury securities with a maturity date commensurate with the expected term of the associated award. The expected dividend yield is assumed to be zero as we have never paid dividends and have no current plans to pay any dividends on our common stock.

Determination of the fair value of our common stock

Due to the absence of an active market for our common stock, we utilized methodologies in accordance with the framework of the American Institute of Certified Public Accountants' Accounting and Valuation Guide, *Valuation of Privately-Held Company Equity Securities Issued as Compensation*, to estimate the fair value of its common stock. The estimated fair value of the common stock has been determined at each grant date based upon a variety of factors, including the illiquid nature of the common stock, arm's-length sales of our capital stock (including convertible preferred stock), the effect of the rights and preferences of the preferred shareholders, and the prospects of a liquidity event. Among other factors are our financial position and historical financial performance, the status of technological developments within our research, the composition and ability of the current research and management team, an evaluation or benchmark of our competition, and the current business climate in the marketplace.

The assumptions underlying the valuations represent management's best estimates, which involve inherent uncertainties and the application of management judgement. As a result, if factors or expected outcomes change and we use significantly different assumptions or estimates, the fair value of our stock-based compensation could be materially different.

Following the closing of this offering, the fair value of our common stock will be determined based on the quoted market price of our common stock.

Awards granted

The following table summarizes the types of awards granted from January 1, 2020 through the date of this prospectus and includes for each grant date the per share exercise price of options, the per share fair value of the common stock, the number of shares underlying each grant, and the estimated value of awards.

Grant date	Type of award	Per share exercise price of options	Per share fair value of common stock on grant date	Number of shares underlying grant	Per share estimated value of award on grant date
September 16, 2020	Stock Options	$ 0.31	$ 0.37(1)	17,165,652	$ 0.27
December 9, 2020	Stock Options	$ 0.31	$ 0.89(1)	1,035,000	$ 0.75
February 12, 2021	Stock Options	$ 0.89	$ 0.89	10,667,500	$ 0.64
February 19, 2021	Stock Options	$ 0.89	$ 0.89	2,100,000	$ 0.64
April 1, 2021	Stock Options	$ 0.97	$ 0.97	3,525,000	$ 0.69
				34,493,152	

(1) For each of the grant dates, we performed a retrospective fair value assessment and concluded that the fair value of our common stock underlying stock options that we granted for the dates noted in this table should be adjusted for accounting purposes. This reassessed value was based, in part, upon third-party valuations of our common stock prepared on the grant date on a retrospective basis. Third-party valuations were prepared using a hybrid approach, which considered an IPO scenario and sale scenarios to determine our enterprise value.

Fair value measurements

Preferred stock tranche liability

We have determined that our obligation to issue, and our investors' obligation to purchase, additional shares of Series A Preferred Stock pursuant to the second and third closings of our Series A financing represent a freestanding instrument that is classified as a liability under Accounting Standards Codification, or ASC 480, *Distinguishing Liabilities From Equity*. The resulting preferred stock tranche liability was initially recorded at fair value, with gains and losses arising from changes in fair value recognized in other income (expense) in the statement of operations. The preferred stock tranche liability was remeasured at each reporting period and upon the exercise or expiration of the obligation. The preferred stock tranche liability was valued using a probability-weighted present value model that considered the probability of triggering the tranche rights through achievement of certain non-scientific and scientific milestones. The preferred stock tranche liability was settled in full during 2020 with the issuance of additional shares of Series A Preferred Stock.

Antidilution rights liability

The antidilution rights liability represents the obligation to issue additional shares of common stock to Harvard and Broad following the completion of preferred stock financings and upon the closing of this offering. These antidilution rights are accounted for under ASC 815, *Derivatives and Hedging*, and were initially recorded at fair value with a corresponding charge to research and development expense. Any subsequent changes in fair value are recognized in other income (expense) in the statement of operations at each reporting period. The antidilution rights liability was valued using (i) a probability-weighted present value model that considered the probability of meeting the defined aggregate level of preferred stock financing, as well as the fair value of our common stock and (ii) a Monte Carlo simulation model, which models the value of the liability based on several key variables, including probability of event occurrence, timing of event occurrence, as well as the fair value of our common stock.

The antidilution rights liability was partially satisfied in 2019 and 2020 and we expect that it will be satisfied in full upon the issuance of an aggregate of an additional shares of common stock upon the closing of this offering, based on our issuance and sale of shares of our common stock in this offering and assuming our post-money valuation exceeds $500 million as further described under "Description of capital stock—License agreement with The Broad Institute and the President and Fellows of Harvard College."

Success payments liability

We are required to make success payments to Harvard and Broad in the event our average market capitalization, following the filing of our first Quarterly Report on Form 10-Q, exceeds specified thresholds ascending from a high nine digit dollar amount to $10.0 billion, or sale of our company for consideration in excess of those thresholds. In the event of a change of control of our company or a sale of our company, we are required to pay in cash within a specified period following such event. Otherwise, the payments may be settled at our option in either cash or shares of our common stock, or a combination of cash and shares of our common stock. The success payments are accounted for under ASC 815, *Derivatives and Hedging*, and were initially recorded at fair value with a corresponding charge to research and development expense. Any subsequent changes in fair value are recognized in other income (expense) in the statement of operations. We will continue to adjust the liability for changes in fair value until the earlier of the achievement or expiration of the success payment obligation. To determine the estimated fair value of the success payments, we used a Monte Carlo simulation model, which models the value of the liability based on several key variables, including probability of event occurrence, timing of event occurrence, as well as the value of our common stock.

Off-balance sheet arrangements

We did not have during the periods presented, and we do not currently have, any off-balance sheet arrangements, as defined in the rules and regulations of the Securities and Exchange Commission.

Recently issued accounting pronouncements

See Note 2, "Summary of significant accounting policies – Recently issued accounting pronouncements" to our consolidated financial statements included elsewhere in this prospectus for more information.

Quantitative and qualitative disclosures about market risk

We are exposed to market risk related to changes in interest rates. As of December 31, 2020, we had cash and equivalents of $9.0 million, which consisted of standard checking accounts and money market account funds that invest primarily in the U.S. government-backed securities and treasuries. In addition, as of December 31, 2020, we also had marketable securities of $63.1 million, which consist of U.S. treasury securities and agency securities. Interest income is sensitive to change in the general level of interest rates, however, due to the short-term maturities of our cash equivalents and the low risk profile of our marketable securities, an immediate 10% change in interest rates would not have a material effect on the fair market value of our cash equivalents and marketable securities.

We are not currently exposed to significant market risk related to changes in foreign currency exchange rates; however, we do contract with vendors that are located outside of the United States and may be subject to fluctuations in foreign currency rates. We may enter into additional contracts with vendors located outside of the United States in the future, which may increase our foreign currency exchange risk.

We do not believe that inflation had a material effect on our business, financial condition or results of operations during the year ended December 31, 2020.

Business

Overview

We are a genetic medicines company pioneering a new approach to the care of cardiovascular disease, or CVD, transforming treatment from chronic management to single-course gene editing medicines. Despite advances in treatment over the last 50 years, CVD remains the leading cause of death worldwide. The current paradigm of chronic care is fragile—requiring rigorous patient adherence, extensive healthcare infrastructure and regular healthcare access—and leaves many patients without adequate care. Our goal is to disrupt the chronic care model for CVD by providing a new therapeutic approach with single-course *in vivo* gene editing treatments focused on addressing the root causes of this highly prevalent and life-threatening disease. Our initial two programs target PCSK9 and ANGPTL3, respectively, genes that have been extensively validated as targets for lowering blood lipids, such as low-density lipoprotein cholesterol, or LDL-C. We believe that editing these genes could potently and durably lower LDL-C throughout the lifetime of patients with or at risk for atherosclerotic cardiovascular disease, or ASCVD, the most common form of CVD.

Our approach leverages multiple breakthroughs in 21st century biomedicine—human genetic analysis, gene editing, messenger RNA, or mRNA, -based therapies and lipid nanoparticle, or LNP, delivery—to target genes that are predominantly expressed in the liver and disrupt the production of proteins that cause CVD. We are advancing a pipeline of single-course *in vivo* gene editing programs, each designed to mimic natural disease resistance mutations and turn off specific genes in order to lower blood lipids, thereby reducing the risk of ASCVD. We intend to initially develop these programs for the treatment of patients with familial hypercholesterolemia, or FH, a genetic disease that causes life-long severely elevated blood LDL-C, leading to increased risk of early-onset ASCVD. If our programs are successful in FH, we believe they could also provide a potential treatment for the broader population of patients with established ASCVD. Ultimately, we believe that these treatments could potentially be developed for administration to people at risk for ASCVD as a preventative measure similar to the way that certain vaccines offer long-term protection against infectious diseases.

High cumulative life-long exposure to LDL-C drives the development of atherosclerotic plaque that results in the hardening of arteries seen in ASCVD. The relationship between lowering of cumulative LDL-C exposure and reduction in the risk of ASCVD is among the best understood relationships in medicine. Studies have shown that lowering LDL-C by 39 mg/dL for five years in patients with established ASCVD reduces the risk of a further event by 21%, whereas a similar degree of LDL-C difference over a lifetime reduces the risk of a first ASCVD event by 88%. This demonstrates that the challenge is not only to substantially reduce LDL-C but also to sustain such a reduction throughout a patient's lifetime. We believe that the cornerstone of the treatment and prevention of ASCVD must be early and aggressive reduction of LDL-C for as long as possible.

The current standard of care is a chronic care model that often fails to sufficiently control overall LDL-C exposure due to the continuous and life-long nature of its treatment approaches and the inherent adherence issues it presents. As a result, a large proportion of patients with established ASCVD have LDL-C levels above the goal recommended by the American Heart Association, or the AHA, and the American College of Cardiology, or the ACC, leaving them at risk for recurrent ASCVD events and the potential for invasive medical procedures or even death. Furthermore, given the silent nature of the damage done by elevated LDL-C, many patients at risk for ASCVD do not properly appreciate the therapeutic benefits of consistent treatment as well as the substantial risk of foregoing treatment, focusing instead on the heavy, life-long medication burden of daily pills, lifestyle changes and other chronic approaches. We believe that single-course gene editing treatments that potently and durably control cumulative LDL-C exposure could fundamentally disrupt the chronic care model for treating patients with or at risk for ASCVD and relieve the significant burden placed on patients, providers and the healthcare system.

Our lead product candidate, VERVE-101, is designed to permanently turn off the PCSK9 gene in the liver. PCSK9 is a highly validated target that plays a critical role in controlling blood LDL-C through its regulation of the LDL receptor, or LDLR. Reduction of PCSK9 protein in the blood improves the ability of the liver to clear LDL-C from the blood. VERVE-101 utilizes LNP-mediated delivery to target the liver and base editing technology to make a single base change at a specific site in the PCSK9 gene in order to disrupt PCSK9 protein production.

In an ongoing *in vivo* proof-of-concept study in non-human primates, or NHPs, we observed substantial lowering of LDL-C levels that was sustained over an extended period of time following treatment. In this study, following a single intravenous infusion of a base editor targeting PCSK9, we observed an average reduction of blood PCSK9 protein of 89% accompanied by an average reduction of blood LDL-C levels of 59% at two weeks after treatment. This LDL-C reduction was maintained at an average of 62% for ten months following treatment. If we are able to achieve similar reductions in PCSK9 protein levels in humans, we believe this could result in marked and sustained LDL-C reductions of approximately 60%, which would potentially offer superior cumulative LDL-C lowering to what has been clinically demonstrated with other PCSK9-targeting treatment modalities. In addition, in our preclinical studies in NHPs, VERVE-101 has been well tolerated following a single administration with only mild elevations in liver function tests that resolved within two weeks. In primary human hepatocytes treated with VERVE-101, we observed on-target editing at the PCSK9 target site and did not observe editing at any of 141 identified potential off-target sites.

Based on our preclinical data, we are advancing VERVE-101 initially for the treatment of heterozygous familial hypercholesterolemia, or HeFH, which is estimated to affect approximately 31 million patients globally. We plan to expand clinical development of VERVE-101 in a stepwise fashion beyond HeFH for the treatment of patients with established ASCVD, which represents hundreds of millions of potential patients globally. Ultimately, we believe that VERVE-101 may be useful to people at risk for ASCVD as a preventative measure in the general population. We have initiated investigational new drug application, or IND, -enabling studies for VERVE-101. We intend to submit an IND to the United States Food and Drug Administration, or FDA, and comparable foreign regulatory authorities in 2022, followed by initiation of clinical development for patients with HeFH.

Our second program is designed to permanently turn off the ANGPTL3 gene in the liver. ANGPTL3 is a key regulator of cholesterol and triglyceride metabolism. We believe that disrupting ANGPTL3 protein production may lead to reductions in LDL-C and triglyceride levels through a mechanism distinct from that of PCSK9. We plan to develop this program initially for the treatment of FH, including both homozygous familial hypercholesterolemia, or HoFH, which is an orphan indication that affects approximately 1,300 patients in the United States, as well as the more prevalent HeFH indication. Similar to our approach with VERVE-101, we plan to expand the clinical development of our ANGPTL3 program in a stepwise fashion beyond FH to patients with established ASCVD. Ultimately, we believe that our ANGPTL3 program may also be useful to people at risk for ASCVD as a preventative measure in the general population.

In preclinical studies of our ANGPTL3 program in NHPs, we observed an average reduction of blood ANGPTL3 protein levels of 96% during the ten-month period following a single treatment. We anticipate nominating a lead development candidate for our ANGPTL3 program and initiating IND-enabling studies in 2022.

We are striving to build the preeminent company developing gene editing medicines to treat patients with CVD, leveraging the expertise and capabilities of our team whose singular focus is on addressing the root causes of the world’s leading cause of mortality. We envision expanding beyond our PCSK9 and ANGPTL3 programs to develop a suite of single-course gene editing medicines that comprehensively and robustly address additional independent causes of CVD. Ultimately, we intend to apply our single-course gene editing approach to additional CVD indications with high unmet needs that are driven by mutations in genes expressed in the liver, including certain forms of cardiomyopathy.

Our team

We were founded in 2018 by a team of world-renowned researchers in cardiovascular genetics, pioneers of gene editing and proven business leaders, including Sekar Kathiresan, M.D., Kiran Musunuru, M.D., Ph.D., MPH, J. Keith Joung, M.D., Ph.D., Burt Adelman, M.D., Issi Rozen, MBA, and Barry Ticho, M.D., Ph.D. Since our founding, we have built an organization and culture driven by a talented team of individuals who embody the meaning behind our name—vigor, spirit and enthusiasm—and who are motivated by a common goal of transforming the care of patients with or at risk for CVD.

Members of our leadership team have extensive collective experience in human genetics, gene editing, CVD care and drug development and commercialization. Our chief executive officer, Dr. Kathiresan, is a preventive cardiologist who has made groundbreaking discoveries of genetic mutations that confer resistance to CVD. Andrew Ashe, J.D., our president and chief operating officer, is an accomplished biotech executive with over 20 years of experience in operations and legal management. Andrew Bellinger, M.D., Ph.D., our chief scientific officer, is a cardiologist with proven expertise in drug delivery, drug development and translational medicine.

We have attracted a diverse team of experts in discovery, preclinical research and clinical development, as well as gene editing technologies and the manufacturing and delivery of genetic medicines. Our team is built on several core values that drive our day-to-day activities and inspire our long-term vision:

- Grit: we work tenaciously to solve problems and advance science with rigor and care.
- Spirit: we act with integrity and inclusion to earn the trust of colleagues, partners, patients and providers.
- Drive: we enthusiastically pursue our potential, and we empower those around us to do the same.
- Passion: we are motivated by our mission to reimagine the approach to the treatment of CVD for patients and their families.

We have a Scientific Advisory Board, or SAB, comprising leading experts in the fields of cardiology, human genetics, translational medicine, delivery technologies, business and finance, including Eugene Braunwald, M.D., Daniel J. Rader, M.D., Andrew Geall, Ph.D., and Penny M. Heaton, M.D. Dr. Braunwald, a cardiovascular medicine specialist at Brigham and Women's Hospital and Hersey Professor of Medicine at Harvard Medical School, serves as chair of our SAB, has been listed as the most frequently cited author in cardiology, and was the first cardiologist elected to the National Academy of Sciences.

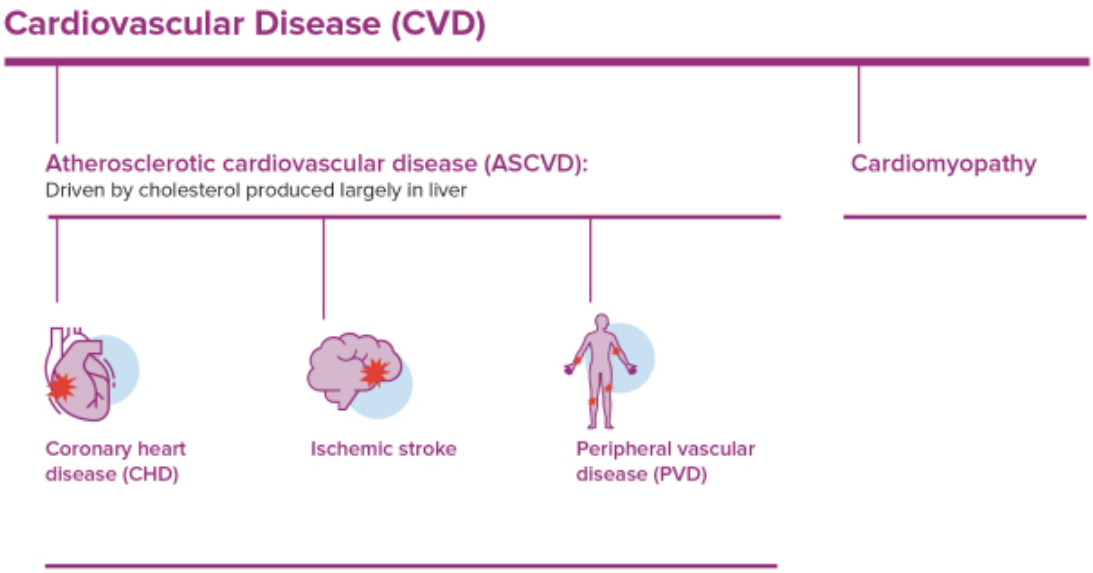
We have in-licensed technologies and intellectual property covering various elements of gene editing, including base editing and CRISPR nucleases, as well as multiple LNPs, with licenses from Beam Therapeutics Inc., or Beam, The Broad Institute, Inc., or Broad, Editas Medicine, Inc., the President and Fellows of Harvard College, or Harvard, Massachusetts General Hospital and Acuitas Therapeutics Inc., or Acuitas. In addition, since our inception through March 31, 2021, we have raised $216.5 million in capital from premier venture capital funds, healthcare-dedicated funds, major mutual funds and other leading investors that share our vision of transforming the treatment of CVD from chronic management to single-course gene editing medicines.

Transforming cardiovascular care

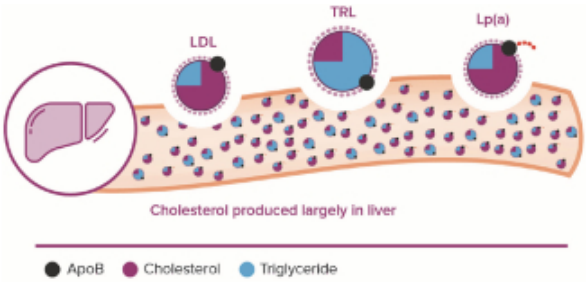
Despite advances in treatment over the last 50 years, CVD remains a global epidemic. The current paradigm of chronic care is fragile—requiring rigorous patient adherence, extensive healthcare infrastructure and regular healthcare access—and leaves many patients without adequate care. CVD remains the leading cause of death worldwide, responsible for nearly one in three deaths according to the World Health Organization. It is also a leading contributor to reductions in life expectancy and is one of the most expensive health conditions in the United States. According to the United States Centers for Disease Control and Prevention, or CDC, CVD costs the

U.S. healthcare system more than $350 billion per year in annual costs and lost productivity. Our goal is to disrupt the chronic care model for CVD by providing a new therapeutic approach focused on addressing the root causes of this highly prevalent and life-threatening disease.

CVD collectively refers to diseases of the heart and blood vessels, which are diagnosed as ASCVD or cardiomyopathy, among others, as depicted in the figure below. In ASCVD, a large subset of CVD, cholesterol drives the development of atherosclerotic plaque, a mixture of cholesterol, cells and cellular debris in the wall of a blood vessel that results in the hardening of the arteries.



High cumulative life-long exposure to blood cholesterol, which is carried in each of low-density lipoprotein, or LDL, triglyceride-rich lipoprotein, or TRL, or lipoprotein(a), or Lp(a), is a root cause of ASCVD. The graphic below depicts these liver-produced lipoproteins being secreted into the blood and their typical compositions, comprising cholesterol and triglycerides and with apolipoprotein B, or ApoB, on the surface. Each of these three lipoproteins represents an independent pathway of risk for ASCVD, and we believe that concurrently reducing the blood lipids carried in more than one of these pathways should provide additive benefit for the treatment of ASCVD.



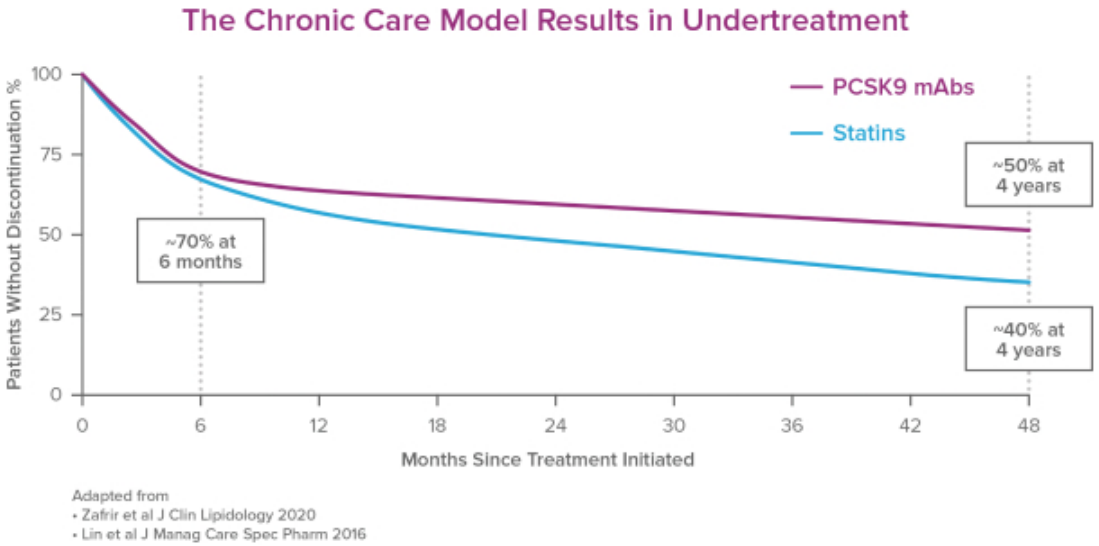
Current treatment approaches to lower LDL-C utilize continuous, life-long treatment, and due to the limitations of this chronic care model, cumulative exposure to LDL-C for many patients with ASCVD remains insufficiently controlled. The most common treatment for patients with ASCVD is daily statin pills in combination with recommended therapeutic lifestyle changes. There are several non-statin daily pills, including ezetimibe, bile acid sequestrants and bempedoic acid, that may be used alone or added sequentially to statin treatment in order to help patients with ASCVD reach recommended LDL-C goals. There are also two FDA-approved monoclonal antibodies, or mAbs, evolocumab and alirocumab, that target and bind to PCSK9 protein and are typically administered via injection twice per month. In addition, inclisiran, a small interfering RNA, or siRNA, that targets PCSK9 and is subcutaneously administered twice per year, was recently approved by the European Medicines Administration, or EMA. Despite these approved treatments, effectively controlling LDL-C levels long-term in patients with or at high risk for ASCVD remains a significant unmet need.

The relationship between lowering of cumulative LDL-C exposure and reduction in the risk of ASCVD is among the best understood relationships in medicine. Human genetic studies have shown that those with FH, a genetic disease, have life-long severely elevated blood LDL-C, which can lead to increased risk of early-onset ASCVD. Conversely, individuals born with resistance mutations that turn off a cholesterol-raising gene expressed in the liver, such as PCSK9, have life-long low levels of LDL-C and rarely suffer from ASCVD. These insights point to the importance of early aggressive treatment to reduce LDL-C exposure over a patient's lifetime. For patients with established ASCVD, such as those who have previously suffered a heart attack, clinical treatment guidelines published by the AHA/ACC recommend lowering blood LDL-C to a goal of less than 70 mg/dL, and the European Society of Cardiology, or ESC, recommends lowering blood LDL-C to a goal of less than 55 mg/dL. If blood LDL-C is maintained low enough for long enough, the risk of a first ASCVD event, including a heart attack, can be dramatically reduced. Studies have shown that lowering LDL-C by 39 mg/dL for five years in patients with established ASCVD reduces the risk of a further event by 21%, whereas a similar degree of LDL-C difference over a lifetime reduces the risk of a first ASCVD event by 88%.

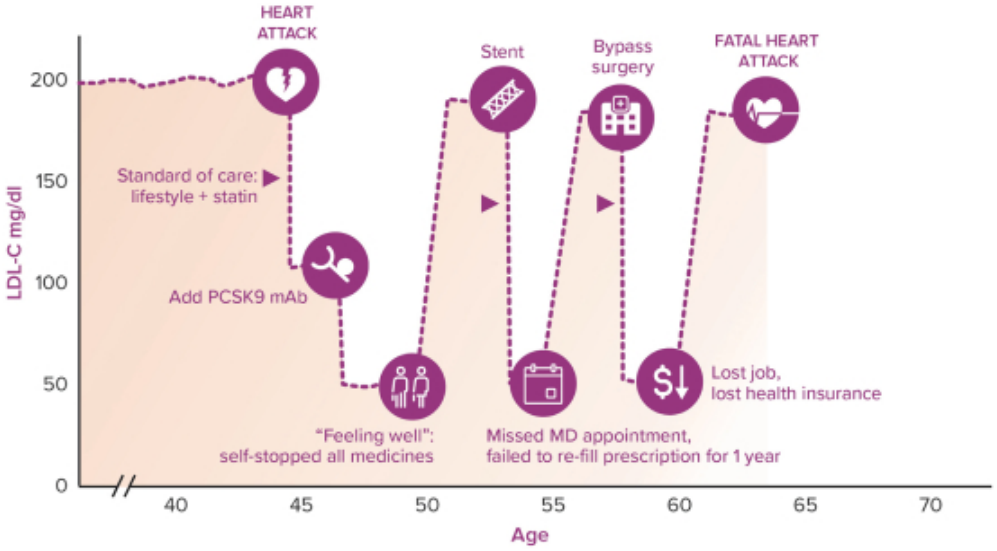
Despite the availability of statin and non-statin therapies, cumulative exposure to LDL-C is often insufficiently controlled in many patients with ASCVD. As a result, a large proportion of patients with established ASCVD have LDL-C levels above clinical treatment guidelines. In a national registry of outpatient cardiovascular care in the United States, out of 2.6 million patients who had suffered a clinical ASCVD event, 53% had not received any cholesterol-lowering therapy and 72% remained above the LDL-C levels recommended by the AHA/ACC. Further, data from a clinical trial of approximately 6,000 patients in the year following a heart attack showed that among the approximately 3,000 patients for whom the medication was provided for free, only 39% reported full adherence to their statin therapy.

A large proportion of patients with or at risk for ASCVD opt against starting or remaining on treatment due to the heavy, life-long medication burden associated with daily pills or frequent injections. Given the silent nature of the damage done by elevated LDL-C, many patients at risk for ASCVD do not properly appreciate the therapeutic benefits of consistent treatment as well as the substantial risk of foregoing treatment, focusing instead on the heavy, life-long medication burden of chronic approaches. Numerous prior studies of statins and injectable mAb PCSK9 inhibitors showed that treatment discontinuation is frequent. The graphic below

illustrates findings from two of these studies, which showed that 50% of patients or fewer remain on treatment with PCSK9 inhibitor mAbs or statins over four years.

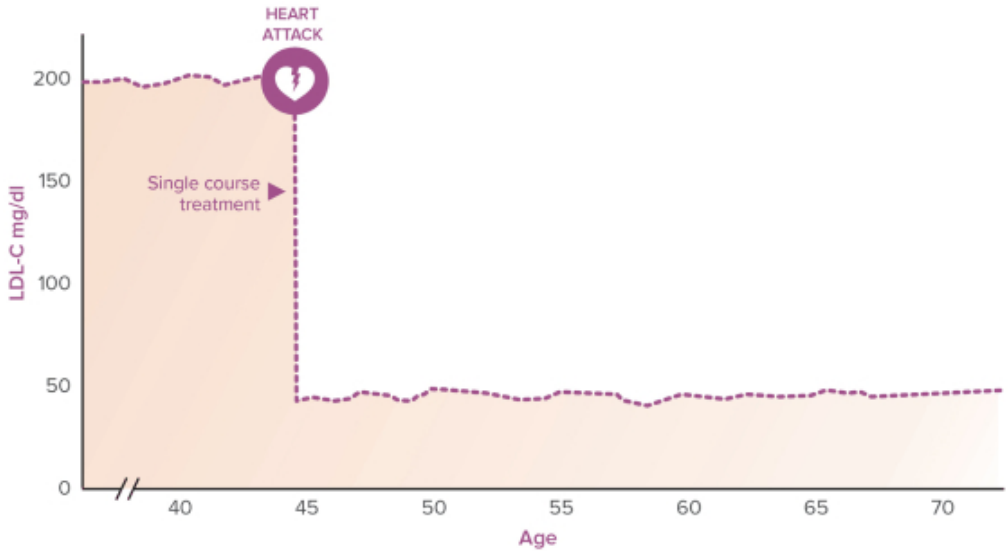


Incomplete adherence to treatment may result in significant oscillation in blood LDL-C levels over a patient's lifetime. The illustrative graphic below depicts the journey of a hypothetical patient with FH who began standard-of-care treatment after suffering a heart attack at age 44, at which point the patient was diagnosed with ASCVD, and the potential consequences of incomplete control of LDL-C over several years due to poor adherence and insufficient healthcare access. Incomplete LDL-C control can lead to recurrent clinical ASCVD events and the need for invasive medical procedures, such as intracoronary stenting and coronary artery bypass surgery, and can be fatal. These recurrent events and procedures place a heavy burden on patients, treating providers and the medical system as a whole, with increased cost and use of healthcare services.



Advantages of our single-course gene editing treatments for ASCVD

We believe that single-course gene editing treatments for patients with ASCVD have the potential to solve many of the challenges of the chronic care model and create a new paradigm for the treatment of this highly prevalent and life-threatening disease. By potently and durably controlling cumulative LDL-C exposure throughout a patient's lifetime, we believe our gene editing medicines could fundamentally disrupt the chronic care model for patients with or at risk for ASCVD and relieve the significant burden placed on patients, providers and the healthcare system. The illustrative graphic below depicts the journey of the same hypothetical patient with FH who, in this case, received a single-course gene editing treatment after suffering a heart attack and avoided recurrent ASCVD events as a result.



To achieve our goal of transforming the treatment of ASCVD, we are developing a pipeline of single-course gene editing treatments that leverage multiple breakthroughs of 21st century biomedicine—human genetic analysis, gene editing, mRNA-based therapies and LNP-mediated delivery. We believe our approach benefits from the following potential advantages:

- *Validated liver targets implicated in ASCVD risk:* Our approach specifically targets genes that are predominantly expressed in the liver and have been validated through human genetics research. Naturally occurring mutations in each of these target genes are associated with a reduced risk of ASCVD. Our gene editing programs are designed to mimic these natural resistance mutations to turn off specific genes in the liver implicated in the risks of CVD. Such resistance mutations in PCSK9, even in adults with homozygous mutations and complete PCSK9 protein deficiency, do not appear to have any serious adverse health consequences. Furthermore, there is established human pharmacologic proof-of-concept and positive tolerability profiles with other modalities targeting these genes, such as mAbs, siRNA and antisense oligonucleotides.
- *Potent, durable and life-long lowering of blood lipids through a single-course treatment:* We are leveraging gene editing technologies, including base editing, to make a permanent change in the target gene and disrupt the production of specific proteins that cause ASCVD. The durability of a gene editing approach appears to hold true in tissues with cell turnover, such as the liver, since the edit is passed on as cells divide. With VERVE-101, we are leveraging base editing with the goal of potently and permanently reducing blood lipids in order to create the potential for a life-long therapeutic outcome. In an ongoing preclinical proof-of-concept

study in NHPs using a precursor formulation of VERVE-101, we observed a 59% reduction in blood LDL-C at two weeks after treatment, with LDL-C reduction maintained at an average of 62% at ten months. In another preclinical proof-of-concept study in NHPs, we observed that a single administration of a precursor formulation targeting ANGPTL3 resulted in a 64% reduction in blood triglycerides at two weeks after treatment, with triglyceride reduction maintained at an average of 69% at ten months. We believe that our gene editing approach has the potential to potently and durably lower blood lipids throughout a patient's lifetime, thereby reducing their risk of ASCVD.

- *Designed and optimized to reduce or avoid safety risks:* To optimize the safety profile of our gene editing programs, we utilize non-viral LNP delivery of a gene editor to the liver due to the potentially superior safety profile of LNPs compared with available viral delivery approaches, specifically the minimization of genome integration risk and immunogenicity. In addition, we use base editing for our initial programs, which enables highly precise editing at the single base pair level and minimizes the risks of unwanted DNA modifications associated with double-stranded breaks from nuclease-based editing approaches. Finally, we extensively screen pairs of gene editors with guide RNA, or gRNA, in human cells, mice and NHPs to maximize the likelihood that our gene editing programs will have limited or no off-target editing effects. For VERVE-101, we have identified a base editor paired with a gRNA targeting PCSK9 and have not observed any significant off-target editing in preclinical studies using primary human hepatocytes.
- *A suite of complementary single-course gene editing treatments to broadly reduce blood lipids and ASCVD risk:* We are focused on targeting distinct pathways implicated in elevated blood lipid levels and related ASCVD risk. VERVE-101, our lead program, is designed to target the PCSK9 gene, a validated regulator of blood LDL-C levels. Our second program targets the ANGPTL3 gene, a regulator of both cholesterol and triglycerides that contributes to ASCVD risk independent of the PCSK9 pathway.
- *Potential to manufacture our programs in a scalable manner to reach a broad population:* We have designed our single-course treatments as LNPs encapsulating mRNA and gRNA, a similar construction to that used in two recent mRNA-based vaccines granted Emergency Use Authorization by the FDA for the prevention of COVID-19. We believe we will benefit from the rapid increase in investment, validation and real-world application of these technologies on a global scale as a result of the COVID-19 pandemic, which should enhance our potential to manufacture our gene editing programs for use with a broad patient population. We believe that scalable manufacturing is paramount to unlocking the true potential of our single-course gene editing treatments to tackle the worldwide burden of ASCVD.

Our strategy

To achieve our vision of developing gene editing medicines that transform treatment for patients with CVD from chronic management to single-course gene editing medicines, we are executing a strategy with the following key elements:

1. *Employ a stepwise approach to realize the full potential of VERVE-101, with initial development for the treatment of patients with HeFH followed by expansion to the broader population of patients with or at risk for ASCVD.* We are pioneering a new approach with single-course gene editing medicines aimed at transforming the care of patients with or at risk for ASCVD. We are initially developing VERVE-101 for the treatment of HeFH, a genetic cardiovascular disorder that causes life-long elevated LDL-C levels and leads to early-onset ASCVD. If we successfully develop VERVE-101 for the treatment of patients with HeFH, we believe it could also be used to treat the broader population of patients with established ASCVD. Ultimately, we believe these treatments could be potentially developed for administration to people at risk for ASCVD as a preventative measure. We have initiated IND-enabling studies with VERVE-101, and plan to submit an IND for the treatment of patients with HeFH in 2022.

2. *Expand our pipeline of gene editing treatments within ASCVD and beyond to additional CVD indications*. We are currently developing two gene editing programs focused on targeting two independent pathways controlling blood lipids implicated in ASCVD risk—PCSK9 and ANGPTL3. We envision expanding beyond our PCSK9 and ANGPTL3 programs to develop a suite of single-course gene editing medicines that comprehensively and robustly address additional independent causes of CVD. We believe our approach may be applicable to additional CVD indications with high unmet need driven by mutations in target genes expressed in the liver.

3. *Leverage our expertise and access to multiple gene editing technologies to become the leader in gene editing for CVD.* We believe that the deep expertise of our team in human genetics, gene editing and off-target analysis combined with multiple in-licensed technologies, including base editing and CRISPR nucleases, positions us to be able to develop single-course gene editing medicines designed to make a precise, predictable and permanent change in a target gene for the treatment of CVD. For each new target, our expertise allows us to systematically evaluate each gene editing technology in primary human hepatocytes, mice and NHPs to identify the optimal approach based on potential efficacy and safety. We believe that our singular focus on developing gene editing medicines to treat CVD enables us to move rapidly and has culminated in the first ever proof-of-concept data in NHPs for base editing.

4. *Advance LNP delivery technology leveraging both external as well as internal LNP capabilities to target the liver*. On a target-by-target basis, we evaluate the best options for non-viral delivery from our external partnerships or our internal LNP discovery platform. For our lead program, VERVE-101, we have licensed LNP technology from Acuitas, an established company with a track record of partnering and developing LNPs for clinical use. Additionally, our internal team's expertise in biodegradable LNP chemistry, formulation and manufacturing has allowed us to develop and screen potent, liver-directed LNPs, including novel liver-targeting GalNAc LNPs, which may offer superior delivery in certain CVD patient populations.

5. *Prioritize rapid iteration of product candidates in NHP preclinical models as an early development strategy*. We believe that studies in NHPs are a powerful predictor of efficacy in humans for gene editing and LNP delivery to the liver. Our preclinical validation approach prioritizes NHP experiments early in the process, enabling us to rapidly optimize drug product development to identify a lead candidate to take into clinical development. With VERVE-101, the bulk of our preclinical studies have been performed in NHPs, allowing us to establish the pharmacodynamic relationship between liver editing and resulting reductions in circulating PCSK9 protein and LDL-C that we believe will translate into a similar profile in humans.

6. *Develop manufacturing capabilities to produce in vivo gene editing medicines at scale.* We are currently working with Good Manufacturing Practice, or GMP, vendors to produce all components of our drug candidates for our first clinical trial batches. We have successfully executed batches at near clinical scale through our vendors and are on-track to produce clinical batches for our planned first-in-human trial of VERVE-101. We have also developed proprietary production processes designed to yield high-purity and high-quality mRNA that are crucial for *in vivo* liver editing applications. We are continuing to invest in building internal manufacturing capabilities for mRNA and LNP production, in order to fulfill our vision of delivering gene editing medicines to millions of patients with CVD.

7. *Build the leading cardiovascular gene editing company by maintaining a dynamic culture that attracts and retains a talented and collaborative team.* We have attracted a talented team of scientists, cardiologists, drug developers and business professionals, as well as experts in the fields of human genetics, gene editing technologies, mRNA biology, off-target analysis and genetic medicine delivery modalities.

Developing gene editing medicines that transform the care of CVD requires that we solve many new and complex problems as a natural component of the drug discovery and development process. Our vision, values, talent and strategy are essential to maximizing our ability to address these problems and bring forward a new approach to treating the leading cause of the death in the world.

Our approach

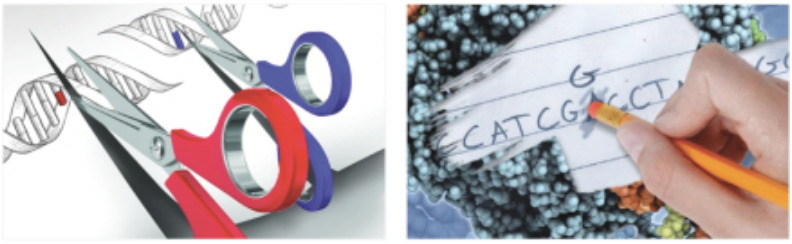
We are employing a tailored approach aimed at developing single-course gene editing medicines to transform treatment for patients with CVD. Our gene editing programs target validated genes in the liver that are supported by extensive human genetics and human pharmacology data and are known to be implicated in CVD. We use base editing for our initial programs, a next-generation gene editing approach that enables precise and efficient editing at the single base level in the genome without making a double-stranded break in the DNA. Our gene editing programs consist of LNPs that encapsulate mRNA encoding for a gene or base editor as well as a gRNA targeting the gene of interest expressed in the liver. We believe that the following key elements of our approach will help us achieve our goal of delivering gene editing treatments on a global scale for millions of patients with CVD.

Editor selection

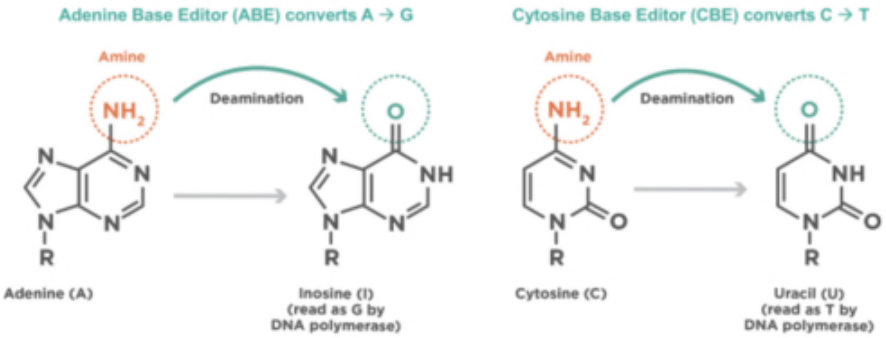
We selected gene editing as the core technology to develop our single-course gene editing treatments for CVD because we believe it offers the potential for durability of effect and versatility in the type of genetic modification compared to other genetic medicine approaches, including gene therapy and RNA therapeutics. We have access to multiple gene editing technologies through licenses including base editing and CRISPR nucleases. We believe having the flexibility to apply different gene editing technologies to different single-course treatments for CVD enables us to identify the best potential option for any given therapeutic application.

CRISPR-Cas is a form of nuclease-based gene editing that enables targeting of genomic DNA sequences with high specificity in human cells by assessing for a match between the gRNA sequence and the DNA sequence. The gRNA allows the Cas protein to recognize a complementary part of the DNA sequence. Once RNA-DNA pairing occurs, the Cas enzyme makes a double-stranded DNA break, and the cell's natural DNA repair mechanisms work to make changes or repair the genome. When the repair is faulty, there can be disruption of a target gene, known as a knockout. CRISPR-Cas is effective at knocking out, or silencing, a targeted gene through disruption. However, potential limitations of standard CRISPR-Cas gene editing include lack of predictability in genetic outcomes and potential toxicities associated with double-stranded DNA breaks.

Base editing is a next-generation gene editing approach that enables precise and efficient editing at the single base level in the genome without making a double-stranded break in the DNA. If CRISPR-Cas gene editing approaches are akin to "scissors" for the genome, base editors are akin to "pencils," erasing and rewriting one letter in a gene, as illustrated in the graphic below.



Through our license agreement with Beam, we have access to two different types of base editors—adenine base editors, or ABEs, and cytosine base editors, or CBEs, each of which has a modified Cas9 protein bound to a gRNA, retaining the ability to target a genomic sequence, yet avoiding double-stranded DNA breaks. The base editors are distinguished by the kind of deaminase, the base editing enzyme that carries out the chemical modification, that is fused to Cas9. The deaminase makes a predictable chemical modification, called deamination, of the amine group on either an adenine, or A, base or a cytosine, or C, base as shown in the figure below.



For our lead programs for PCSK9 and ANGPTL3, we are using an ABE to convert an amine group of A to an inosine, or I, base, which is read by DNA polymerase as a guanine, or G, base, leading ultimately to an A-to-G spelling change. Once the initial modification has occurred, the intermediate DNA consists of an edited strand, containing an I at the target site, and an unedited strand with a thymine, or T, base. The I:T base pair is a mismatch, which the cell will normally attempt to repair in a process that can potentially lose the edit. In order to preserve the editing, our base editors cleave the unedited single strand of the DNA, referred to as nicking, rather than creating double-stranded breaks. The presence of the nick on the unedited strand, however, increases the efficiency of editing by inducing the cell to use the newly edited strand, and not the unedited strand, as the template for repair, resulting in an I:C base pair. Upon DNA repair or replication, the I is read as a G, resulting in a G:C base pair, and the permanent conversion of an A:T base pair to a G:C base pair is completed. This single base pair change at the specific site within the PCSK9 or ANGPTL3 gene alters the gene in such a way that no functional PCSK9 or ANGPTL3 protein is made, disrupting its role in maintaining elevated levels of circulating blood lipids.

Target selection

We focus on validated genes in the liver-cardiovascular axis, which are genes predominantly expressed in the liver and where disrupting protein production or introducing a beneficial mutation may effectively treat an underlying cause of CVD. When considering targets for our programs, we evaluate the following criteria:

- human genetic evidence that loss-of-function, or LoF, mutations confer resistance to disease;
- human genetic evidence that LoF mutations do not have adverse effects, and that homozygous LoF, inheriting two mutant alleles, are well tolerated;
- human clinical proof-of-concept data for targeting with other modalities to support the potential safety and efficacy of permanent gene or base editing;
- technical efficiencies, such as liver-predominant expression and known estimates of the pharmacodynamic relationship between target protein and therapeutic effect;

- existence of circulating protein biomarkers for efficacy, clinical biomarkers of disease modulation, and the availability of appropriate preclinical disease models; and
- clear unmet medical need and development rationale for the target indications.

Evaluating for off-target editing

Gene editing enables precise alterations at specific locations in the genome but has the potential to make alterations at undesired locations, known as off-target editing. Base editing has inherently fewer risks for off-target editing than CRISPR-Cas nuclease editing given the precision and efficiency of editing at the single base pair level and ability to make the edit without making a double-stranded DNA break.

Our approach to minimizing off-target editing involves the use of comprehensive, sensitive and state-of-the-art methods to identify potential off-target sites with our editors. These include computational methods that predict off-target sites based on sequence similarity to the on-target site. We also use biochemical methods in which either DNA extracted from cells or synthetic DNA is treated with a nuclease or base editor *in vitro* and edited sites are identified by next-generation DNA sequencing. A key part of our approach includes the use of a new technique called ONE-seq, which was developed by Dr. Keith Joung, one of our founders. ONE-seq is an *in vitro* method to screen tens of thousands of potential sites in the genome where editing may occur. We believe that our internal expertise in the application of multiple innovative techniques to evaluate off-target editing gives us a leading position in the field and the ability to rapidly advance future programs.

Lipid nanoparticle delivery selection

Gene editing treatments require intracellular delivery of mRNA and gRNA molecules into the target cell type—in our case, hepatocytes in the liver, and all of our programs utilize a non-viral approach, LNPs, for delivery. LNPs are well-established, both by approved products and by clinical trials conducted by others with other agents, to preferentially accumulate in the liver after systemic administration. We have chosen non-viral LNP delivery due to the potentially superior safety profile compared with available viral delivery approaches, as well as the high efficiencies of liver editing achievable with LNPs due to their natural tropism to the liver.

Non-viral delivery to the liver with LNPs confers potential advantages, including:

- protection of the mRNA and gRNA payloads while in circulation in the blood;
- transient expression of gene editing proteins, allowing more control over the editing process;
- transient expression of the editing protein and rapid completion of the editing process within days, minimizing immunogenicity;
- absence of DNA or viral components, avoiding exogenous DNA capable of inserting into the genome;
- rapid degradation of drug product within one to two weeks, supporting the potential for long-term safety;
- known, manageable infusion-related side effects; and
- cost-effective manufacturing with potential to efficiently scale to reach millions of patients.

On a target-by-target basis, we evaluate the optimal LNP delivery options from either external partnerships or our internal LNP discovery platform. For our lead program, VERVE-101, we have licensed LNP technology from Acuitas, an established company with a track record of partnering and developing LNPs for clinical use. Our collaboration with Acuitas included serial NHP studies to evaluate various LNP formulations and RNA payloads prior to selecting an Acuitas LNP for VERVE-101.

We view our internal LNP discovery platform as an important source of delivery technology for future therapeutic programs. We are optimizing our internal LNP discovery platform by focusing on:

- strategies to enhance delivery to the liver in certain CVD patient populations, such as patients with HoFH, in whom LNP-mediated delivery may be challenging;
- improved efficiency of delivery to the liver, such that lower doses of RNA payload could be used;
- wider therapeutic indices to optimize the benefit-risk profile of our product candidates; and
- improved stability and potential for powder formulation enabling easier storage for commercial application.

To date, our LNP discovery platform has yielded novel proprietary ionizable lipids that we have designed, synthesized and evaluated for their potential to deliver gene editing payloads to the liver in mice. We are further optimizing and scaling up such formulations for evaluation in NHPs. We have also developed novel targeting ligands that when added to LNPs allow for more efficient delivery of RNA payloads to the liver. We believe that our internal LNP discovery platform will yield improvement in our product candidates for current and future programs.

Single-course therapy

We are designing our single-course gene editing treatments to be administered as single-dose regimens through intravenous infusion, which is supported by data generated in our preclinical studies in NHPs. However, an advantage of using LNPs is the potential for split-dosing. In the case of our gene editing programs, we may elect to dose patients using a single, short course consisting of a limited number of split-doses over a short period of time to improve safety, efficacy or both. In patients who may not receive an adequate therapeutic effect with a single course of treatment, our approach may enable the option to re-dose. Patisiran, an approved LNP-encapsulated siRNA, is chronically administered without safety and efficacy concerns for patients with transthyretin amyloidosis, or ATTR. This is in contrast to viral vectors, which face safety and efficacy challenges with re-dosing.

The value of a single-course gene editing treatment will be determined by the safety, potency and durability of its desired effect. We believe a single-course treatment with VERVE-101 could durably lower LDL-C throughout the lifetime of patients with or at risk for ASCVD. Our gene editing treatments are designed to make a permanent change in the DNA of liver cells. With VERVE-101, transient expression of ABE protein in hepatocytes is designed to lead to permanent editing of the PCSK9 gene. Since liver cells turn over predominantly through division of hepatocytes that themselves will carry the PCSK9 edit, we believe that the efficacy resulting from the edit will be durable.

This stands in contrast to gene therapy, where the therapeutic benefit has been challenged by a lack of durability. Gene therapies are often designed to express exogenous mRNA levels by viral delivery or viral expression of mRNA. The therapeutic effect is limited by the short half-life of the mRNA transcript, or the limited duration of mRNA expression from a viral vector that does not integrate into the genome. This leads to either a reliance on viral integration at unpredictable sites in the genome, which have safety challenges, or on frequent dosing that has its own challenges with viral delivery.

We believe that single-course gene editing treatments could provide durable and transformative outcomes, producing sustained health benefits for patients with CVD.

Scalable manufacturing

By designing our gene editing treatments as LNPs encapsulating mRNA and gRNA, we expect to benefit from the potential for scalable and cost-effective manufacturing processes enabling the opportunity to treat millions of patients with CVD.

Our product candidates are similar to two validated and approved drug classes: LNP-encapsulated siRNAs, such as patisiran, and LNP-encapsulated mRNA-based COVID-19 vaccines, which are LNPs containing a long mRNA molecule for the spike protein of SARS-CoV-2. Significant and ongoing investments are being made by multiple organizations to enhance the supply chain for all components and processes related to mRNA production, LNP production and fill-finish, especially in light of the intense worldwide efforts to manufacture massive quantities of COVID-19 vaccines. We believe we will ultimately benefit from the increased global capacity for LNP-encapsulated mRNA production over the next several years.

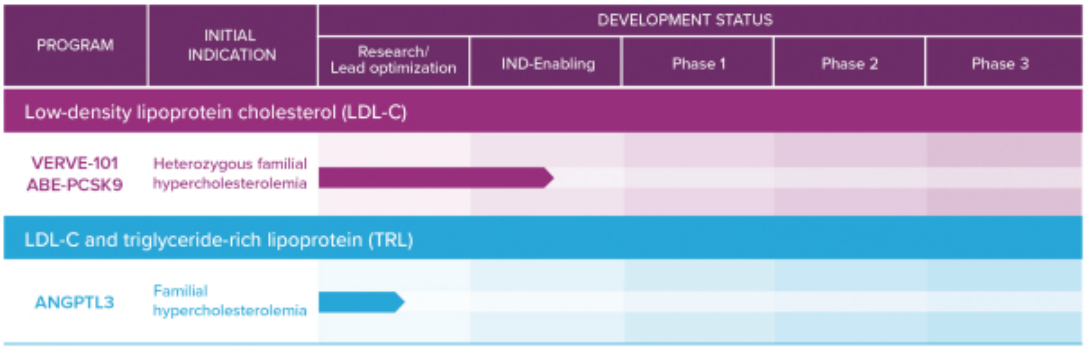
We are currently working with GMP vendors to produce all components of our drug candidates for our first clinical trial batches. These include plasmid DNA preparation, mRNA production via *in vitro* transcription reactions, gRNA synthesis via solid state synthesis, lipid synthesis and LNP formulation and fill finish. Working closely with these vendors, we have successfully executed batches at near clinical scale and are on track to produce the clinical batch for our planned first-in-human trial of VERVE-101.

We are also investing in the buildout of internal process development capabilities in mRNA production and LNP formulation, which we believe will become one of our core competencies in the future. The goals of this internal process development capability are to scale-up plasmid DNA, mRNA and LNP production batches, to make improvements in order to enhance quality, consistency and stability, and to reduce costs. Further, we are investing in analytical method development including bioactivity and potency assays that will be critical to further product development, batch comparability assessments and additional manufacturing growth.

Our gene editing programs

We are advancing a pipeline of single-course *in vivo* gene editing programs intended to durably turn off genes in the liver implicated in CVD. Our gene editing programs consist of LNPs that encapsulate mRNA encoding for a gene editor as well as a gRNA targeting the gene of interest expressed in the liver. Our initial pipeline is focused on two genes, PCSK9 and ANGPTL3, implicated in the control of blood lipids. We are developing these gene editing treatments initially for the treatment of patients with forms of FH, which is an autosomal dominant genetic disorder, which is an autosomal dominant genetic disorder leading to life-long severely elevated blood LDL-C and increased risk of early-onset ASCVD. Patients with FH have mutations predominantly in the LDLR gene that affect the ability of liver cells to remove LDL from the circulation. FH manifests clinically in two forms: the more common heterozygous form, known as HeFH, and the rarer homozygous form, known as HoFH.

The following graphic summarizes our pipeline of programs.



Our most advanced product candidate, VERVE-101 targeting the PCSK9 gene, is in IND-enabling studies for the treatment of patients with HeFH, which affects approximately 1.3 million people in the United States, 2.1 million in the European Union and the United Kingdom and approximately 31 million worldwide. We intend to submit an IND to the FDA and comparable foreign regulatory authorities in 2022, followed by initiation of clinical development for patients with HeFH. Our approval pathway is subject to discussions with the FDA and other regulatory authorities; however, we note that FDA-approved lipid-lowering therapies, including for FH, have used LDL-C reduction as a primary endpoint in registrational trials. Outcome studies have not been required for initial approval of these other therapies in patients with FH.

We are strategically developing VERVE-101 initially in patients with HeFH, recognizing that the unmet need is highest in those patients and the benefit-risk profile may be more favorable. We intend to use a stepwise clinical development plan for VERVE-101 as depicted in the illustration below, evaluating efficacy and safety in higher-risk populations first, and then if successful, expanding into broader population of patients with established ASCVD, and ultimately to those at risk for ASCVD in the general population.

We plan to develop our second program targeting the ANGPTL3 gene using a similar stepwise approach. We plan to initially develop this program for the treatment of each form of FH, including HoFH, which affects approximately 1,300 patients in the United States, as well as the more prevalent HeFH indication. We plan to nominate a lead development candidate for our ANGPTL3 program and initiate IND-enabling studies for this program in 2022.

We intend to develop a broad pipeline of gene editing programs for patients with ASCVD, targeting distinct pathways implicated in elevated blood lipid levels and related ASCVD risk. In addition to ASCVD, we believe our gene editing approach could have broader applications for additional CVD indications, including certain forms of cardiomyopathy.

Familial hypercholesterolemia: our initial focus for our single-course gene editing treatments

FH is a genetic disorder where patients have life-long severely elevated blood LDL-C, which can lead to increased risk of early-onset ASCVD. FH is an autosomal dominant disease often caused by a mutation in the LDLR gene. Individuals with FH may harbor one mutant allele and are thereby heterozygous for the disease, known as HeFH, or two mutated alleles and are therefore homozygous for the disease, known as HoFH. HoFH is typically more severe than HeFH.

Men and women with untreated HeFH typically have LDL-C levels ranging from approximately 200 to 400 mg/dL and develop ASCVD before age 50 and 60, respectively. The estimated prevalence of HeFH is roughly one in 250, which translates to about 1.3 million patients in the United States. Men and women with HoFH have LDL-C levels above 500 mg/dL and typically develop ASCVD before the age of 20 and, without intervention, die before age 30. The estimated prevalence of HoFH is roughly one in 250,000, which translates to about 1,300 patients in the United States.

FH is clinically diagnosed based on a combination of factors, including the concentration of blood LDL-C, physical findings, personal or family history of hypercholesterolemia and early onset of ASCVD. Extensor tendon xanthomas, typically Achilles, subpatellar and hand extensor tendons, with extremely elevated LDL-C levels are considered specific for FH. However, FH is often silent until the development of a heart attack at a young age, at which time a family history of ASCVD and elevated LDL-C levels are often the only findings. In an analysis of the FH phenotype, which typically means LDL-C levels of greater 190 mg/dL, from six prospective cohort studies with 30-year follow-up, the FH phenotype was associated with up to a five-fold elevated 30-year ASCVD risk. ASCVD development was accelerated in those with the FH phenotype by 10 to 20 years in men and 20 to 30 years in women. In HoFH, patients typically develop atherosclerosis in childhood, initially in the aortic root, causing supravalvular aortic stenosis, and then extending into the coronary arteries. If the LDL-C level is not effectively reduced, people with HoFH die prematurely of ASCVD. The severity of atherosclerosis in FH is proportional to the extent and duration of elevated blood LDL-C levels.

Although the diagnosis of FH can be made on the basis of clinical features, genetic testing may offer additional insight into cardiac risk and diagnosis. Recent analysis of data from more than 26,000 individuals suggests that at any given LDL-C level, having an identified FH mutation is associated with significantly higher ASCVD risk than having the same LDL-C level but no apparent pathogenic FH mutation. In this analysis, individuals with an LDL-C level greater than or equal to 190 mg/dL and no pathogenic FH mutation had a six-fold higher risk of ASCVD than the reference group with an LDL-C level less than or equal to 130 mg/dL. However, individuals with an LDL-C level greater than or equal to 190 mg/dL and a pathogenic FH mutation were at a 22-fold higher risk of ASCVD than the reference group, possibly reflecting greater atherogenicity of life-long LDL-C elevation in FH compared with LDL-C elevation acquired later in life.

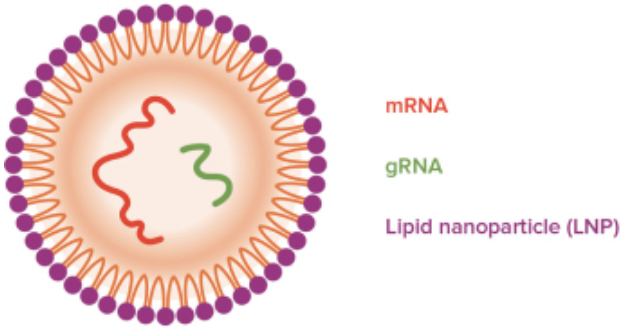
While dietary and lifestyle changes are important for LDL-C lowering in patients with FH, multidrug treatment is often required to achieve recommended LDL-C levels. The recommended LDL-C levels for FH patients are similar to those for non-FH patients with ASCVD. Treatment for FH patients tends to start earlier than those with or at risk for ASCVD without FH, and typically follows a more aggressive course with multidrug treatment given the elevated risk of early-onset ASCVD. While FH patients are treated with medicines similar to those used for non-FH patients, the chronic care for FH patients is typically more burdensome with earlier intervention and more drugs. In addition, for many patients, especially those with HoFH, their LDL-C levels remain inadequately controlled and do not reach goals recommended by clinical treatment guidelines.

VERVE-101: PCSK9 program

Our lead product candidate, VERVE-101, is designed to be a single-course *in vivo* gene editing treatment targeting the PCSK9 gene. We plan to develop VERVE-101 initially for patients with HeFH, and, if successful, to expand development for the broader population of patients who have established ASCVD.

In patients with HeFH, a genetic mutation in the LDLR gene down-regulates LDLR expression, which limits the ability of liver cells to remove LDL from the bloodstream, resulting in extremely high LDL-C levels in the blood. Over time, high LDL-C builds up in the arteries, leading to formation of atherosclerotic plaque, reduced blood flow or blockage and ultimately heart attack or stroke. We believe that inactivation of the PCSK9 gene will result in lower PCSK9 protein levels, thereby increasing LDLR expression, leading to lower LDL-C levels and reduced risk for ASCVD. Clinical trials conducted by others evaluating PCSK9 inhibitors have suggested that targeting PCSK9 has the potential to work in patients with HeFH regardless of the underlying mutation.

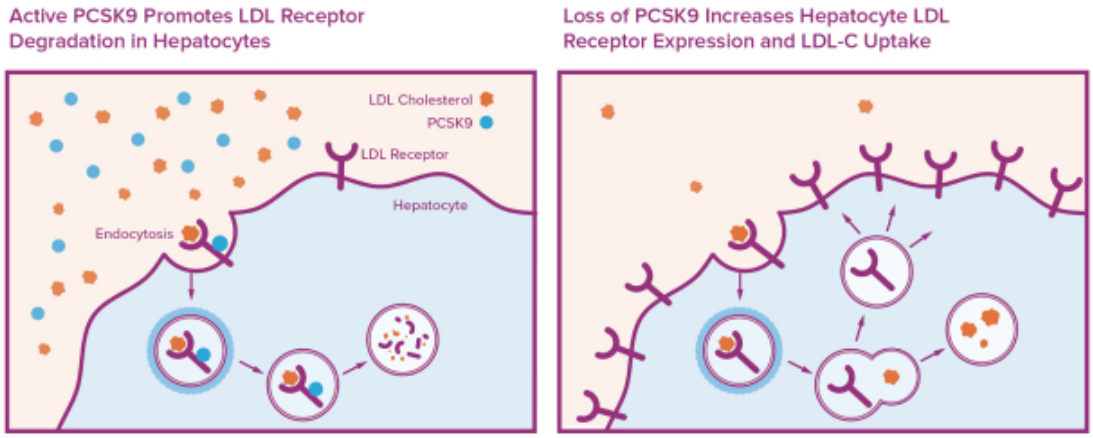
VERVE-101 consists of an LNP encapsulating an mRNA encoding an ABE and a gRNA, as depicted in the image below. Four lipid components assemble along with the RNAs to form a dense, stable LNP that is approximately 60 nanometers in diameter.



VERVE-101 is designed to be infused intravenously into the patient over approximately one to two hours, and then accumulates in the liver. Prior to administration of VERVE-101, a pre-medication regimen is given that consists of antihistamines and steroids. Once in the liver, VERVE-101 is brought into hepatocytes and escapes into the cytoplasm where the base editor protein is transiently expressed. The gRNA then binds to the base editor protein, and the complex is carried into the nucleus to locate the gene target specified by the 20-nucleotide spacer sequence of the gRNA. The ABE binds to the DNA and makes a single A-to-G spelling change at the target site, thereby turning off the PCSK9 gene. The ABE mRNA construct is codon-optimized and contains chemical modifications to reduce the potential for mRNA-mediated immune responses. The gRNA sequence has several chemical modifications to enhance *in vivo* stability to endonucleases and exonucleases.

PCSK9 as a target

The PCSK9 gene plays a critical role in the regulation of blood LDL-C through its regulation of the LDLR gene. The normal function of PCSK9 is depicted in the figure below on the left. The PCSK9 gene produces a protein in the liver that is released into the blood. LDLR is present on the surface of liver cells and binds to LDL and removes LDL from circulation. The LDL bound to LDLR is taken up by liver cells to enable the breakdown of LDL particles. LDLR is then recycled back to the surface of the cell, enabling the process of LDL uptake to recur. PCSK9 protein in the blood interrupts this LDLR recycling process. Specifically, PCSK9 protein in the blood binds to LDLR and targets LDLR for destruction. In doing so, PCSK9 reduces the number of LDLRs on the liver cell surface, thereby reducing the ability of the liver to clear LDL from the blood. The figure on the right depicts a loss of PCKS9 gene function, which results in less PCSK9 protein and thereby increased LDLR expression and uptake of LDL-C.



As reported in *The New England Journal of Medicine*, one study found that adults with naturally occurring LoF mutations in the PCSK9 gene had LDL-C levels that were 38 mg/dL lower than adults without the mutation, and those with the mutation had an 88% lower risk of ASCVD. Human genetic studies also showed that carrying naturally occurring loss-of-function mutations in one or both copies of the PCSK9 gene was not associated with serious adverse health consequences.

In addition to human genetic studies, human pharmacology studies have provided validation for PCSK9 as a target. The impact of PCSK9 inhibition on cardiovascular outcomes has been established by two large, randomized, double-blind, placebo-controlled studies of two approved mAbs that bind to PCSK9 protein and block its activity, the FOURIER trial and the ODYSSEY OUTCOMES trial. The FOURIER trial demonstrated that treatment with evolocumab in addition to background statin therapy over a median of 2.2 years reduced major cardiovascular events by an additional 15% in patients with established ASCVD. The ODYSSEY OUTCOMES trial demonstrated that treatment with alirocumab in addition to background statin therapy over a median of 2.8 years reduced major cardiovascular events by an additional 15% in patients with established ASCVD. Treatment with these mAbs demonstrated an approximately 60% reduction in LDL-C on average across clinical trials when compared with placebo treatment. Notably, in both trials, with the exception of injection site reactions, overall adverse event rates were similar between patients treated with placebo or drug, with no observed increase of new-onset diabetes, worsening glycemic control or neurocognitive adverse events.

The PCSK9 target has been further validated by inclisiran, which was approved by the EMA in 2020 and is being evaluated for approval by the FDA. In the ORION-9 trial, the pivotal Phase 3 trial of inclisiran in patients with HeFH, the percent change in the PCSK9 level after 510 days was a decrease of 60.7% in the inclisiran-treated group compared with baseline, which led to a reduction in LDL-C after 510 days of 39.7% compared to baseline.

We believe the human genetic studies and the human pharmacology with PCSK9 inhibitors provide substantial evidence that targeting PCSK9 is a potentially safe and effective approach to lower LDL-C and reduce ASCVD risk.

Preclinical studies

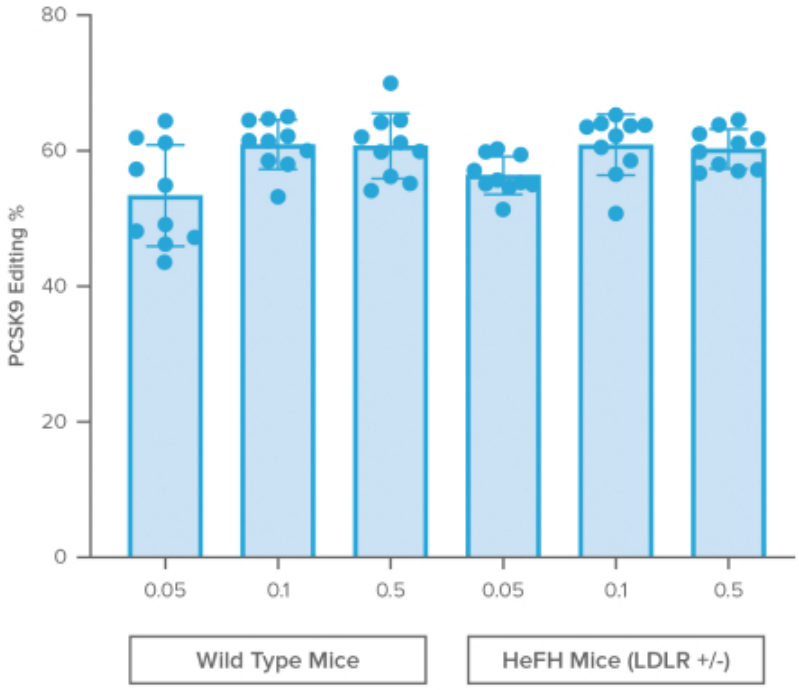
We discovered VERVE-101 based on extensive screening of a large library of gRNA candidates, evaluation of multiple LNP formulations and optimization of the ABE mRNA construct. We have tested a mouse surrogate of VERVE-101, precursor formulations of VERVE-101, which we refer to as our ABE-PCSK9 precursor formulation, and VERVE-101 itself *in vitro* and *in vivo* across multiple animal models. In these studies, we have observed the following:

- high PCSK9 gene editing activity in the liver by a mouse surrogate of VERVE-101 in both wild type mice and heterozygous LDLR knockout mice, a well-established mouse model of HeFH;

- ten-month NHP durability data for blood PCSK9 protein and LDL-C reduction following treatment with our ABE-PCSK9 precursor formulation, with average reductions of 89% of PCSK9 protein and 62% for LDL-C;
- dose-responsive liver PCSK9 gene editing, blood PCSK9 protein reduction, and LDL-C reduction in NHPs, with a 1 mg/kg dose of VERVE-101 achieving approximately 71% editing, approximately 85% reduction in blood PCSK9 protein and approximately 64% reduction in LDL-C;
- VERVE-101 editing occurred predominantly in the liver and within 24 hours of treatment in NHP studies;
- administration of VERVE-101 to NHPs caused transient, mild elevations in liver function tests that entirely resolved within two weeks; and
- no significant off-target editing in primary human hepatocytes.

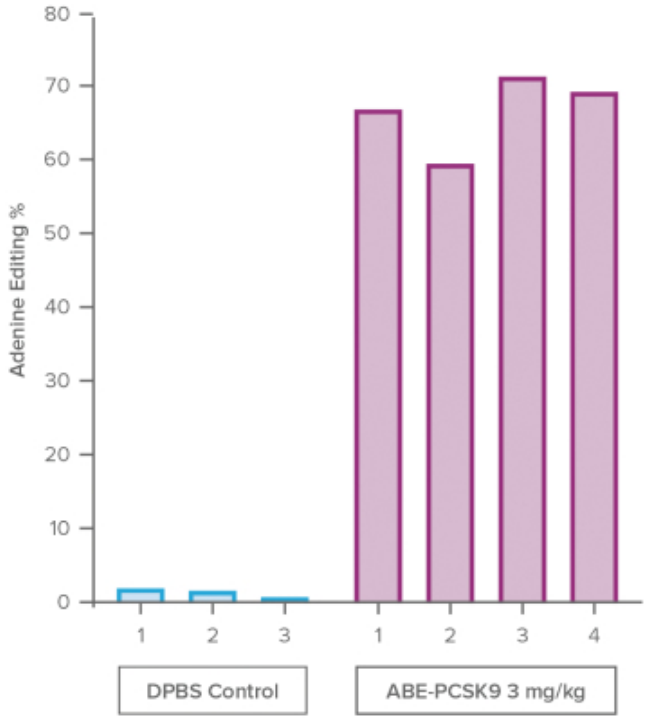
In vivo validation with ABE-PCSK9 mouse surrogate

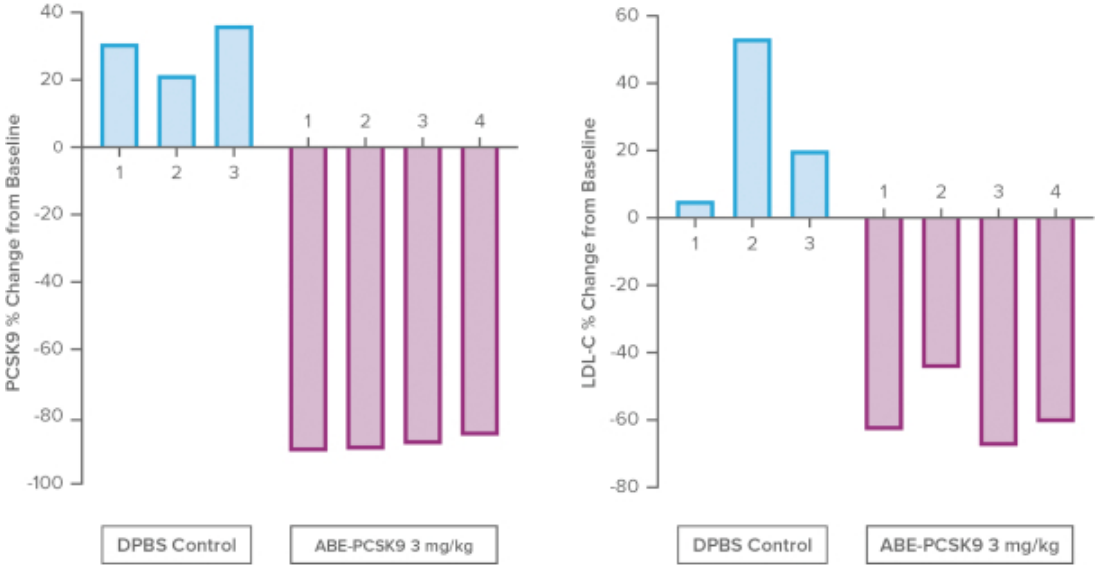
Our initial target patient population for VERVE-101 is patients with HeFH who produce reduced levels of functional LDLR, which results in increased levels of LDL-C in the blood. We utilized heterozygous LDLR knockout mice to model the HeFH disease state. A mouse surrogate version of VERVE-101 was developed for use in this model comprising a mouse surrogate gRNA targeting the ortholog of the same PCSK9 site, along with two components identical to VERVE-101—the ABE mRNA and LNP. As shown in the figure below, we observed that doses of 0.05, 0.1 and 0.5 mg/kg of the mouse surrogate of VERVE-101 administered once to wild-type and heterozygous LDLR knockout mice resulted in similar and robust amounts of PCSK9 editing in the liver.



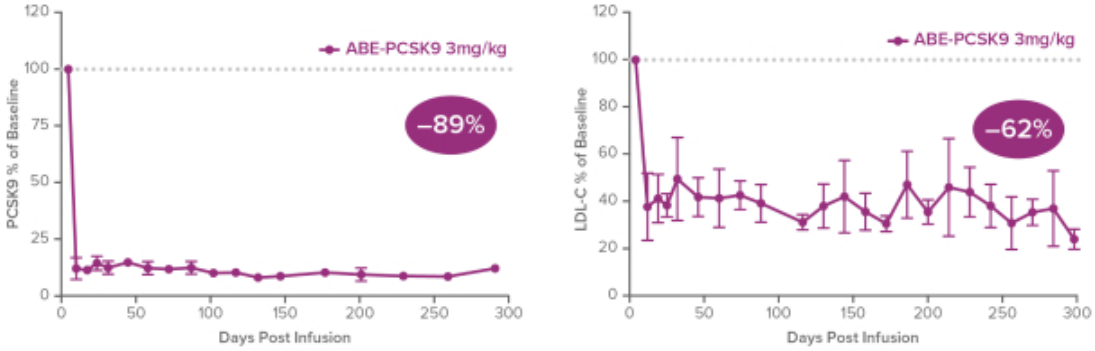
NHP validation with ABE-PCSK9 precursor formulation

We then applied this approach in an NHP model to establish preclinical proof-of-concept using an ABE-PCSK9 precursor formulation. In this study, which is ongoing, we administered a single dose to healthy NHPs. In the figures below, each treated NHP is represented by a purple bar and each vehicle treated control is represented by a blue bar. Following a single treatment with our ABE-PCSK9 precursor formulation, we observed an average 67% editing of PCSK9 in whole liver tissue sampled through a liver biopsy two weeks after dosing, as shown in the first graph. This was accompanied by an average 89% reduction of blood PCSK9 protein and an average 59% reduction of blood LDL-C concentrations, as shown in the additional two graphs below.



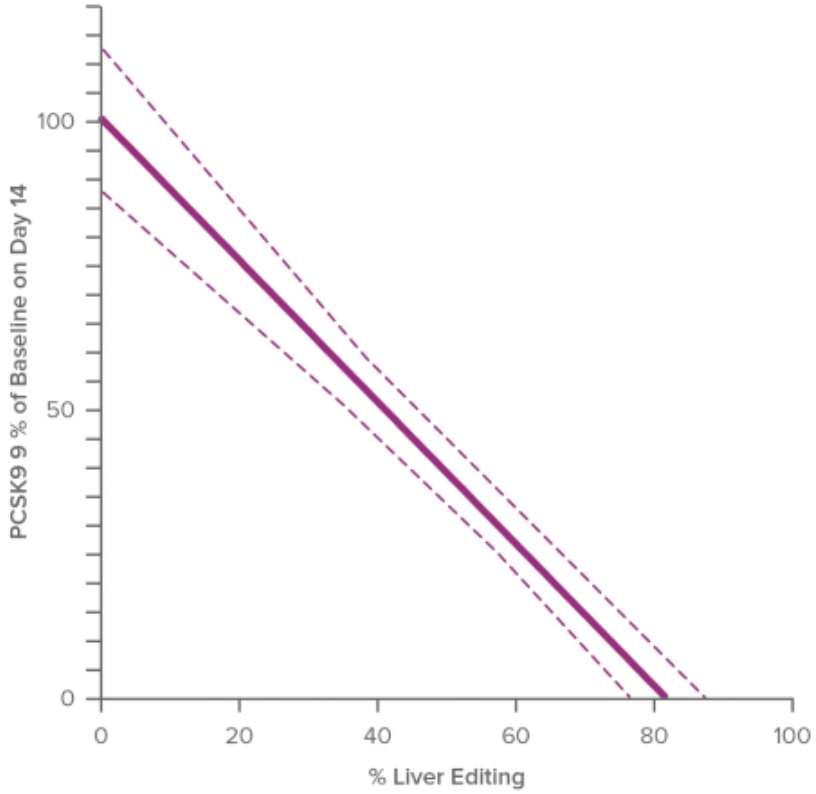


Importantly, in this preclinical study, we observed that the reductions in blood PCSK9 protein and blood LDL-C levels were durably maintained. As shown in the figures below, at ten months following a single intravenous administration of ABE-PCSK9, we observed that the NHPs continued to exhibit an average 89% reduction in blood PCSK9 protein and an average 62% reduction in blood LDL-C. If we are able to achieve similar reductions in PCSK9 protein levels in humans, we believe this could result in marked and sustained LDL-C reductions of approximately 60%, which would potentially offer superior cumulative LDL-C lowering to what has been clinically demonstrated with other PCSK9-targeting treatment modalities.



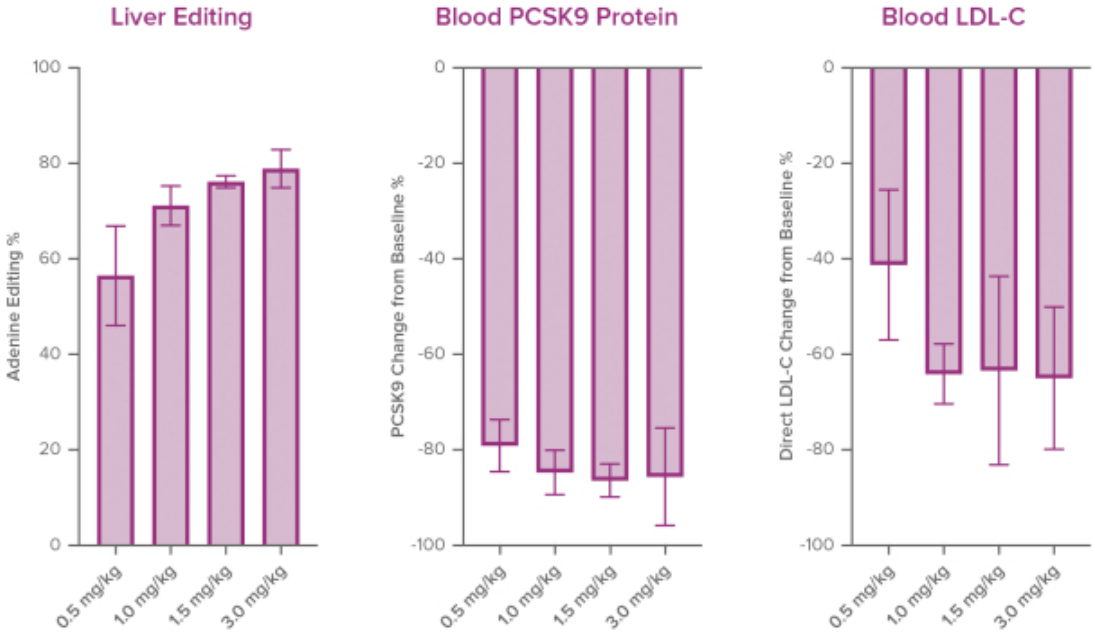
Turnover of mature hepatocytes in the liver is estimated to occur on average every 200 to 300 days. The source of new hepatocytes is not certain, but evidence suggests that mature hepatocytes are responsible for production of new hepatocytes during both homeostatic liver turnover and following liver injury. Less likely, a fraction of hepatocytes with greater regenerative capacity may exist in the liver. In either case, the 300-day durability data shown above in our preclinical studies with an ABE-PCSK9 precursor formulation suggest that the liver cells responsible for regeneration are edited at the PCSK9 gene site. In addition, we have not observed evidence of persistent inflammation or liver injury that might suggest more rapid hepatocyte turnover or immune-mediated clearance of edited hepatocytes.

We have explored the pharmacodynamics of liver editing and consequent effect on blood PCSK9 protein levels across a large number of iterative NHP studies. We have identified a linear relationship between editing of the PCSK9 gene in liver cells and blood PCSK9 protein levels. The figure below shows a best-fit line with confidence intervals representing a large number of data points from individual NHPs. In NHPs, we have achieved a reduction of greater than 60% in PCSK9 protein with a whole liver editing rate of approximately 50% to 55%. We believe that this relationship between whole liver editing and PCSK9 reduction should be similar in humans.

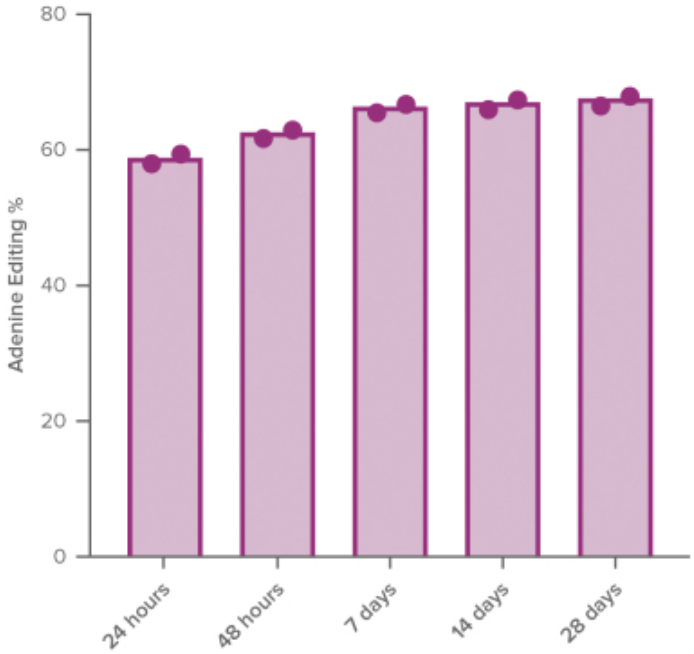


VERVE-101 preclinical efficacy data

Our preclinical studies of our ABE-PCSK9 precursor formulation led to the development of VERVE-101. In preclinical studies of VERVE-101 in healthy, wild-type NHPs, we have observed dose-dependent levels of editing of the PCSK9 gene in liver cells when administered as a single dose, with three NHPs evaluated per dose level. With a dose of 1 mg/kg, we observed whole liver editing levels of approximately 71%, as shown in the figure below, which we believe represents editing of the majority of hepatocytes. We also observed that the level of editing translated into dose-dependent reductions of both blood PCSK9 protein and blood LDL-C. At the 1 mg/kg dose, we observed a PCSK9 protein reduction of approximately 85% and a robust LDL-C reduction of approximately 64%.



We observed that editing occurred quickly following dosing of VERVE-101 in NHPs, with the majority of the editing observed within one to two days of dosing. In the study, NHPs (N=2 per group) were administered the same 1 mg/kg dose, and necropsies were serially performed on day one, day two, day seven, day 14 and day 28. We observed high efficiency editing within 24 hours with minimal additional editing at subsequent time points as shown in the figure below.

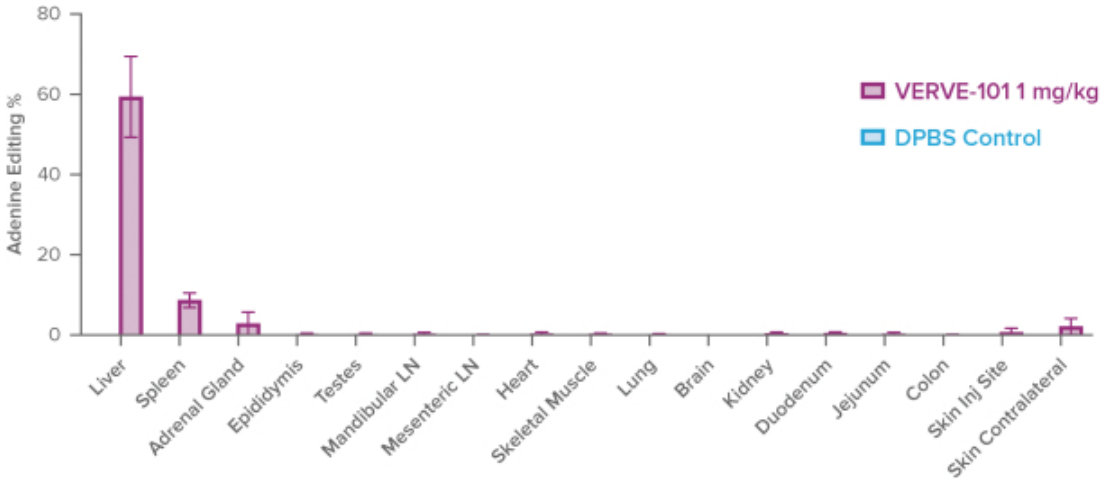


The effects on blood PCSK9 protein and LDL-C reached their peak outcomes within two weeks of dosing. Within two to three weeks of dosing, the LNP was not detectable in the blood and largely cleared from the liver. The

ABE mRNA was detectable in the liver 24 hours after dosing, but levels decreased substantially by 48 hours after dosing and were virtually undetectable within one to two weeks after dosing.

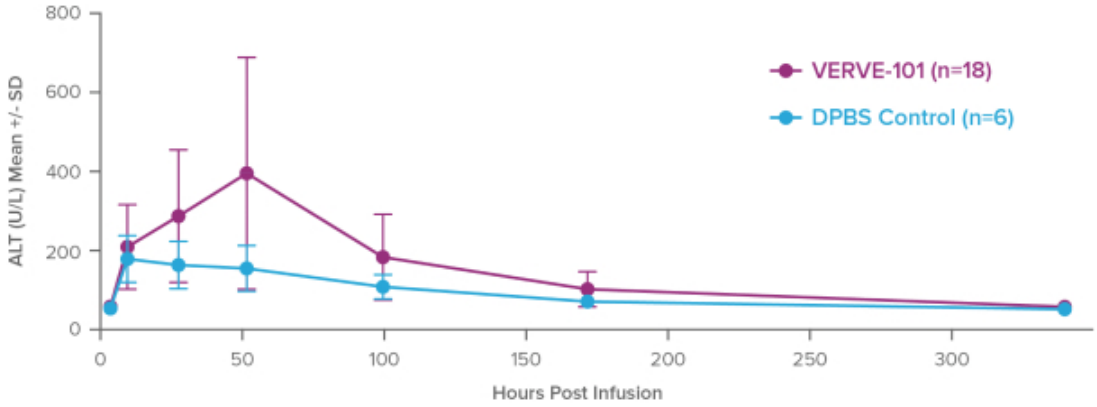
VERVE-101 biodistribution data

We are using an LNP-based approach to deliver VERVE-101 to the liver. An analysis of the biodistribution of VERVE-101 following administration of a single dose of 1 mg/kg in NHPs indicated that the large majority of editing occurred in the liver in a dose-dependent manner, with lesser rates of editing observed in the spleen and adrenal glands, as shown in the figure below. Other tissues examined showed editing of less than 1%.



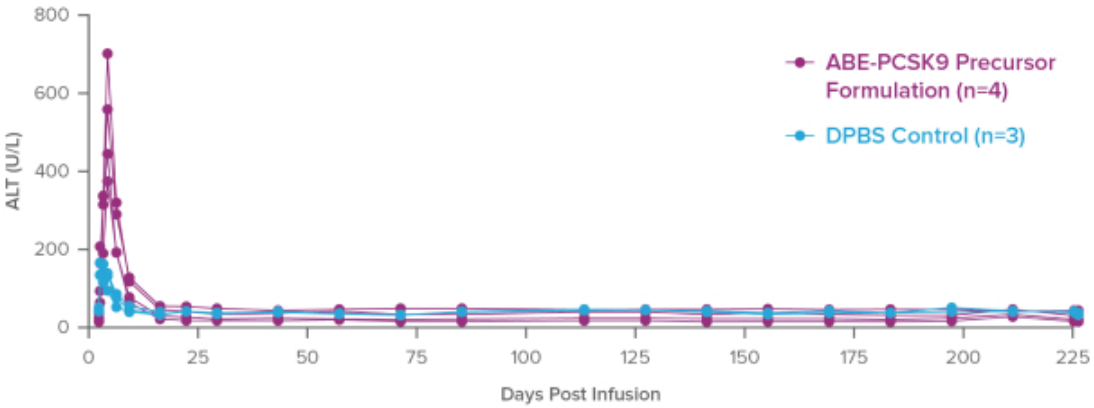
Tolerability of VERVE-101 in NHPs

VERVE-101 was generally well tolerated in NHP studies. We compared treatment with VERVE-101 to a control, or DPBS, at doses of 1 mg/kg or less and observed transient elevations of alanine aminotransferase, or ALT, consistent with mild acute liver injury within one to two days after dosing, which then peaked two to three days after dosing, with average values around 400 U/L following a 1 mg/kg dose. ALT is a commonly used blood marker of liver injury. Within one week of dosing, the average ALT value was within the normal range, indicating recovery, as shown in the figure below. These findings are consistent with observations from clinical trials of approved LNP-based products that are administered intravenously.



The liver enzyme findings, which can be monitored with standard clinical laboratory testing, were consistently transient and mild in nature and fully normalized by one to two weeks. We believe that these findings compare favorably to viral vector delivery approaches, which can lead to unpredictable and acute liver injury.

In order to assess the long-term liver safety of VERVE-101, we monitored liver enzymes in a long-term durability study of an ABE-PCSK9 precursor formulation. As shown in the figure below, at eight months following administration, we did not observe evidence of any ongoing inflammation in the livers of NHPs that had undergone high levels of PCSK9 editing in the liver. In contrast, viral vector delivery can have subacute and chronic liver injury as a result of autoimmune reactions to the viral vector.



As LNPs are known to stimulate the immune system, we also assessed a panel of common cytokines following administration of a single dose of VERVE-101 in NHPs. At doses of 1 mg/kg or less, we observed mild and transient activation of certain cytokines, such as IP-10 or MCP-1, compared to control animals. This activation was apparent within 24 hours of dosing and fully resolved by the next observation point at one week. Other cytokines, including TNF-a, did not exhibit any changes above those seen in control animals.

We also assessed complement activation in NHPs that received single administration of VERVE-101. At doses of 1 mg/kg and less, we observed only minimal activation above that in control animals. This minimal activation was detectable approximately two hours after dosing but resolved by 24 hours.

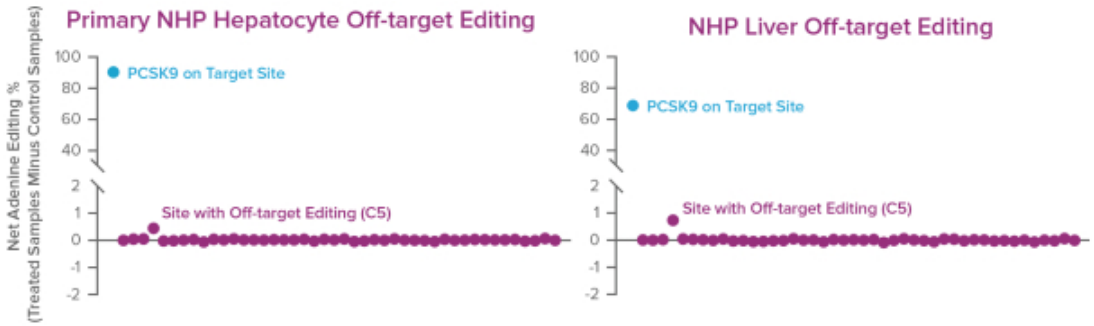
Preclinical off-target editing in NHP

While the human genome is the relevant genome to assess off-target editing, we believe that evaluations of off-target editing in NHPs can support the ability of off-target analysis in primary hepatocytes *in vitro* to predict off-target editing in the liver when dosed *in vivo*.

To evaluate off-target editing, we performed a technique called ONE-seq, which is a comprehensive, sensitive and state-of-the-art *in vitro* method to screen for and identify potential sequences where editing may occur. This technique evaluated the 25,000 sequences in the NHP genome most closely matching the sequence of our on-target site. We prioritized 45 potential sites where editing may occur, of which the PCSK9 target site was identified as the top site.

We then used next-generation DNA sequencing to assess these sites for editing in primary NHP hepatocytes treated with VERVE-101. As shown in the figure below, besides editing at the PCSK9 target site, we did not observe off-target editing at any of the 44 potential off-target sites evaluated, depicted by the purple dots, except for one site designated C5. The C5 site is not present in the human genome.

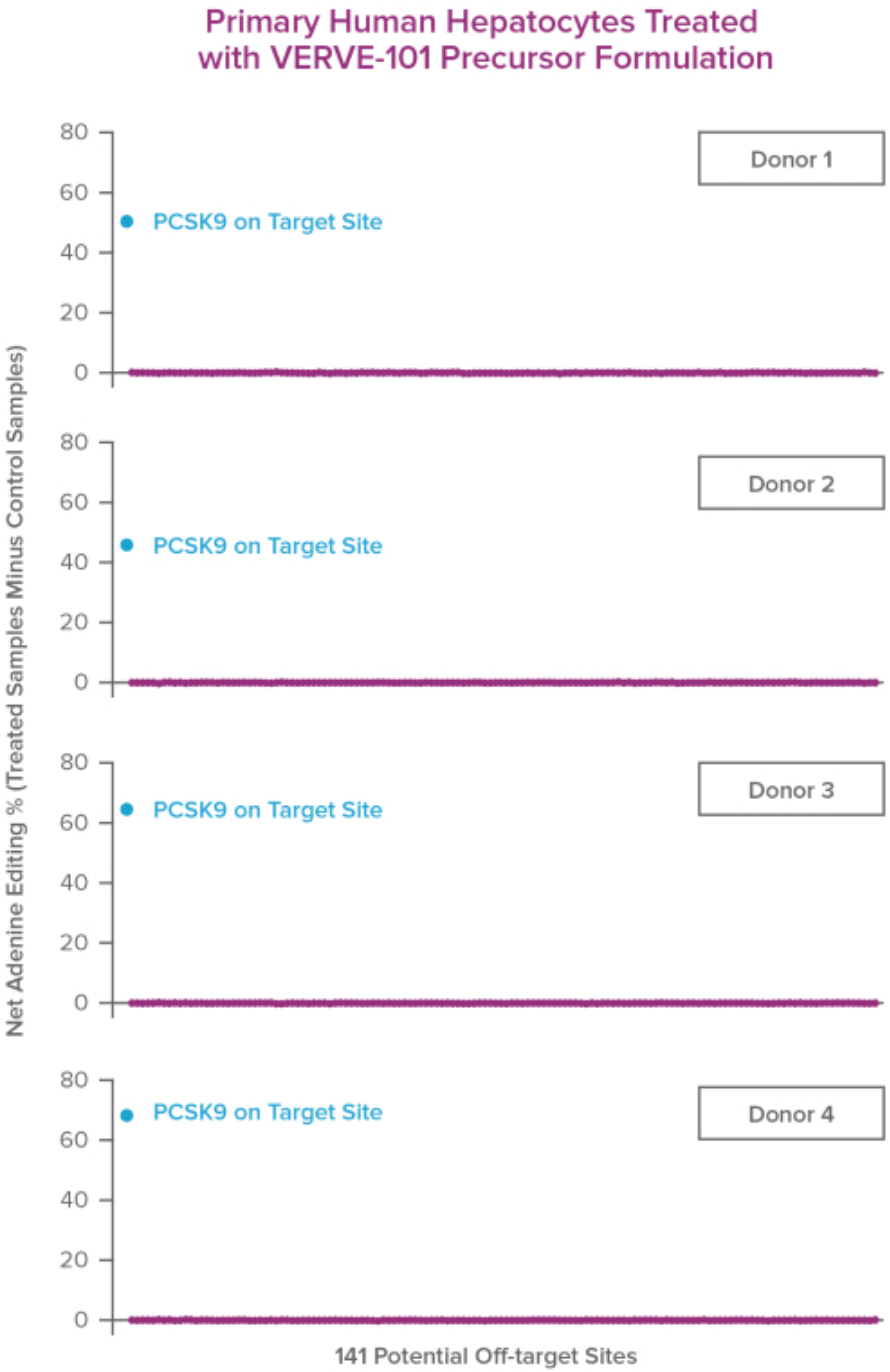
We then treated NHPs with VERVE-101, took NHP liver samples and sequenced the same sites that we evaluated in primary NHP hepatocytes. In NHP liver samples, we identified off-target editing only at the C5 site. These data support our belief that we have the ability to accurately predict off-target sites *in vivo* based on off-target analysis in primary hepatocytes *in vitro*.



Off-target analysis in primary human hepatocytes

Having established a methodology to connect off-target analysis in cells to *in vivo* editing, we turned to evaluation of the human genome for VERVE-101. Using the same ONE-seq methodology, we evaluated the 27,000 sequences in the human genome most closely matching the sequence of our on-target site. We prioritized 142 potential sites where editing may occur, of which the PCSK9 target site was the top site.

We next treated primary human hepatocytes from four donors with a VERVE-101 precursor and used next-generation DNA sequencing to assess the 142 sites for editing. As shown in the figure below, we did not observe editing at any of 141 potential off-target sites, depicted by the purple dots, when compared to control and observed only on-target editing at the PCSK9 target site.



In addition to the above analysis, we have evaluated for two other theoretical risks: editing of RNA by the base editor and translocations of DNA. In primary human hepatocytes, we did not observe any RNA editing above control or any translocations of DNA.

VERVE-101 next steps

We have had an initial regulatory interaction with the FDA via the INTERACT mechanism. We plan to have additional regulatory interactions, including a pre-IND meeting with the FDA in 2021. We have initiated IND-enabling studies for VERVE-101 and intend to submit an IND to the FDA and comparable foreign regulatory authorities in 2022, followed by initiation of clinical development for patients with HeFH.

Subject to discussion of the trial design with regulatory agencies, we expect that the patient population for the first-in-human, Phase 1 clinical trial of VERVE-101 will be adult patients with HeFH. We expect the trial to have an open-label design and include single-ascending dose cohorts as well as a dose-expansion cohort at a selected dose. Participants will be evaluated for safety and circulating PCSK9 protein and LDL-C levels. We expect that all participants will be subsequently enrolled into a long-term follow-up trial to characterize the long-term safety and efficacy of VERVE-101.

ANGPTL3 program

Our second gene editing program is designed to permanently turn off the ANGPTL3 gene in the liver. ANGPTL3 is a key regulator of cholesterol and triglyceride metabolism. We plan to develop this program initially for the treatment of FH, including both homozygous familial hypercholesterolemia, or HoFH, which affects approximately 1,300 patients in the United States, as well as the more prevalent HeFH indication. Similar to our approach with VERVE-101, we plan to expand the clinical development of our ANGPTL3 program in a stepwise fashion beyond FH to patients with established ASCVD. Ultimately, we believe that our ANGPTL3 program may also be useful to people at risk for ASCVD as a preventative measure in the general population.

Our ANGPTL3 program is currently in the lead optimization stage. We expect that this program will utilize a GalNAc-modified LNP encapsulating an mRNA encoding an ABE and a gRNA targeting the ANGPTL3 gene.

ANGPTL3 as a target

The ANGPTL3 gene has recently emerged as a new and promising target for severe hyperlipidemia. The ANGPTL3 protein is produced almost exclusively in the liver and released into the blood. It was first identified as a regulator of cholesterol and triglyceride metabolism through genetic studies of a naturally occurring strain of mice with low cholesterol, low triglycerides and low circulating fatty acids. The main function of the ANGPTL3 protein is the inhibition of lipoprotein lipase, an enzyme on the surface of blood vessels in the heart, skeletal muscle and fat that is responsible for the breakdown and clearance of circulating triglycerides. ANGPTL3 protein has also been shown to regulate LDL-C by a mechanism that does not depend on LDLR expression, which is in contrast to the mechanism by which PCSK9 regulates LDL-C.

Human genetic studies, conducted by our founders, determined that naturally occurring loss-of-function mutations in the ANGPTL3 gene result in extremely low levels of triglycerides, LDL-C and high-density lipoprotein cholesterol, or HDL-C. Subsequent studies determined that there were no apparent adverse health consequences observed in patients who naturally lack ANGPTL3 function. Furthermore, individuals completely lacking ANGTPL3 gene function were free from coronary atherosclerotic plaques evaluated by coronary computerized tomography, or CT, scan, compared to matched control family members. Two independent population genetic studies of individuals carrying a single mutated copy of ANGPTL3 demonstrated that partial loss of ANGPTL3 function is protective against ASCVD, with a 34% and 41% lower risk, respectively, compared to individuals without any ANGPTL3 mutations. Collectively, these studies provided strong evidence for ANGPTL3 as a potential therapeutic target for hyperlipidemia and ASCVD risk reduction.

Multiple therapeutic approaches targeting ANGPTL3 have been developed or are being evaluated in the clinic and provide further validation for ANGPTL3 as a target. Evinacumab is a mAb targeting ANGPTL3 that has been

shown to effectively lower LDL-C and triglycerides in patients with HoFH and HeFH. The Phase 3 trial for evinacumab in patients with HoFH demonstrated a 49% reduction of LDL-C and a 50% reduction of triglycerides after 24 weeks compared to placebo. Based on these data, evinacumab was approved by the FDA in 2021 for the treatment of patients with HoFH.

The LDL-C lowering effect of evinacumab has been demonstrated to be additive to that of PCSK9 inhibition. In a late-stage clinical trial of patients with refractory hypercholesterolemia, due to HeFH in the majority of cases, the addition of evinacumab to a PCSK9 inhibitor further reduced LDL-C by 56% compared to placebo. In addition, other investigational agents targeting ANGPTL3 are being evaluated in patients with severe hypertriglyceridemia, including vupanorsen, an antisense oligonucleotide therapy targeting ANGPTL3, and ARO-ANG3, a siRNA targeting ANGPTL3.

Preclinical studies

We are evaluating multiple LNP formulations with a view to enabling treatment of patients with all forms of FH, as well as multiple editor and gRNA options. In preclinical data generated to date, and discussed below, we have observed the following:

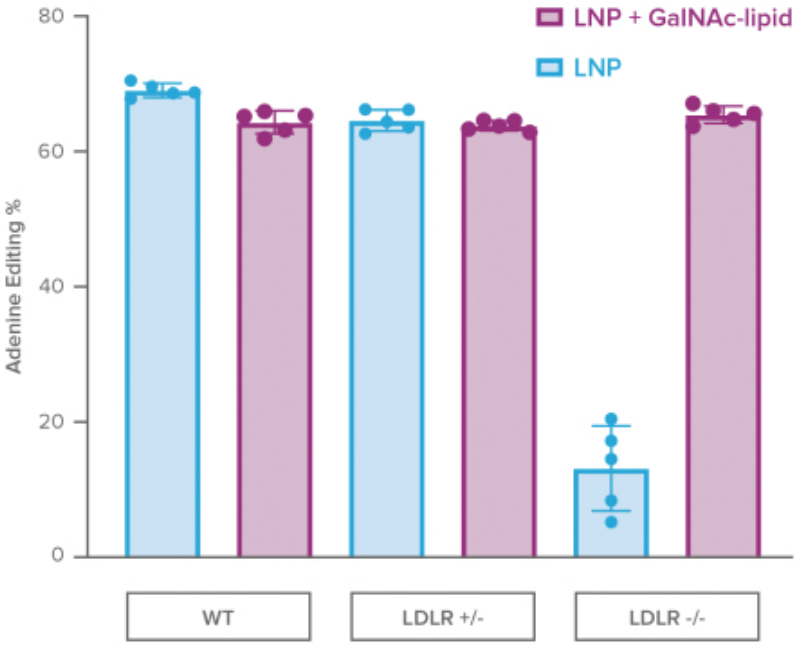
- development of a proprietary GalNAc-targeting ligand that when added to an LNP is capable of delivering a base editor to the liver independent of the LDL receptor status in mice, and which may potentially be used to treat patients with HeFH and HoFH;
- proof-of-concept data in NHPs for an ABE-ANGPTL3 precursor formulation demonstrating 60% whole liver editing, 95% reduction in ANGPTL3 and 64% reduction in triglycerides at two weeks after a single treatment; and
- durability data in NHPs for an ABE-ANGPTL3 precursor formulation demonstrating an ANGPTL3 reduction of 96% and triglyceride reduction of 69% seen at ten months following a single treatment.

Discovery and validation of LNPs

LNP-mediated delivery to the liver is more challenging in patients with HoFH than in those with HeFH. This is due to the fact that deficiency in the LDLR gene often drives HoFH pathophysiology, and uptake of LNPs into the liver is generally thought to be through a predominantly LDLR-dependent pathway. An approach to bypass the LDLR would be the addition of a targeting ligand to LNPs that works through a receptor other than LDLR.

We have screened and developed a proprietary GalNAc-targeting ligand that can be incorporated into LNPs. GalNAc ligands bind to the asialoglycoprotein receptors, or ASGPR, in the liver and have been used to enhance delivery of siRNAs to the liver. ASGPR is highly expressed in the liver with rapid turnover in about 15 minutes and high capacity to mediate uptake into the liver independent of LDLR.

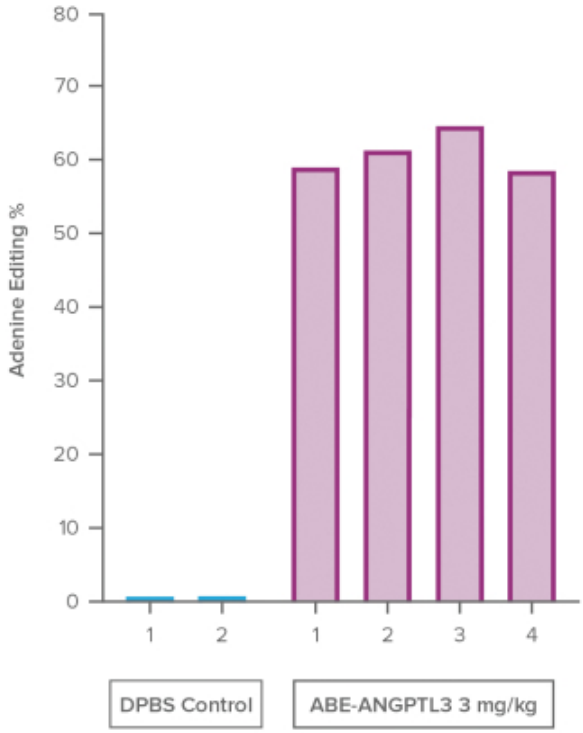
We conducted a preclinical study in mice that were entirely deficient in the LDL receptor, or LDLR -/- mice, in order to evaluate the efficacy of our proprietary GalNAc-targeted LNPs. As shown in the graphic below, the addition of the GalNAc ligand onto the LNP increased editing in the liver of LDLR -/- mice. We observed that GalNAc-targeted LNPs have similar apparent potency in wild-type, LDLR +/- mice and LDLR -/- mice.



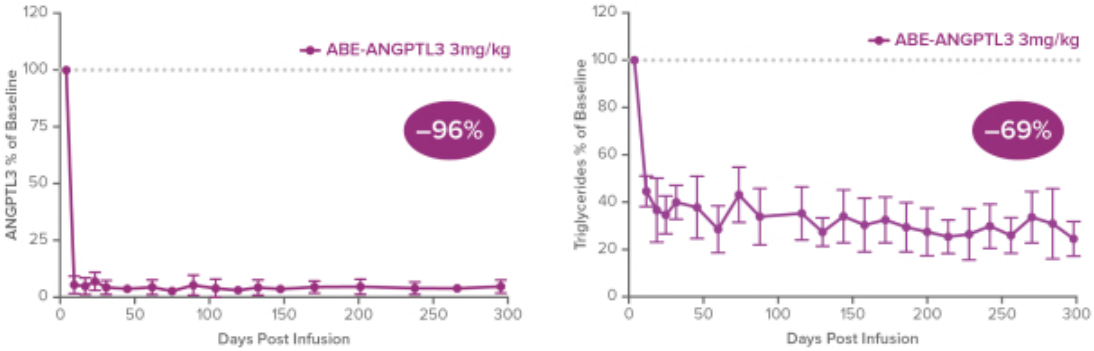
We are continuing to invest and build out capabilities in the development of novel and optimized GalNAc-targeting ligands, optimal lipid anchors, optimal compositions and ratios of LNP components, and optimal processes of addition and LNP formation with targeting ligands. We believe GalNAc provides a delivery platform for patients with both forms of FH and potentially may be applicable in other applications where liver-directed delivery is advantageous.

NHP validation with ABE-ANGPTL3 precursor formulation

We conducted a preclinical proof-of-concept study using an ABE-ANGPTL3 precursor formulation. In this study, which is ongoing, we administered a single dose to healthy NHPs. In the figure below, each treated NHP is represented by a purple bar and each vehicle treated control is represented by a blue bar. Following a single treatment with our ABE-ANGPTL3 precursor formulation, we observed an average 60% editing of ANGPTL3 in whole liver tissue sampled through a liver biopsy two weeks after dosing. This was accompanied by an average 95% reduction of blood ANGPTL3 protein and an average 64% reduction of blood triglycerides concentrations.



Importantly, in this preclinical study, we observed that the reductions in blood ANGPTL3 protein and blood triglycerides levels were durably maintained. As shown in the figure below, at ten months following a single intravenous administration of ABE-ANGPTL3, we observed that the NHPs continued to exhibit an average reduction of 96% in blood ANGPTL3 protein and an average reduction of 69% in blood triglycerides.



ANGPTL3 program next steps

We are currently conducting additional mouse and NHP preclinical studies as we optimize the gRNA, editor and LNP delivery, including GalNAc modifications, for our ANGPTL3 program. We plan to nominate a lead development candidate and initiate IND-enabling studies in 2022.

Future opportunities

We are investing in the identification of new product candidates within the liver-cardiovascular axis. We are exploring additional targets in two categories: lipoprotein targets for the treatment of ASCVD and other liver-cardiovascular targets for cardiomyopathy, thrombotic disorders or cardiometabolic disorders. We plan to continue to focus on programs where the target has biology substantially validated by human genetics and, in many cases, by clinical development programs using other modalities.

Manufacturing

We do not currently own or operate manufacturing facilities. We currently rely on third-party contract manufacturing organizations, or CMOs, and suppliers for critical starting materials, drug substances—gRNA, mRNA—and our drug products. We plan to use third-party CMOs to support our IND-enabling studies and to fully supply our clinical trials and commercial activities. As we scale manufacturing, we intend to continue to expand and strengthen our network of CMOs. We believe there are multiple sources for all of the materials required for the manufacture of our product candidates, as well as multiple CMOs who could assemble the components of our program candidates.

Manufacturing is subject to extensive regulations that impose procedural and documentation requirements. These regulations govern record keeping, manufacturing processes and controls, personnel, quality control and quality assurance. Our CMOs are required to comply with these regulations and are assessed by regular monitoring and formal audits. Our third-party manufacturers are required to manufacture any product candidates we develop under current Good Manufacturing Practice, or cGMP, requirements and other applicable laws and regulations.

We have personnel with extensive technical, manufacturing, analytical and quality experience to oversee our contracted manufacturing and testing activities.

Competition

The biotechnology and biopharmaceutical industries generally, and the CVD field specifically, are characterized by rapid evolution of technologies, sharp competition and strong defense of intellectual property. Any product candidates that we successfully develop and commercialize will have to compete with existing therapies and new therapies that may become available in the future. While we believe that our technology, development experience and scientific knowledge in CVD, gene editing and manufacturing provide us with competitive advantages, we face potential competition from many different sources, including major pharmaceutical, specialty pharmaceutical and biotechnology companies, academic institutions, governmental agencies and public and private research institutions.

Many of the companies against which we are competing or against which we may compete in the future have significantly greater financial resources and expertise in research and development, manufacturing, preclinical testing, conducting clinical trials, obtaining regulatory approvals and marketing approved products than we do. Mergers and acquisitions in the pharmaceutical and biotechnology industry may result in even more resources being concentrated among a smaller number of our competitors. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies. These competitors also compete with us in recruiting and retaining qualified scientific and management personnel and establishing clinical trial sites and patient registration for clinical trials, as well as in acquiring technologies complementary to, or necessary for, our programs.

The key competitive factors affecting the success of all of our product candidates that we develop for the treatment of CVD if approved, are likely to be efficacy, safety, convenience, price, the level of generic competition and the availability of reimbursement from government and other third-party payors.

Our commercial opportunity could be reduced or eliminated if our competitors develop and commercialize products that are safer, more effective, have fewer or less severe side effects, are more convenient or are less expensive than any products that we may develop. Our competitors also may obtain FDA or other regulatory approval for their products more rapidly than we may obtain approval for ours, which could result in our competitors establishing a strong market position before we are able to enter the market. In addition, our ability to compete may be affected in many cases by insurers or other third-party payors seeking to encourage the use of generic products. If our product candidates achieve marketing approval, we expect that they will be priced at a significant premium to competitive generic products.

There are several approved products for LDL-C lowering or cardiovascular risk reduction, such as statins, ezetimibe, bempedoic acid, lomitapide, mipomersen and icosapent ethyl. There are several approved products that target PCSK9 protein as a mechanism to lower LDL-C and reduce the risk of ASCVD. Evolocumab, which is a mAb marketed as Repatha® by Amgen Inc., is approved by the FDA for the treatment of patients with HeFH, patients with HoFH and patients with ASCVD. Alirocumab, which is a mAb marketed as PRALUENT® by both Sanofi and Regeneron Pharmaceuticals, Inc., is approved by the FDA for the treatment of patients with ASCVD and for the treatment of patients with primary hyperlipidemia, including HeFH. The approved mAb treatments act through extracellular inhibition of the PCSK9 protein. Inclisiran, which is a siRNA marketed as Leqvio® by Novartis, is approved in Europe for the treatment of patients with hypercholesterolemia, including HeFH, or mixed dyslipidemia. Inclisiran acts by inhibiting the synthesis of PCSK9 within liver cells, which is distinct from extracellular protein inhibition. We are also aware of several product candidates in clinical development that target PCSK9 protein as a mechanism to lower LDL-C and reduce the risk of ASCVD, including an oral small molecule PCSK9 inhibitor from Serometrix LLC in-licensed by Esperion Therapeutics, Inc. for which they plan to submit an IND in 2021.

We are aware of one other gene editing program targeting the PCSK9 gene in preclinical development. Precision Biosciences, Inc. has published preclinical data showing long-term stable reduction of LDL-C levels in NHPs following *in vivo* gene editing of the PCSK9 gene using its gene editing platform.

Evinacumab, which is a mAb targeting ANGPTL3 protein that is marketed by Regeneron Pharmaceuticals, Inc., is approved by the FDA for the treatment of patients with HoFH and being evaluated in Phase 2 development for severe hypertriglyceridemia. We are aware of several product candidates in clinical development that target ANGPTL3 as a mechanism to lower LDL-C and reduce the risk of ASCVD, including vupanorsen, an antisense oligonucleotide therapy in a Phase 2 clinical trial by Ionis Pharmaceuticals and Pfizer Inc. for the treatment of patients with elevated non-HDL-C and triglycerides. In addition, ARO-ANG3, a siRNA targeting ANGPTL3, is being evaluated in a Phase 1/2 clinical trial by Arrowhead Pharmaceuticals, with an IND filed for a Phase 2 trial of ARO-ANG3 for the treatment of patients with mixed dyslipidemia.

Intellectual property

We strive to protect the proprietary technologies that we believe are important to our business, including pursuing and maintaining patent protection intended to cover the composition of matter of our product candidates, their methods of use, related technologies and other inventions that are important to our business. In addition to patent protection, we also rely on trade secrets to protect aspects of our business that are not amenable to, or that we do not consider appropriate for, patent protection, including certain aspects of our technology.

Our commercial success depends in part upon our ability to obtain and maintain patent and other proprietary protection for commercially important technologies, inventions and know how related to our business, defend and enforce our intellectual property rights, in particular, our patent rights, preserve the confidentiality of our trade secrets and operate without infringing valid and enforceable intellectual property rights of others.

The patent positions for biotechnology and pharmaceutical companies like ours are generally uncertain and can involve complex legal, scientific and factual issues. In addition, the coverage claimed in a patent application can be significantly reduced before a patent is issued, and its scope can be reinterpreted and even challenged after issuance. As a result, we cannot guarantee that any of our product candidates will be protected or remain protectable by enforceable patents. We cannot predict whether the patent applications we are currently pursuing will issue as patents in any particular jurisdiction or whether the claims of any issued patents will provide sufficient proprietary protection from competitors. Any patents that we hold may be challenged, circumvented or invalidated by third parties.

As of April 15, 2021, our solely owned patent estate included one pending U.S. non-provisional patent application, six pending U.S. provisional applications, and five international PCT applications pending.

Our owned and licensed patent estate covers various aspects of our programs and technology, including our gene editing programs for PCSK9 and ANGPTL3 targets as well as our RNA delivery and other platform technology. Any U.S. or foreign patents issued from national stage filings of our PCT patent applications and any U.S. patents issued from non-provisional applications we may file in connection with our provisional patent applications would be scheduled to expire on various dates from 2041 through 2042, without taking into account any possible patent term adjustments or extensions and assuming payment of all appropriate maintenance, renewal, annuity and other governmental fees. Further details on certain segments of our patent portfolio are included below.

PCSK9 program

With regard to our VERVE-101 program, as of April 15, 2021, we solely own one pending international PCT patent application and two pending U.S. provisional patent applications, which, if issued, are expected to expire between 2041 to 2042, without taking potential patent term extensions into account. Our patent applications cover various aspects of our VERVE-101 program, including guide RNA sequences targeting the PCSK9 gene, mRNAs encoding adenine base editors, and compositions thereof, methods of using such compositions for therapeutic indications, methods for *in vivo* gene editing, formulations, dosing regimens, and combination therapies.

ANGPTL3 program

With regard to our ANGPTL3 program, as of April 15, 2021, we solely own one pending international PCT patent application and one pending U.S. provisional patent application, which, if issued, are expected to expire in 2041, without taking potential patent term extensions into account. Our patent applications cover various aspects of our ANGPTL3 program, including guide RNA sequences targeting the ANGPTL3 gene, mRNAs encoding adenine base editors, and compositions thereof, methods of using such compositions for therapeutic indications, methods for *in vivo* gene editing, formulations, dosing regimens, and combination therapies.

License and collaboration agreements

We are a party to a number of license agreements under which we license patents, patent applications and other intellectual property from third parties. The licensed intellectual property covers, in part, CRISPR-related compositions of matter and their use for base editing. These licenses impose various diligence and financial payment obligations on us. We expect to continue to enter into these types of license agreements in the future. We consider the following license agreements to be material to our business.

Collaboration and license agreement with Beam Therapeutics

In April 2019, we entered into a collaboration and license agreement with Beam, or the Beam Agreement, pursuant to which we received an exclusive, worldwide, sublicensable license under certain of Beam's base editing technology, as well as gene editing and delivery technologies to develop, make, use, offer for sale, sell and import base editing products and nuclease products using Beam's CRISPR associated protein 12b, or Cas12b technology, in each case, directed to any of four gene targets, including the PCSK9 and ANGPTL3 genes, that are associated with an increased risk of coronary diseases, or the licensed products. Upon execution of the Beam Agreement and as partial consideration for the rights granted to us thereunder, we issued 2,556,322 shares of our common stock to Beam.

In addition, we granted Beam a non-exclusive license under know-how and patents controlled by us, and an interest in joint collaboration technology, to allow Beam to conduct activities under agreed upon research and development plans, as applicable, under the Beam Agreement. We further granted Beam an exclusive, worldwide, sublicensable license under certain of our delivery technology relating to our know-how and patent rights solely to the extent such rights claim, embody or incorporate a delivery system or component thereof that can be used for the delivery of base editor product to human genome targets, to allow Beam to develop, make, use, offer for sale, sell, and import product candidates and products, except for base editor products.

We and Beam each have the right to sublicense our licensed rights, subject to certain restrictions and provided that the sublicense agreement is in compliance and consistent with the terms of the Beam Agreement and any applicable in-licensed agreements.

Following the final dosing of a patient in a Phase 1 clinical trial of a given licensed product, Beam has the right to opt in to share worldwide expenses of the development of such licensed product, as well as jointly commercialize and share profits and expenses of commercializing such licensed product in the United States on a 50/50 basis. If Beam exercises its opt-in right for a given licensed product, which we refer to following such opt-in as a collaboration product, it will be obligated to pay for a specified percentage of the development and commercialization costs of such collaboration product and will have the right to receive a specified percentage of the profits from any sales of such collaboration product. With respect to each collaboration product, we and Beam will enter into a subsequent co-promotion agreement prior to the anticipated sale of such collaboration product in the United States, pursuant to which we and Beam will each provide 50% of the promotional effort required to promote the collaboration product.

Except as described in the foregoing, we are fully responsible for the development of licensed products under the Beam Agreement.

For collaboration products, on a product-by-product basis outside of the United States, we are obligated to pay clinical and regulatory milestones of up to an aggregate of $5.6 million and sales-based milestones of up to an aggregate of $7.5 million. For non-collaboration products, on a product-by-product basis worldwide, we are obligated to pay clinical and regulatory milestones of up to an aggregate of $11.3 million and sales-based milestones of up to an aggregate of $15.0 million.

To the extent there are sales of a collaboration product outside of the United States or a non-collaboration product worldwide, we will be required to pay tiered royalties to Beam at rates ranging from the low-to-mid single digit percentage of net sales, subject to specified reductions. Such royalty payments will terminate on a country-by-country and product-by-product basis upon the later to occur of (i) the expiration of the last to expire valid claim under the patent rights covering such product in such country, (ii) the period of regulatory exclusivity associated with such product in such country or (iii) 10 years after the first commercial sale of such product in such country.

In further consideration for the licenses granted under each of our and Beam's respective delivery technologies, we or Beam will pay to the other party development-based milestone payments of up to $6.0 million for each delivery technology product of such paying party to achieve the corresponding milestone event. To the extent there are sales of a delivery technology product, we or Beam will pay the other party low-to-mid single digit royalties based on the annual aggregate worldwide net sales resulting from the sale of each delivery technology product of such paying party on a delivery technology product-by-delivery technology product basis; provided however that such royalty payments will not apply to net sales of the collaboration products or licensed products. Such royalty payments will terminate on a country-by-country and delivery technology product-by-delivery technology product basis upon the later to occur of (i) the expiration of the last to expire valid claim under the patent rights covering such delivery technology product in such country, (ii) the period of regulatory exclusivity associated with such delivery technology in such country or (iii) 10 years after the first commercial sale of such delivery technology product in such country.

Beam retains control of the prosecution of its respective patent rights, at its sole expense. We have the first right, but not the obligation, to file for, and prosecute and enforce, at our sole expense, product-specific patent rights under the Beam Agreement, to the extent permitted by Beam's applicable in-license agreements, and we have the exclusive right to file for, prosecute and maintain the patent rights under our delivery technology and any other patent rights that we licensed to Beam under the Beam Agreement.

With respect to intellectual property rights jointly developed by Beam and Verve arising out of a party's performance of its obligations under the agreement, such intellectual property, depending on its nature, is considered under the agreement as joint collaboration technology and subject to joint ownership by Beam and Verve and we and Beam shall decide in good faith as to who shall bear responsibility for filing for, prosecuting and maintaining the jointly owned patent rights.

The term of the Beam Agreement continues until the last to expire of any royalty term for any licensed product. We have the right to terminate the Beam Agreement as to any licensed product, but not for any collaboration product, by delivering a 90-day termination notice to Beam, provided that Beam has elected not to exercise its opt-in right or the period to exercise such opt-in right has expired. The Beam Agreement may be terminated by either party upon (i) written notice if the other party is in material breach and fails to cure such breach within the specified cure period or (ii) the other party's bankruptcy or liquidation. Beam may terminate the Beam Agreement, and we may terminate the licenses granted to Beam under the Beam Agreement, immediately if the other party, directly or indirectly, challenges the enforceability, validity or scope of any patent rights underlying the licenses granted under the Beam Agreement.

Acuitas agreements

Development and option agreement

In December 2019, we entered into a development and option agreement with Acuitas, which agreement we amended and restated in October 2020, or the Acuitas Development Agreement, pursuant to which Acuitas granted us a non-exclusive, worldwide, royalty-free license under its LNP technology. The Acuitas Development Agreement provides us the option to enter into separate non-exclusive license agreements for a specified number of targets under which we can pursue further development and commercialization of licensed products that include the Acuitas LNP technology. Under the Acuitas Development Agreement, we paid Acuitas an upfront technology access fee of $0.5 million and we are obligated to pay annual maintenance fees of $0.3 million for each target and annual target reservation fees of $0.1 million per target to Acuitas. Upon exercising an option to enter into a non-exclusive license agreement for any gene target, we are required to pay Acuitas $2.0 million less any amounts from the target reservation and maintenance fees that are creditable against the option exercise fee.

The collaboration is supervised by a joint development committee that oversees, reviews and manages the development plan with respect to LNPs developed and optimized under the collaboration. With respect to the patent rights underlying each license, we and Acuitas separately retain control of the prosecution of our respective in-licensed patent rights. With respect to any intellectual property rights resulting from the collaboration, other than improvements to each parties' solely owned intellectual property, we and Acuitas each have a one-half interest in the intellectual property rights and jointly maintain and prosecute such intellectual property rights.

The Acuitas Development Agreement will terminate in December 2022, provided that we have the option to extend the term for an additional two years upon prior written notice. We may terminate the Acuitas Development Agreement without cause upon prior written notice to Acuitas. Either party may terminate the Acuitas Development Agreement upon (i) written notice if the other party is in material breach and fails to cure such breach within the specified cure period or (ii) immediately upon notice in the event of the other party's bankruptcy or insolvency.

License agreement for the PCSK9 gene target

In October 2020, we selected an LNP optimized under the Acuitas Development Agreement to be a component of our VERVE-101 product candidate. In connection with that selection, we exercised an option with respect to the use of the LNP technology and entered into a non-exclusive, worldwide license with Acuitas, or the Acuitas License Agreement, with a right to sub-license through multiple tiers, under the licensed LNP technology to research, develop, have developed, make, have made, keep, use and have used, sell, offer for sale, have sold, import and have imported, export and have exported and otherwise commercialize and exploit licensed products using the LNP technology in connection with the PCSK9 gene target for all human therapeutic or prophylactic uses. Under the Acuitas License Agreement, we are obligated to use diligent efforts to develop and commercialize licensed products.

Acuitas retained the right to prosecute and maintain, at its sole expense, patents related to the LNP technology. In the event that Acuitas elects not to file, prosecute or maintain patents related to the LNP technology, it will notify us and we have the right, but not the obligation, to request that Acuitas continue to file, prosecute or maintain such patents, at our expense, and our license to such patents will automatically become irrevocable, perpetual, fully paid-up and royalty free, but such patents will thereafter no longer be part of the licensed technology in such country.

We and Acuitas will enter into a joint patent prosecution and maintenance agreement with respect to the jointly owned patents under the Acuitas License Agreement and as further provided in the Acuitas Development Agreement.

We paid Acuitas an upfront license fee of $2.0 million (less previously paid target reservation fees) and are required to pay an annual license maintenance fee of $0.8 million until the achievement of a certain development-based milestone. We are also obligated to reimburse Acuitas quarterly for employee and reasonable external expenses incurred that are related to the transfer of its licensed technology to our CMO.

We are also obligated to pay Acuitas up to an aggregate of $9.8 million in clinical and regulatory milestones and $9.5 million in sales-based milestones. We will be required to pay royalties at a low single digit percentage based on annual net sales of licensed products sold by us, our affiliates or our sublicensees. Such royalty payments are subject to reduction if we obtain a license from a third party under technology relating to the LNP technology. Any such royalty payments are payable, on a country-by-country and licensed product-by-licensed product basis, until the later of (i) the expiration of the last to expire valid claim in the licensed technology that covers the licensed product in such country, (ii) the expiration of the regulatory exclusivity period in such country and (iii) ten years from the first commercial sale of the licensed product in such country.

The Acuitas License Agreement will terminate on a licensed product-by-licensed product and country-by-country basis upon the last-to-expire royalty term in such country with respect to such licensed product. We may terminate the Acuitas License Agreement without cause upon prior written notice to Acuitas. Either party may terminate the Acuitas License Agreement upon (i) written notice if the other party is in material breach and fails to cure such breach within the specified cure period or (ii) immediately upon notice in the event of the other party's bankruptcy or insolvency. In lieu of terminating the agreement for Acuitas' uncured material breach, we have the alternative option, upon written notice to Acuitas, not to terminate the agreement but instead reduce the applicable milestone and royalty payments by a specified percentage.

Cas9 license agreement with The Broad Institute and President and Fellows of Harvard College

In March 2019, we entered into a license agreement with Broad and Harvard for specified patent rights and in December 2019, we entered into an amendment to this license agreement, or, as amended, the Cas9 License Agreement. The licenses granted to us under the Cas9 License Agreement include rights to (i) certain patents and patent applications solely owned by Harvard, or the Harvard Cas9-I Patent Rights, certain patents and patent applications co-owned by the Massachusetts Institute of Technology, or MIT, and Broad, certain patents and patent applications co-owned by The Rockefeller University, or Rockefeller, and Broad, and certain patents and patent applications co-owned by MIT, Broad and Harvard, which patents and patent applications licensed under the Cas9 License Agreement we refer to as the Harvard/Broad Cas9-I Patent Rights and (ii) certain patents and patent applications co-owned by MIT, Broad, Harvard and the University of Iowa Research Foundation, or Iowa, which patents and patent applications licensed under the Cas9 License Agreement we refer to as the Harvard/Broad Cas9-II Patent Rights, and together with the Harvard/Broad Cas9-I Patent Rights, the Harvard/Broad Cas9 Patent Rights.

In February 2017, Broad and Rockefeller entered into an inter-institutional agreement pursuant to which Rockefeller authorized Broad to act as its sole and exclusive agent for the purposes of licensing Rockefeller's rights in such Harvard/Broad Cas9-I Patent Rights.

In December 2014, as amended in August 2016, MIT, Iowa and Broad entered into a joint invention administration agreement pursuant to which Iowa authorized Broad to act as their sole and exclusive agent for the purposes of licensing their rights in such Harvard/Broad Cas9-II Patent Rights.

License rights under Cas9 License Agreement

Pursuant to the Cas9 License Agreement, Broad and Harvard granted us a worldwide, royalty-bearing, sublicensable license to the Harvard/Broad Cas9 Patent Rights to make, have made, use, have used, sell, offer for sale, have sold, import and export products directed to PCSK9, ANGPTL3 and two additional targets, in the field of the prevention and treatment of human disease, subject to certain limitations and retained rights. With respect to the Harvard/Broad Cas9-I Patent Rights and certain of the Harvard/Broad Cas9-II Patent Rights, or the Cas 9-II Group A Patent Rights, the license is co-exclusive with Editas Medicine, Inc., or Editas. With respect to certain other of the Harvard/Broad Cas9-II Patent Rights, or the Cas9-II Group B Patent Rights, the license is non-exclusive. The license follows the inclusive innovation strategy developed by Broad, MIT and Harvard.

Broad and Harvard also granted us a non-exclusive, worldwide, royalty-bearing, sublicensable license to the Harvard/Broad Cas9 Patent Rights for internal research purposes; for research, development and commercialization of products for the prevention or treatment of human disease outside the field of Editas' exclusive license agreements with Broad and Harvard; and with respect to the targets, to make, have made, use, have used, sell, offer for sale, have sold, import and export products that are not Cas9 licensed products but is a Cas9 enabled products.

The licenses granted by Broad and Harvard to us under the Cas9 License Agreement are subject to retained rights of the U.S. government in the Harvard/Broad Cas9 Patent Rights and the rights retained by Broad, Harvard, MIT, Rockefeller and Iowa on behalf of themselves and other academic, government and non-profit entities, to practice the Harvard/Broad Cas9 Patent Rights, as applicable, for research, educational or teaching purposes. In addition, certain rights granted to us under the Cas9 License Agreement for the Harvard/Broad Cas9-I Patent Rights are further subject to a non-exclusive license to the Howard Hughes Medical Institute for research purposes. Our co-exclusive license rights also are subject to rights retained by Broad, Harvard, MIT, Rockefeller and Iowa, for each of them and for any third party (including non-profit and for-profit entities), to research, develop, make, have made, use, offer for sale, sell, have sold, import or otherwise exploit the Harvard/Broad Cas9 Patent Rights and licensed products as research products or research tools, or for research purposes.

We have the right to sublicense our licensed rights, subject to certain restrictions and provided that the sublicense agreement must be in compliance and consistent with the terms of the Cas9 License Agreement. Any sublicense agreement cannot include the right to assign sublicenses without the written consent of Broad and Harvard. In addition, any sublicense agreements must contain certain terms, including a provision requiring the sublicensee to indemnify Harvard, Broad, MIT, Rockefeller, Iowa and Howard Hughes Medical Institute according to the same terms as are provided in the Cas9 License Agreement and a statement that Broad, Harvard, MIT, Rockefeller, Iowa and Howard Hughes Medical Institute are intended third-party beneficiaries of the sublicense agreement for certain purposes.

We are obligated to use commercially reasonable efforts, or to cause at least one of our affiliates or sublicensees to use commercially reasonable efforts, (i) to research and develop Cas9 licensed products in the licensed field, (ii) to introduce such products in the licensed field into the commercial market, and (iii) to market such products in the licensed field following such introduction into the market and make such products reasonably available to the public. In addition, we, by ourselves or through any of our affiliates or sublicensees, are obligated to achieve certain development milestones within certain time periods. Broad and Harvard have the right to terminate the Cas9 License Agreement if we fail to achieve a development milestone, subject to our right to extend or amend such milestone in accordance with certain procedures. Such termination right will not apply solely with respect to a particular target if, at the time Broad and Harvard elect to terminate the Cas9 License Agreement for failure to achieve a development milestone, we provide evidence reasonably acceptable to Harvard and Broad that we are not in breach of our development milestone diligence obligations with respect to such target and that we are, or one of our affiliates or sublicensees are, (a) researching and developing Cas9 licensed products in the licensed field directed to such target, (b) using commercially reasonable efforts to introduce Cas9 licensed products in the licensed field directed to such target into the commercial market (if applicable), and (c) using commercially reasonable efforts to market Cas9 licensed products in the licensed field directed to such target following such introduction into the market and make such Cas9 licensed products reasonably available to the public (if applicable), and thereafter, for the remainder of the term, we continue, or cause at least one of our affiliates or sublicensees to continue, to develop and commercialize Cas9 licensed products directed to such target in accordance with the foregoing (a)-(c).

Under the Cas9 License Agreement, Broad and Harvard also retained rights to grant further licenses, through its inclusive innovation strategy, under specified circumstances, to third parties, other than specified entities, that wish to develop and commercialize products that target a particular gene outside of the cardiovascular disease field and that otherwise would fall within the scope of our co-exclusive license from Broad and Harvard. If a third party requests a license under the Harvard/Broad Cas9-I Patent Rights for the development and commercialization of a product that would be subject to our co-exclusive license grant from Broad and Harvard under the Cas9 License Agreement, Broad and Harvard may notify us of the request, which we refer to as the Cas9 Third Party Proposed Product Requests. A Cas9 Third Party Proposed Product Request must be

accompanied by the third party's bona fide proposal, including the proposed target or category. Broad may not grant a Cas9 Third Party Proposed Product Request (i) if we, directly or indirectly through any of our affiliates or sublicensees, are researching, developing or commercializing a product directed to the same gene target that is the subject of the Cas9 Third Party Proposed Product Request, or the Cas9 Licensee Product, and we can demonstrate such ongoing efforts to Broad's reasonable satisfaction, or (ii) if we, directly or indirectly through any of our affiliates or sublicensees, wish to do so, and we can demonstrate to Broad's reasonable satisfaction that we are interested in researching, developing and commercializing a Cas9 Licensee Product, that we have a commercially reasonable research, development and commercialization plan to do so, and we commence and continue reasonable commercial efforts under such plan. Furthermore, if we, directly or indirectly through any of our affiliates or sublicensees, are not researching, developing or commercializing a Cas9 Licensee Product but wish to grant a sublicense to do so, Broad is obligated to disclose to us the name of the third party and we may enter into a sublicense agreement with the third party. If we, directly or indirectly through any of our affiliates or sublicensees, are not researching, developing or commercializing a Cas9 Licensee Product, are unable to develop and implement a plan reasonably satisfactory to Broad and Harvard, or are unable to enter into a sublicense agreement with the third party, Broad and Harvard have the right to terminate our rights to the specified third-party target or to a specified category and have the right to freely grant to third parties licenses in the licensed field (a) under the patent rights that are exclusively or co-exclusively licensed to us with respect to such specified third party target or (b) under the patent rights that are exclusively or co-exclusively licensed to us within such specified category, provided that such licenses do not grant rights to commercialize products intended for use in the cardiovascular disease field.

Payment terms

Under the Cas9 License Agreement, we paid Broad and Harvard an upfront license fee of $0.1 million and issued an aggregate of 1,278,161 shares of our common stock to Broad and Harvard. Broad and Harvard also have anti-dilution rights, pursuant to which we (i) have issued Broad and Harvard an aggregate of an additional 2,863,766 shares of our common stock in the aggregate following the completion of preferred stock financings and (ii) expect to issue to Broad and Harvard an aggregate of an additional shares of common stock upon the closing of this offering, based on our issuance and sale of shares of our common stock in this offering and assuming our post-money valuation exceeds $500 million. See "Description of capital stock—License agreement with The Broad Institute and the President and Fellows of Harvard College—Expected issuance of shares in a private placement in connection with this offering."

We also must pay an annual license maintenance fee ranging in dollars from the low- to mid-five figures, depending on the calendar year. A portion of this annual license maintenance fee is creditable against royalties owed on licensed or enabled products in the same year as the maintenance fee is paid.

Broad and Harvard, collectively, are entitled to receive (i) clinical and regulatory milestone payments of up to an aggregate of $5.7 million per licensed product in the United States, the European Union and Japan for the prevention or treatment of a human disease that afflicts fewer than a certain number of patients in the United States and (ii) clinical and regulatory milestone payments of up to an aggregate of $17.4 million per licensed product in the United States, the European Union and Japan for the prevention or treatment of a human disease that afflicts at least a certain number of patients in the United States. If we undergo a change of control during the term of the Cas9 License Agreement, certain of these clinical and regulatory milestone payments will increase by a certain percentage. We are also obligated to make additional payments to Broad and Harvard, collectively, of up to an aggregate of $54.0 million upon the occurrence of certain sales-based milestones per licensed product.

We are also obligated to pay to Broad and Harvard tiered success payments in the event our average market capitalization exceeds specified thresholds ascending from a high nine digit dollar amount to $10.0 billion, or the Market Cap Success Payments, or sale of our company for consideration in excess of those thresholds, or the Company Sale Success Payments, which with the Market Cap Success Payments, we refer to as the Success Payments. Market Cap Success Payments are payable by us in cash, in shares of our common stock, with such shares being valued for such purpose at the closing price of our common stock as reported on the Nasdaq Stock Market for the trading day immediately preceding the date of such payment if our common stock was then listed on the Nasdaq Stock Market, or a combination of shares and cash. In the event of a change of control of our company or a sale of our company, we are required to pay the related Company Sale Success Payment in cash within a specified period following such event. The Success Payments are cumulative and more than one Success Payment may be due and payable based on the average market capitalization on any trigger date. The maximum aggregate Success Payments that could be payable by us is $31.3 million. Certain of the Success Payments are only payable if a licensed product is or has been evaluated in clinical trials. To the extent we issue shares of our common stock in satisfaction of such Success Payments, we will be obligated to file a registration statement with the SEC to register the resale of such shares by Broad and Harvard.

Broad and Harvard, collectively, are entitled to receive mid single-digit percentage royalties on net sales of licensed products, and low single-digit percentage royalties on net sales of other products enabled by the license, made by us, our affiliates or our sublicensees. The royalty percentage depends on the aggregate amount of the net sales for the licensed or enabled products. If we are legally required to pay royalties to a third party on net sales of our licensed products because such third party holds patent rights that cover such licensed product, then we can credit, subject to a floor, up to a certain percentage of the amount paid to such third party against the royalties due to Broad and Harvard in the same period. On a target-by-target basis, if Editas initiates a program that uses technology covered by the Harvard/Broad Cas Patent Rights and is directed to one of the targets, then the milestone and royalty payments for that specific target shall be reduced by a certain percentage. Our obligation to pay royalties will expire on a product-by-product and country-by-country basis upon the later of (i) the expiration of the last to expire valid claim of the Harvard/Broad Cas9 Patent Rights that cover the composition, manufacture or use of each covered product in each country or (ii) the tenth anniversary of the date of the first commercial sale of the licensed or enabled product. If we sublicense any of the Harvard/Broad Cas9 Patent Rights to a third party, Broad and Harvard, collectively, have the right to receive between 10% and 20% of the sublicense income, which percentage shall decrease to a high single-digit after we meet certain clinical milestones.

Prosecution and enforcement provisions

Broad and Harvard retain control of the prosecution of their respective patent rights. We are obligated to reimburse Broad and Harvard for certain expenses associated with the prosecution and maintenance of the Harvard/Broad Cas9 Patent Rights, including expenses associated with any interference proceedings in the USPTO, any opposition proceedings in the European Patent Office, or any other *inter partes* or other post grant proceedings in these or other jurisdictions where we are seeking patent protection. Broad and Harvard are required to maintain any application or patent within the Harvard/Broad Patents Rights so long as we meet our obligation to reimburse Broad and Harvard for expenses related to prosecution, there is a good faith basis for doing so and doing so is consistent with Broad or Harvard's patent prosecution strategy. If we cease payment for the prosecution of any Harvard/Broad Cas9 Patent Right, then any license granted to us with respect to such Harvard/Broad Cas9 Patent Right will terminate.

We have the first right, but not the obligation, to enforce the Harvard/Broad Cas9-I Patent Rights with respect to our licensed products so long as certain conditions are met, such as providing Broad and Harvard with evidence demonstrating a good faith basis for bringing suit against a third party and subject to coordination with Editas. We are solely responsible for the costs of any lawsuits we elect to initiate and cannot enter into a settlement without the prior written consent of Broad and Harvard (and MIT, Rockefeller and Iowa, if applicable). Any sums recovered in such lawsuits will be shared among us, Broad and Harvard.

Termination provisions

Unless terminated earlier, the term of the Cas9 License Agreement will expire upon the expiration of the last to expire valid claim of the Harvard/Broad Cas9 Patent Rights. However, our royalty and milestone payment obligations, discussed above, may survive expiration or termination. We have the right to terminate the agreement at will upon four months' written notice to Broad and Harvard. Either we or Broad and Harvard may terminate the agreement upon a specified period of notice in the event of the other party's uncured material breach, such notice period varying depending on the nature of the breach. Both Broad and Harvard may terminate the Cas9 License Agreement immediately if we, or our affiliates or sublicensee(s), subject to our ability to cure, challenge the enforceability, validity or scope of any Harvard/Broad Patent Right or assist a third party to do so, or in the event of our bankruptcy or insolvency. Neither Broad nor Harvard acting alone has the right to terminate the Cas9 License Agreement. However, Broad and Harvard may separately terminate the licenses granted to us with respect to their respective patent rights upon the occurrence of the same events that would give rise to the right of both institutions acting collectively to terminate the Cas9 License Agreement.

Government regulation

Government authorities in the United States, at the federal, state and local level and in other countries and jurisdictions, including the European Union, extensively regulate, among other things, the research, development, testing, manufacture, pricing, reimbursement, sales, quality control, approval, packaging, storage, recordkeeping, labeling, advertising, promotion, distribution, marketing, post-approval monitoring and reporting and import and export of pharmaceutical products, including biological products. The processes for obtaining marketing approvals in the United States and in foreign countries and jurisdictions, along with subsequent compliance with applicable statutes and regulations and other regulatory authorities, require the expenditure of substantial time and financial resources.

Licensure and regulation of biologics in the United States

In the United States, any product candidates we may develop would be regulated as biological products, or biologics, under the Public Health Service Act, or PHSA, and the Federal Food, Drug and Cosmetic Act, or FDCA, and its implementing regulations and guidance. The failure to comply with the applicable U.S. requirements at any time during the product development process, including preclinical testing, clinical testing, the approval process, or post-approval process, may subject an applicant to delays in the conduct of the study, regulatory review and approval and/or administrative or judicial sanctions.

An applicant seeking approval to market and distribute a new biologic in the United States generally must satisfactorily complete each of the following steps:

- preclinical laboratory tests, animal studies and formulation studies all performed in accordance with the FDA's Good Laboratory Practices, or GLP regulations;
- completion of the manufacture, under cGMP conditions, of the drug substance and drug product that the sponsor intends to use in human clinical trials along with required analytical and stability testing;

- submission to the FDA of an IND application for human clinical testing, which must become effective before human clinical trials may begin;
- approval by an independent institutional review board, or IRB, representing each clinical site before each clinical trial may be initiated;
- performance of adequate and well-controlled human clinical trials to establish the safety, potency and purity of the product candidate for each proposed indication, in accordance with current Good Clinical Practices, or GCP;
- preparation and submission to the FDA of a BLA for a biologic product requesting marketing for one or more proposed indications, including submission of detailed information on the manufacture and composition of the product in clinical development and proposed labelling;
- review of the product by an FDA advisory committee, where appropriate or if applicable;
- satisfactory completion of one or more FDA inspections of the manufacturing facility or facilities, including those of third parties, at which the product, or components thereof, are produced to assess compliance with cGMP requirements and to assure that the facilities, methods and controls are adequate to preserve the product's identity, strength, quality and purity;
- satisfactory completion of any FDA audits of the preclinical studies and clinical trial sites to assure compliance with GLP, as applicable, and GCP, and the integrity of clinical data in support of the BLA;
- payment of user Prescription Drug User Fee Act, or PDUFA, securing FDA approval of the BLA and licensure of the new biologic product; and
- compliance with any post-approval requirements, including the potential requirement to implement a Risk Evaluation and Mitigation Strategy, or REMS, and any post-approval studies or other post-marketing commitments required by the FDA.

Preclinical studies and investigational new drug application

Before testing any biologic product candidate in humans, the product candidate must undergo preclinical testing. Preclinical tests include laboratory evaluations of product chemistry, formulation and stability, as well as studies to evaluate the potential for efficacy and toxicity in animal studies. The conduct of the preclinical tests and formulation of the compounds for testing must comply with federal regulations and requirements. The results of the preclinical tests, together with manufacturing information and analytical data, are submitted to the FDA as part of an IND application.

An IND is an exemption from the FDCA that allows an unapproved product candidate to be shipped in interstate commerce for use in an investigational clinical trial and a request for FDA authorization to administer such investigational product to humans. The IND automatically becomes effective 30 days after receipt by the FDA, unless before that time the FDA raises concerns or questions about the product or conduct of the proposed clinical trial, including concerns that human research subjects will be exposed to unreasonable health risks. In that case, the IND sponsor and the FDA must resolve any outstanding FDA concerns before the clinical trials can begin or recommence.

As a result, submission of the IND may result in the FDA not allowing the trials to commence or allowing the trial to commence on the terms originally specified by the sponsor in the IND. If the FDA raises concerns or questions either during this initial 30-day period, or at any time during the IND review process, it may choose to impose a partial or complete clinical hold. Clinical holds are imposed by the FDA whenever there is concern for patient safety, may be a result of new data, findings, or developments in clinical, preclinical and/or chemistry,

manufacturing and controls or where there is non-compliance with regulatory requirements. This order issued by the FDA would delay either a proposed clinical trial or cause suspension of an ongoing trial, until all outstanding concerns have been adequately addressed and the FDA has notified the company that investigations may proceed. This could cause significant delays or difficulties in completing our planned clinical trial or future clinical trials in a timely manner.

Expanded access to an investigational drug for treatment use

Expanded access, sometimes called “compassionate use,” is the use of investigational products outside of clinical trials to treat patients with serious or immediately life-threatening diseases or conditions when there are no comparable or satisfactory alternative treatment options. The rules and regulations related to expanded access are intended to improve access to investigational products for patients who may benefit from investigational therapies. FDA regulations allow access to investigational products under an IND by the company or the treating physician for treatment purposes on a case-by-case basis for: individual patients (single-patient IND applications for treatment in emergency settings and non-emergency settings); intermediate-size patient populations; and larger populations for use of the investigational product under a treatment protocol or treatment IND application.

When considering an IND application for expanded access to an investigational product with the purpose of treating a patient or a group of patients, the sponsor and treating physicians or investigators will determine suitability when all of the following criteria apply: patient(s) have a serious or immediately life-threatening disease or condition, and there is no comparable or satisfactory alternative therapy to diagnose, monitor, or treat the disease or condition; the potential patient benefit justifies the potential risks of the treatment and the potential risks are not unreasonable in the context or condition to be treated; and the expanded use of the investigational drug for the requested treatment will not interfere with initiation, conduct, or completion of clinical investigations that could support marketing approval of the product or otherwise compromise the potential development of the product.

There is no obligation for a sponsor to make its drug products available for expanded access; however, as required by the 21st Century Cures Act, or Cures Act, passed in 2016, if a sponsor has a policy regarding how it responds to expanded access requests, it must make that policy publicly available. Sponsors are required to make such policies publicly available upon the earlier of initiation of a Phase 2 or Phase 3 trial; or 15 days after the investigational drug or biologic receives designation as a breakthrough therapy, fast track product, or regenerative medicine advanced therapy.

In addition, on May 30, 2018, the Right to Try Act was signed into law. The law, among other things, provides a federal framework for certain patients to access certain investigational products that have completed a Phase 1 clinical trial and that are undergoing investigation for FDA approval. Under certain circumstances, eligible patients can seek treatment without enrolling in clinical trials and without obtaining FDA permission under the FDA expanded access program. There is no obligation for a manufacturer to make its investigational products available to eligible patients as a result of the Right to Try Act.

Human clinical trials in support of a BLA

Clinical trials involve the administration of the investigational product candidate to healthy volunteers or patients with the disease or condition to be treated under the supervision of a qualified principal investigator in accordance with GCP requirements. Clinical trials are conducted under protocols detailing, among other things, the objectives of the trial, inclusion and exclusion criteria, the parameters to be used in monitoring safety, and the effectiveness criteria to be evaluated. A protocol for each clinical trial and any subsequent protocol amendments must be submitted to the FDA as part of the IND.

A sponsor who wishes to conduct a clinical trial outside the United States may, but need not, obtain FDA authorization to conduct the clinical trial under an IND. When a foreign clinical trial is conducted under an IND, all FDA IND requirements must be met unless waived. When a foreign clinical trial is not conducted under an IND, the sponsor must ensure that the trial complies with certain regulatory requirements of the FDA in order to use the trial as support for an IND or application for marketing approval. Specifically, the FDA requires that such trials be conducted in accordance with GCP, including review and approval by an independent ethics committee and informed consent from participants. The GCP requirements encompass both ethical and data integrity standards for clinical trials. The FDA's regulations are intended to help ensure the protection of human subjects enrolled in non-IND foreign clinical trials, as well as the quality and integrity of the resulting data. They further help ensure that non-IND foreign trials are conducted in a manner comparable to that required for clinical trials in the United States.

Further, each clinical trial must be reviewed and approved by an IRB either centrally or individually at each institution at which the clinical trial will be conducted. The IRB will consider, among other things, clinical trial design, patient informed consent, ethical factors, the safety of human subjects, and the possible liability of the institution. An IRB must operate in compliance with FDA regulations. The FDA, IRB, or the clinical trial sponsor may suspend or discontinue a clinical trial at any time for various reasons, including a finding that the clinical trial is not being conducted in accordance with FDA requirements or that the participants are being exposed to an unacceptable health risk. Clinical testing also must satisfy extensive GCP rules and the requirements for informed consent.

Additionally, some clinical trials are overseen by an independent group of qualified experts organized by the clinical trial sponsor, known as a data safety monitoring board, or DSMB. This group may recommend continuation of the trial as planned, changes in trial conduct, or cessation of the trial at designated check points based on certain available data from the trial to which only the DSMB has access.

Clinical trials typically are conducted in three sequential phases, but the phases may overlap or be combined. Additional studies may be required after approval.

- *Phase 1* clinical trials are initially conducted in a limited population to test the product candidate for safety, including adverse effects, dose tolerance, absorption, metabolism, distribution, excretion and pharmacodynamics in healthy humans or, on occasion, in patients, such as cancer patients.
- *Phase 2* clinical trials are generally conducted in a limited patient population to identify possible adverse effects and safety risks, evaluate the efficacy of the product candidate for specific targeted indications and determine dose tolerance and optimal dosage. Multiple Phase 2 clinical trials may be conducted by the sponsor to obtain information prior to beginning larger and more costly Phase 3 clinical trials.
- *Phase 3* clinical trials proceed if the Phase 2 clinical trials demonstrate that a dose range of the product candidate is potentially effective and has an acceptable safety profile. Phase 3 clinical trials are undertaken within an expanded patient population to further evaluate dosage, provide substantial evidence of clinical efficacy and further test for safety in an expanded and diverse patient population at multiple, geographically dispersed clinical trial sites. A well-controlled, statistically robust Phase 3 trial may be designed to deliver the data that regulatory authorities will use to decide whether or not to approve, and, if approved, how to appropriately label a biologic; such Phase 3 studies are referred to as "pivotal."

In some cases, the FDA may approve a BLA for a product but require the sponsor to conduct additional clinical trials to further assess the product's safety and effectiveness after approval. Such post-approval trials are typically referred to as Phase 4 clinical trials. These studies are used to gain additional experience from the treatment of patients in the intended therapeutic indication and to document a clinical benefit in the case of biologics approved under accelerated approval regulations. If the FDA approves a product while a company has

ongoing clinical trials that were not necessary for approval, a company may be able to use the data from these clinical trials to meet all or part of any Phase 4 clinical trial requirement or to request a change in the product labeling. The failure to exercise due diligence with regard to conducting Phase 4 clinical trials could result in withdrawal of approval for products.

Information about applicable clinical trials must be submitted within specific timeframes to the National Institutes of Health, or NIH, for public dissemination on its ClinicalTrials.gov website.

Special regulations and guidance governing gene therapy products

It is possible that the procedures and standards applied to gene therapy products and cell therapy products may be applied to any product candidates we may develop, but that remains uncertain at this point. The FDA has defined a gene therapy product as one that mediates its effects by transcription and/or translation of transferred genetic material and/or by integrating into the host genome and which are administered as nucleic acids, viruses, or genetically engineered microorganisms. The products may be used to modify cells *in vivo* or transferred to cells *ex vivo* prior to administration to the recipient.

Within the FDA, the Center for Biologics Evaluation and Research, or CBER, regulates gene therapy products. Within CBER, the review of gene therapy and related products is consolidated in the OTAT and the FDA has established the Cellular, Tissue and Gene Therapies Advisory Committee to advise CBER on its reviews. The NIH, including the Novel and Exceptional Technology and Research Advisory Committee, also advises the FDA on gene therapy issues and other issues related to emerging biotechnologies. The FDA and the NIH have published guidance documents with respect to the development and submission of gene therapy protocols.

The FDA has issued various guidance documents regarding gene therapies, including recent final guidance documents released in January 2020 relating to chemistry, manufacturing and controls information for gene therapy INDs, long-term follow-up after the administration of gene therapy products, gene therapies for rare diseases and gene therapies for retinal disorders, as well as draft guidance in January 2021 for Human Gene Therapy for Neurodegenerative Diseases. Although the FDA has indicated that these and other guidance documents it previously issued are not legally binding, compliance with them is likely necessary to gain approval for any gene therapy product candidate. The guidance documents provide additional factors that the FDA will consider at each of the above stages of development and relate to, among other things: the proper preclinical assessment of gene therapies; the chemistry, manufacturing and control information that should be included in an IND application; the proper design of tests to measure product potency in support of an IND or BLA application; and measures to observe for potential delayed adverse effects in participants who have received investigational gene therapies with the duration of follow-up based on the potential for risk of such effects. For AAV vectors specifically, the FDA typically recommends that sponsors continue to monitor participants for potential gene therapy-related adverse events for up to a 5-year period.

Pediatric studies

Under the Pediatric Research Equity Act of 2003, or PREA, a BLA or supplement thereto must contain data that are adequate to assess the safety and effectiveness of the product for the claimed indications in all relevant pediatric subpopulations, and to support dosing and administration for each pediatric subpopulation for which the product is safe and effective. Sponsors must also submit pediatric study plans prior to the assessment data. Those plans must contain an outline of the proposed pediatric study or studies the applicant plans to conduct, including study objectives and design, any deferral or waiver requests, and other information required by regulation. The applicant, the FDA, and the FDA's internal review committee must then review the information submitted, consult with each other, and agree upon a final plan. The FDA or the applicant may request an amendment to the plan at any time.

The FDA may, on its own initiative or at the request of the applicant, grant deferrals for submission of some or all pediatric data until after approval of the product for use in adults, or full or partial waivers from the pediatric data requirements.

Compliance with cGMP requirements

Before approving a BLA, the FDA typically will inspect the facility or facilities where the product is manufactured. The FDA will not approve an application unless it determines that the manufacturing processes and facilities are in full compliance with cGMP requirements and adequate to assure consistent production of the product within required specifications. The PHSA emphasizes the importance of manufacturing control for products like biologics whose attributes cannot be precisely defined.

Manufacturers and others involved in the manufacture and distribution of products must also register their establishments with the FDA and certain state agencies. Both domestic and foreign manufacturing establishments must register and provide additional information to the FDA upon their initial participation in the manufacturing process. Any product manufactured by or imported from a facility that has not registered, whether foreign or domestic, is deemed misbranded under the FDCA. Establishments may be subject to periodic unannounced inspections by government authorities to ensure compliance with cGMPs and other laws. Inspections must follow a “risk-based schedule” that may result in certain establishments being inspected more frequently. Manufacturers may also have to provide, on request, electronic or physical records regarding their establishments. Delaying, denying, limiting, or refusing inspection by the FDA may lead to a product being deemed to be adulterated.

Review and approval of a BLA

The results of product candidate development, preclinical testing and clinical trials, including negative or ambiguous results as well as positive findings, are submitted to the FDA as part of a BLA requesting license to market the product. The BLA must contain extensive manufacturing information and detailed information on the composition of the product and proposed labeling as well as payment of a user fee. Under federal law, the submission of most BLAs is subject to a substantial application user fee. The sponsor of a licensed BLA is also subject to an annual program fee. Certain exceptions and waivers are available for some of these fees, such as an exception from the application fee for products with orphan designation and a waiver for certain small businesses.

The FDA has 60 days after submission of the application to conduct an initial review to determine whether it is sufficient to accept for filing based on the agency’s threshold determination that it is sufficiently complete to permit substantive review. Once the submission has been accepted for filing, the FDA begins an in-depth review of the application. Under the goals and policies agreed to by the FDA under the PDUFA, the FDA has ten months in which to complete its initial review of a standard application and respond to the applicant, and six months for a priority review of the application. The FDA does not always meet its PDUFA goal dates for standard and priority BLAs. The review process may often be significantly extended by FDA requests for additional information or clarification.

Under the PHSA, the FDA may approve a BLA if it determines that the product is safe, pure and potent, and the facility where the product will be manufactured meets standards designed to ensure that it continues to be safe, pure and potent. On the basis of the FDA’s evaluation of the application and accompanying information, including the results of the inspection of the manufacturing facilities and any FDA audits of preclinical and clinical trial sites to assure compliance with GCPs, the FDA may issue an approval letter or a complete response letter, or CRL. An approval letter authorizes commercial marketing of the product with specific prescribing information for specific indications. If the application is not approved, the FDA will issue a CRL, which will contain the conditions that must be met in order to secure final approval of the application, and when possible

will outline recommended actions the sponsor might take to obtain approval of the application. Sponsors that receive a CRL may submit to the FDA information that represents a complete response to the issues identified by the FDA.

The FDA may also refer the application to an advisory committee for review, evaluation and recommendation as to whether the application should be approved. In particular, the FDA may refer applications for novel biologic products or biologic products that present difficult questions of safety or efficacy to an advisory committee. Typically, an advisory committee is a panel of independent experts, including clinicians and other scientific experts, that reviews, evaluates and provides a recommendation as to whether the application should be approved and under what conditions. The FDA is not bound by the recommendations of an advisory committee, but it considers such recommendations carefully when making decisions.

If the FDA approves a new product, it may limit the approved indication(s) for use of the product. It may also require that contraindications, warnings, or precautions be included in the product labeling. In addition, the FDA may call for post-approval studies, including Phase 4 clinical trials, to further assess the product's efficacy and/or safety after approval. The agency may also require testing and surveillance programs to monitor the product after commercialization, or impose other conditions, including distribution restrictions or other risk management mechanisms, including REMS, to help ensure that the benefits of the product outweigh the potential risks. REMS can include medication guides, communication plans for healthcare professionals and elements to assure safe use, or ETASU. ETASU can include, but are not limited to, special training or certification for prescribing or dispensing, dispensing only under certain circumstances, special monitoring and the use of patent registries. The FDA may prevent or limit further marketing of a product based on the results of post-market studies or surveillance programs. After approval, many types of changes to the approved product, such as adding new indications, manufacturing changes and additional labeling claims, are subject to further testing requirements and FDA review and approval.

Expedited review programs

The FDA is authorized to expedite the review of BLAs in several ways. Under the Fast Track program, the sponsor of a product candidate may request the FDA to designate the product for a specific indication as a Fast Track product concurrent with or after the filing of the IND. Candidate products are eligible for Fast Track designation if they are intended to treat a serious or life-threatening condition and demonstrate the potential to address unmet medical needs for the condition. Fast Track designation applies to the combination of the product candidate and the specific indication for which it is being studied. In addition to other benefits, such as the ability to have greater interactions with the FDA, the FDA may initiate review of sections of a Fast Track application before the application is complete, a process known as rolling review.

Any product candidate submitted to the FDA for marketing, including under a Fast Track program, may be eligible for other types of FDA programs intended to expedite development and review, such as breakthrough therapy designation, priority review and accelerated approval.

- *Breakthrough therapy designation.* To qualify for the breakthrough therapy program, product candidates must be intended to treat a serious or life-threatening disease or condition and preliminary clinical evidence must indicate that such product candidates may demonstrate substantial improvement on one or more clinically significant endpoints over existing therapies. The FDA will seek to ensure the sponsor of a breakthrough therapy product candidate receives intensive guidance on an efficient drug development program, intensive involvement of senior managers and experienced staff on a proactive, collaborative and cross-disciplinary review and rolling review.

- *Priority review.* A product candidate is eligible for priority review if it treats a serious condition and, if approved, it would be a significant improvement in the safety or effectiveness of the treatment, diagnosis or prevention compared to marketed products. FDA aims to complete its review of priority review applications within six months as opposed to 10 months for standard review.
- *Accelerated approval.* Drug or biologic products studied for their safety and effectiveness in treating serious or life-threatening illnesses and that provide meaningful therapeutic benefit over existing treatments may receive accelerated approval. Accelerated approval means that a product candidate may be approved on the basis of adequate and well controlled clinical trials establishing that the product candidate has an effect on a surrogate endpoint that is reasonably likely to predict a clinical benefit, or on the basis of an effect on a clinical endpoint other than survival or irreversible morbidity or mortality or other clinical benefit, taking into account the severity, rarity and prevalence of the condition and the availability or lack of alternative treatments. As a condition of approval, the FDA may require that a sponsor of a drug or biologic product candidate receiving accelerated approval perform adequate and well controlled post-marketing clinical trials. In addition, the FDA currently requires as a condition for accelerated approval pre-approval of promotional materials.
- *Regenerative advanced therapy.* With passage of the 21st Century Cures Act, or the Cures Act, in December 2016, Congress authorized the FDA to accelerate review and approval of products designated as regenerative advanced therapies. A product is eligible for this designation if it is a regenerative medicine therapy that is intended to treat, modify, reverse or cure a serious or life-threatening disease or condition and preliminary clinical evidence indicates that the product candidate has the potential to address unmet medical needs for such disease or condition. The benefits of a regenerative advanced therapy designation include early interactions with the FDA to expedite development and review, benefits available to breakthrough therapies, potential eligibility for priority review and accelerated approval based on surrogate or intermediate endpoints.

None of these expedited programs change the standards for approval but they may help expedite the development or approval process of product candidates.

Post-approval regulation

If regulatory approval for marketing of a product or new indication for an existing product is obtained, the sponsor will be required to comply with all regular post-approval regulatory requirements as well as any post-approval requirements that the FDA have imposed as part of the approval process. The sponsor will be required to report certain adverse reactions and production problems to the FDA, provide updated safety and efficacy information and comply with requirements concerning advertising and promotional labeling requirements. Manufacturers and certain of their subcontractors are required to register their establishments with the FDA and certain state agencies and are subject to periodic unannounced inspections by the FDA and certain state agencies for compliance with ongoing regulatory requirements, including cGMP regulations, which impose certain procedural and documentation requirements upon manufacturers. Accordingly, the sponsor and its third-party manufacturers must continue to expend time, money and effort in the areas of production and quality control to maintain compliance with cGMP regulations and other regulatory requirements.

A product may also be subject to official lot release, meaning that the manufacturer is required to perform certain tests on each lot of the product before it is released for distribution. If the product is subject to official lot release, the manufacturer must submit samples of each lot, together with a release protocol showing a summary of the history of manufacture of the lot and the results of all of the manufacturer's tests performed on the lot, to the FDA. The FDA may in addition perform certain confirmatory tests on lots of some products before releasing the lots for distribution. Finally, the FDA will conduct laboratory research related to the safety, purity, potency and effectiveness of pharmaceutical products.

Once an approval is granted, the FDA may withdraw the approval if compliance with regulatory requirements and standards is not maintained or if problems occur after the product reaches the market. Later discovery of previously unknown problems with a product, including adverse events of unanticipated severity or frequency, or with manufacturing processes, or failure to comply with regulatory requirements, may result in revisions to the approved labeling to add new safety information; imposition of post-market studies or clinical trials to assess new safety risks; or imposition of distribution or other restrictions under a REMS program. Other potential consequences include, among other things:

- restrictions on the marketing or manufacturing of the product, complete withdrawal of the product from the market or product recalls;
- fines, warning letters or holds on post-approval clinical trials;
- refusal of the FDA to approve pending applications or supplements to approved applications, or suspension or revocation of product license approvals;
- product recall, seizure or detention, or refusal to permit the import or export of products; or
- injunctions or the imposition of civil or criminal penalties.

Pharmaceutical products may be promoted only for the approved indications and in accordance with the provisions of the approved label. Although healthcare providers may prescribe products for uses not described in the drug's labeling, known as off-label uses, in their professional medical judgment, drug manufacturers are prohibited from soliciting, encouraging or promoting unapproved uses of a product. Drug manufacturers may only share truthful and non-misleading information that is otherwise consistent with a product's FDA approved labeling. The FDA and other agencies actively enforce the laws and regulations prohibiting the promotion of off-label uses, and a company that is found to have improperly promoted off-label uses may be subject to significant liability.

The FDA strictly regulates the marketing, labeling, advertising and promotion of prescription drug products placed on the market. This regulation includes, among other things, standards and regulations for direct-to-consumer advertising, communications regarding unapproved uses, industry-sponsored scientific and educational activities and promotional activities involving the Internet and social media. Promotional claims about a drug's safety or effectiveness are prohibited before the drug is approved. After approval, a drug product generally may not be promoted for uses that are not approved by the FDA, as reflected in the product's prescribing information.

If a company is found to have promoted off-label uses, it may become subject to adverse public relations and administrative and judicial enforcement by the FDA, the DOJ, or the Office of the Inspector General of the Department of Health and Human Services, as well as state authorities. This could subject a company to a range of penalties that could have a significant commercial impact, including civil and criminal fines and agreements that materially restrict the manner in which a company promotes or distributes drug products. The federal government has levied large civil and criminal fines against companies for alleged improper promotion and has also requested that companies enter into consent decrees or permanent injunctions under which specified promotional conduct is changed or curtailed.

Orphan drug designation

Orphan drug designation in the United States is designed to encourage sponsors to develop products intended for treatment of rare diseases or conditions. In the United States, a rare disease or condition is statutorily defined as a condition that affects fewer than 200,000 individuals in the United States or that affects more than 200,000 individuals in the United States and for which there is no reasonable expectation that the cost of

developing and making available the biologic for the disease or condition will be recovered from sales of the product in the United States.

Orphan drug designation qualifies a company for tax credits and market exclusivity for seven years following the date of the product's marketing approval if granted by the FDA. An application for designation as an orphan product can be made any time prior to the filing of an application for approval to market the product. A product becomes an orphan when it receives orphan drug designation from the Office of Orphan Products Development at the FDA based on acceptable confidential requests made under the regulatory provisions. The product must then go through the review and approval process like any other product.

A sponsor may request orphan drug designation of a previously unapproved product or new orphan indication for an already marketed product. In addition, a sponsor of a product that is otherwise the same product as an already approved orphan drug may seek and obtain orphan drug designation for the subsequent product for the same rare disease or condition if it can present a plausible hypothesis that its product may be clinically superior to the first drug. More than one sponsor may receive orphan drug designation for the same product for the same rare disease or condition, but each sponsor seeking orphan drug designation must file a complete request for designation.

If a product with orphan designation receives the first FDA approval for the disease or condition for which it has such designation or for a select indication or use within the rare disease or condition for which it was designated, the product generally will receive orphan drug exclusivity. Orphan drug exclusivity means that the FDA may not approve another sponsor's marketing application for the same product for the same indication for seven years, except in certain limited circumstances. If a product designated as an orphan drug ultimately receives marketing approval for an indication broader than what was designated in its orphan drug application, it may not be entitled to exclusivity.

The period of exclusivity begins on the date that the marketing application is approved by the FDA and applies only to the indication for which the product has been designated. Orphan drug exclusivity will not bar approval of another product under certain circumstances, including if the company with orphan drug exclusivity is not able to meet market demand or the subsequent product with the same drug for the same condition is shown to be clinically superior to the approved product on the basis of greater efficacy or safety, or providing a major contribution to patient care. This is the case despite an earlier court opinion holding that the Orphan Drug Act unambiguously required the FDA to recognize orphan drug exclusivity regardless of a showing of clinical superiority. Under Omnibus legislation signed by President Trump on December 27, 2020, the requirement for a product to show clinical superiority applies to drugs and biologics that received orphan drug designation before enactment of the FDA Reauthorization Act of 2017, but have not yet been approved or licensed by FDA.

Pediatric exclusivity

Pediatric exclusivity is another type of non-patent marketing exclusivity in the United States and, if granted, provides for the attachment of an additional six months of marketing protection to the term of any existing regulatory exclusivity, including the non-patent and orphan exclusivity. This six-month exclusivity may be granted if a BLA sponsor submits pediatric data that fairly respond to a written request from the FDA for such data. The data do not need to show the product to be effective in the pediatric population studied; rather, if the clinical trial is deemed to fairly respond to the FDA's request, the additional protection is granted. If reports of requested pediatric studies are submitted to and accepted by the FDA within the statutory time limits, whatever statutory or regulatory periods of non-patent exclusivity that cover the product are extended by six months.

Biosimilars and exclusivity

The 2010 Patient Protection and Affordable Care Act, which was signed into law in March 2010, included a subtitle called the Biologics Price Competition and Innovation Act of 2009, or BPCIA. The BPCIA established a

regulatory scheme authorizing the FDA to approve biosimilars and interchangeable biosimilars. A biosimilar is a biological product that is highly similar to an existing FDA-licensed "reference product." No interchangeable biosimilars, however, have been approved. The FDA has issued several guidance documents outlining an approach to review and approval of biosimilars. Additional guidances are expected to be finalized by the FDA in the near term.

Under the BPCIA, a manufacturer may submit an application for licensure of a biologic product that is "biosimilar to" or "interchangeable with" a previously approved biological product or "reference product." In order for the FDA to approve a biosimilar product, it must find that there are no clinically meaningful differences between the reference product and proposed biosimilar product in terms of safety, purity and potency. For the FDA to approve a biosimilar product as interchangeable with a reference product, the agency must find that the biosimilar product can be expected to produce the same clinical results as the reference product, and (for products administered multiple times) that the biologic and the reference biologic may be switched after one has been previously administered without increasing safety risks or risks of diminished efficacy relative to exclusive use of the reference biologic.

Under the BPCIA, an application for a biosimilar product may not be submitted to the FDA until four years following the date of approval of the reference product. The FDA may not approve a biosimilar product until 12 years from the date on which the reference product was approved. Even if a product is considered to be a reference product eligible for exclusivity, another company could market a competing version of that product if the FDA approves a full BLA for such product containing the sponsor's own preclinical data and data from adequate and well-controlled clinical trials to demonstrate the safety, purity and potency of their product. The BPCIA also created certain exclusivity periods for biosimilars approved as interchangeable products. At this juncture, it is unclear whether products deemed "interchangeable" by the FDA will, in fact, be readily substituted by pharmacies, which are governed by state pharmacy law. Since the passage of the BPCIA, many states have passed laws or amendments to laws, including laws governing pharmacy practices, which are state-regulated, to regulate the use of biosimilars.

Federal and state data privacy and security laws

Under the federal Health Insurance Portability and Accountability Act of 1966, or HIPAA, the U.S. Department of Health and Human Services, or HHS, has issued regulations to protect the privacy and security of protected health information, or PHI, used or disclosed by covered entities including certain healthcare providers, health plans and healthcare clearinghouses. HIPAA also regulates standardization of data content, codes and formats used in healthcare transactions and standardization of identifiers for health plans and providers. HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009 or HITECH, and their regulations, including the omnibus final rule published on January 25, 2013, also imposes certain obligations on the business associates of covered entities that obtain protected health information in providing services to or on behalf of covered entities, as well as their covered subcontractors. In addition to federal privacy regulations, there are a number of state laws governing confidentiality and security of health information that are applicable to our business. In addition to possible federal civil and criminal penalties for HIPAA violations, state attorneys general are authorized to file civil actions for damages or injunctions in federal courts to enforce HIPAA and seek attorney's fees and costs associated with pursuing federal civil actions. Accordingly, state attorneys general (along with private plaintiffs) have brought civil actions seeking injunctions and damages resulting from alleged violations of HIPAA's privacy and security rules. New laws and regulations governing privacy and security may be adopted in the future as well.

Additionally, California recently enacted legislation that has been dubbed the first "GDPR-like" law in the United States. Known as the California Consumer Privacy Act, or CCPA, it creates new individual privacy rights for consumers (as that word is broadly defined in the law) and places increased privacy and security obligations on

entities handling personal data of consumers or households. The CCPA went into effect on January 1, 2020 and requires covered companies to provide new disclosures to California consumers, provide such consumers new ways to opt-out of certain sales of personal information, and allow for a new cause of action for data breaches. Additionally, effective starting on January 1, 2023, the California Privacy Rights Act, or CPRA, will significantly modify the CCPA, including by expanding consumers' rights with respect to certain sensitive personal information. The CPRA also creates a new state agency that will be vested with authority to implement and enforce the CCPA and the CPRA. The CCPA and CPRA could impact our business activities depending on how it is interpreted and exemplifies the vulnerability of our business to not only cyber threats but also the evolving regulatory environment related to personal data and protected health information.

Because of the breadth of these laws and the narrowness of the statutory exceptions and regulatory safe harbors available under such laws, it is possible that some of our current or future business activities, including certain clinical research, sales and marketing practices and the provision of certain items and services to our customers, could be subject to challenge under one or more of such privacy and data security laws. The heightening compliance environment and the need to build and maintain robust and secure systems to comply with different privacy compliance and/or reporting requirements in multiple jurisdictions could increase the possibility that a healthcare company may fail to comply fully with one or more of these requirements. If our operations are found to be in violation of any of the privacy or data security laws or regulations described above that are applicable to us, or any other laws that apply to us, we may be subject to penalties, including potentially significant criminal, civil and administrative penalties, damages, fines, imprisonment, contractual damages, reputational harm, diminished profits and future earnings, additional reporting requirements and/or oversight if we become subject to a consent decree or similar agreement to resolve allegations of non-compliance with these laws, and the curtailment or restructuring of our operations, any of which could adversely affect our ability to operate our business and our results of operations. To the extent that any product candidates we may develop, once approved, are sold in a foreign country, we may be subject to similar foreign laws.

Patent term restoration and extension

In the United States, a patent claiming a new biologic product, its method of use or its method of manufacture may be eligible for a limited patent term extension under the Hatch-Waxman Act, which permits a patent extension of up to five years for patent term lost during product development and FDA regulatory review. Assuming grant of the patent for which the extension is sought, the restoration period for a patent covering a product is typically one-half the time between the effective date of the IND and the submission date of the BLA, plus the time between the submission date of the BLA and the ultimate approval date. Patent term restoration cannot be used to extend the remaining term of a patent past a total of 14 years from the product's approval date in the United States. Only one patent applicable to an approved product is eligible for the extension, and the application for the extension must be submitted prior to the expiration of the patent for which extension is sought. A patent that covers multiple products for which approval is sought can only be extended in connection with one of the approvals. The USPTO reviews and approves the application for any patent term extension in consultation with the FDA.

FDA approval of companion diagnostics

In August 2014, the FDA issued final guidance clarifying the requirements that will apply to approval of therapeutic products and *in vitro* companion diagnostics. According to the guidance, for novel drugs, a companion diagnostic device and its corresponding therapeutic should be approved or cleared contemporaneously by the FDA for the use indicated in the therapeutic product's labeling. Approval or clearance of the companion diagnostic device will ensure that the device has been adequately evaluated and has adequate performance characteristics in the intended population. In July 2016, the FDA issued a draft

guidance intended to assist sponsors of the drug therapeutic and *in vitro* companion diagnostic device on issues related to co-development of the products.

The 2014 guidance also explains that a companion diagnostic device used to make treatment decisions in clinical trials of a biologic product candidate generally will be considered an investigational device, unless it is employed for an intended use for which the device is already approved or cleared. If used to make critical treatment decisions, such as patient selection, the diagnostic device generally will be considered a significant risk device under the FDA's Investigational Device Exemption, or IDE, regulations. Thus, the sponsor of the diagnostic device will be required to comply with the IDE regulations. According to the guidance, if a diagnostic device and a product are to be studied together to support their respective approvals, both products can be studied in the same investigational study, if the study meets both the requirements of the IDE regulations and the IND regulations. The guidance provides that depending on the details of the study plan and subjects, a sponsor may seek to submit an IND alone, or both an IND and an IDE.

Under the FDCA, *in vitro* diagnostics, including companion diagnostics, are regulated as medical devices. In the United States, the FDCA and its implementing regulations, and other federal and state statutes and regulations govern, among other things, medical device design and development, preclinical and clinical testing, premarket clearance or approval, registration and listing, manufacturing, labeling, storage, advertising and promotion, sales and distribution, export and import and post-market surveillance. Unless an exemption applies, diagnostic tests require marketing clearance or approval from the FDA prior to commercial distribution.

The FDA previously has required *in vitro* companion diagnostics intended to select the patients who will respond to the product candidate to obtain pre-market approval, or PMA, simultaneously with approval of the therapeutic product candidate. The PMA process, including the gathering of clinical and preclinical data and the submission to and review by the FDA, can take several years or longer. It involves a rigorous premarket review during which the applicant must prepare and provide the FDA with reasonable assurance of the device's safety and effectiveness and information about the device and its components regarding, among other things, device design, manufacturing and labeling. PMA applications are subject to an application fee.

Regulation and procedures governing approval of medical products in the European Union

In order to market any product outside of the United States, a company must also comply with numerous and varying regulatory requirements of other countries and jurisdictions regarding quality, safety and efficacy and governing, among other things, clinical trials, marketing authorization, commercial sales and distribution of products. Whether or not it obtains FDA approval for a product, an applicant will need to obtain the necessary approvals by the comparable foreign regulatory authorities before it can commence clinical trials or marketing of the product in those countries or jurisdictions. Specifically, the process governing approval of medicinal products in the European Union generally follows the same lines as in the United States. It entails satisfactory completion of preclinical studies and adequate and well-controlled clinical trials to establish the safety and efficacy of the product for each proposed indication. It also requires the submission to the relevant competent authorities of a marketing authorization application, or MAA, and granting of a marketing authorization by these authorities before the product can be marketed and sold in the European Union.

Clinical trial approval

Pursuant to the currently applicable Clinical Trials Directive 2001/20/EC and the Directive 2005/28/EC on GCP, a system for the approval of clinical trials in the European Union has been implemented through national legislation of the member states. Under this system, an applicant must obtain approval from the competent national authority of a European Union member state in which the clinical trial is to be conducted, or in multiple member states if the clinical trial is to be conducted in a number of member states. Furthermore, the applicant may only start a clinical trial at a specific site after the competent ethics committee has issued a favorable

opinion. The clinical trial application must be accompanied by an investigational medicinal product dossier with supporting information prescribed by Directive 2001/20/EC and Directive 2005/28/EC and corresponding national laws of the member states and further detailed in applicable guidance documents.

In April 2014, the European Union adopted a new Clinical Trials Regulation (EU) No 536/2014, but it has not yet become effective. It will overhaul the current system of approvals for clinical trials in the European Union. Specifically, the new legislation, which will be directly applicable in all member states, aims at simplifying and streamlining the approval of clinical trials in the European Union. For instance, the new Clinical Trials Regulation provides for a streamlined application procedure via a single-entry point and strictly defined deadlines for the assessment of clinical trial applications.

The conduct of all clinical trials performed in the EU will continue to be bound by currently applicable provisions until the new Clinical Trials Regulation becomes applicable. The extent to which on-going clinical trials will be governed by the Clinical Trials Regulation will depend on when the Clinical Trials Regulation becomes applicable and on the duration of the individual clinical trial. If a clinical trial continues for more than three years from the day on which the Clinical Trials Regulation becomes applicable the Clinical Trials Regulation will at that time begin to apply to the clinical trial.

On January 1, 2020, the website of the European Commission reported that the implementation of the new Clinical Trials Regulation was dependent on the development of a fully functional clinical trials portal and database, which would be confirmed by an independent audit, and that the new legislation would come into effect six months after the European Commission publishes a notice of this confirmation. In late 2020, the European Medicines Agency, or EMA, indicated that it plans to focus on the findings of a system audit; improving the usability, quality and stability of the clinical trial information system; and knowledge transfer to prepare users and their organizations for the new clinical trial system. The EMA has indicated that the system will go live in January 2022.

Parties conducting certain clinical trials must, as in the United States, post clinical trial information in the European Union at the EudraCT website: https://eudract.ema.europa.eu.

PRIME designation in the European Union

In March 2016, the EMA launched an initiative to facilitate development of product candidates in indications, often rare, for which few or no therapies currently exist. The PRIority MEdicines, or PRIME, scheme is intended to encourage drug development in areas of unmet medical need and provides accelerated assessment of products representing substantial innovation reviewed under the centralized procedure. Products from small- and medium-sized enterprises may qualify for earlier entry into the PRIME scheme than larger companies. Many benefits accrue to sponsors of product candidates with PRIME designation, including but not limited to, early and proactive regulatory dialogue with the EMA, frequent discussions on clinical trial designs and other development program elements, and accelerated marketing authorization application assessment once a dossier has been submitted. Importantly, a dedicated EMA contact and rapporteur from the Committee for Human Medicinal Products, or CHMP, or Committee for Advanced Therapies are appointed early in the PRIME scheme facilitating increased understanding of the product at the EMA's Committee level. A kick-off meeting initiates these relationships and includes a team of multidisciplinary experts at the EMA to provide guidance on the overall development and regulatory strategies.

Marketing authorization

To obtain a marketing authorization for a product under the European Union regulatory system, an applicant must submit an MAA, either under a centralized procedure administered by the EMA or one of the procedures administered by competent authorities in European Union Member States (decentralized procedure, national

procedure, or mutual recognition procedure). A marketing authorization may be granted only to an applicant established in the European Union. Regulation (EC) No 1901/2006 provides that prior to obtaining a marketing authorization in the European Union, an applicant must demonstrate compliance with all measures included in an EMA-approved Pediatric Investigation Plan, or PIP, covering all subsets of the pediatric population, unless the EMA has granted a product-specific waiver, class waiver or a deferral for one or more of the measures included in the PIP.

The centralized procedure provides for the grant of a single marketing authorization by the European Commission that is valid for all European Union member states. Pursuant to Regulation (EC) No. 726/2004, the centralized procedure is compulsory for specific products, including for medicines produced by certain biotechnological processes, products designated as orphan medicinal products, advanced therapy products and products with a new active substance indicated for the treatment of certain diseases, including products for the treatment of cancer. For products with a new active substance indicated for the treatment of other diseases and products that are highly innovative or for which a centralized process is in the interest of patients, the centralized procedure may be optional. Manufacturers must demonstrate the quality, safety and efficacy of their products to the EMA, which provides an opinion regarding the MAA. The European Commission grants or refuses marketing authorization in light of the opinion delivered by the EMA.

Specifically, the grant of marketing authorization in the European Union for products containing viable human tissues or cells such as gene therapy medicinal products is governed by Regulation 1394/2007/EC on advanced therapy medicinal products, read in combination with Directive 2001/83/EC of the European Parliament and of the Council, commonly known as the Community code on medicinal products. Regulation 1394/2007/EC lays down specific rules concerning the authorization, supervision and pharmacovigilance of gene therapy medicinal products, somatic cell therapy medicinal products and tissue engineered products. Manufacturers of advanced therapy medicinal products must demonstrate the quality, safety and efficacy of their products to EMA which provides an opinion regarding the application for marketing authorization. The European Commission grants or refuses marketing authorization in light of the opinion delivered by EMA.

Under the centralized procedure, the CHMP established at the EMA is responsible for conducting an initial assessment of a product. Under the centralized procedure in the European Union, the maximum timeframe for the evaluation of an MAA is 210 days, excluding clock stops when additional information or written or oral explanation is to be provided by the applicant in response to questions of the CHMP. Accelerated evaluation may be granted by the CHMP in exceptional cases, when a medicinal product is of major interest from the point of view of public health and, in particular, from the viewpoint of therapeutic innovation. If the CHMP accepts such a request, the time limit of 210 days will be reduced to 150 days, but it is possible that the CHMP may revert to the standard time limit for the centralized procedure if it determines that it is no longer appropriate to conduct an accelerated assessment.

Specialized procedures for gene therapies

As in the United States, it is unclear whether the regulatory authorities in the EU would treat our candidate products as gene therapy products. The grant of marketing authorization in the EU for gene therapy products is governed by Regulation 1394/2007/EC on advanced therapy medicinal products, read in combination with Directive 2001/83/EC of the European Parliament and of the Council, commonly known as the Community code on medicinal products. Regulation 1394/2007/EC includes specific rules concerning the authorization, supervision and pharmacovigilance of gene therapy medicinal products. Manufacturers of advanced therapy medicinal products must demonstrate the quality, safety and efficacy of their products to the EMA, which provides an opinion regarding the MAA. The European Commission grants or refuses marketing authorization in light of the opinion delivered by the EMA.

Pediatric studies

Prior to obtaining a marketing authorization in the European Union, applicants must demonstrate compliance with all measures included in an EMA-approved PIP covering all subsets of the pediatric population, unless the EMA has granted a product-specific waiver, a class waiver, or a deferral for one or more of the measures included in the PIP. The respective requirements for all marketing authorization procedures are laid down in Regulation (EC) No 1901/2006, the so-called Paediatric Regulation. This requirement also applies when a company wants to add a new indication, pharmaceutical form or route of administration for a medicine that is already authorized. The Paediatric Committee of the EMA, or PDCO, may grant deferrals for some medicines, allowing a company to delay development of the medicine for children until there is enough information to demonstrate its effectiveness and safety in adults. The PDCO may also grant waivers when development of a medicine for children is not needed or is not appropriate, such as for diseases that only affect the elderly population. Before an MAA can be filed, or an existing marketing authorization can be amended, the EMA determines that companies actually comply with the agreed studies and measures listed in each relevant PIP.

Regulatory data protection in the European Union

In the European Union, new chemical entities approved on the basis of a complete independent data package qualify for eight years of data exclusivity upon marketing authorization and an additional two years of market exclusivity pursuant to Regulation (EC) No 726/2004, as amended, and Directive 2001/83/EC, as amended. Data exclusivity prevents regulatory authorities in the European Union from referencing the innovator's data to assess a generic (abbreviated) application for a period of eight years. During the additional two-year period of market exclusivity, a generic marketing authorization application can be submitted, and the innovator's data may be referenced, but no generic medicinal product can be marketed until the expiration of the market exclusivity. The overall ten-year period will be extended to a maximum of eleven years if, during the first eight years of those ten years, the marketing authorization holder obtains an authorization for one or more new therapeutic indications which, during the scientific evaluation prior to authorization, is held to bring a significant clinical benefit in comparison with existing therapies. Even if a compound is considered to be a new chemical entity so that the innovator gains the prescribed period of data exclusivity, another company may market another version of the product if such company obtained marketing authorization based on an MAA with a complete independent data package of pharmaceutical tests, preclinical tests and clinical trials.

Patent term extensions in the European Union and other jurisdictions

The European Union also provides for patent term extension through Supplementary Protection Certificates, or SPCs. The rules and requirements for obtaining a SPC are similar to those in the United States. An SPC may extend the term of a patent for up to five years after its originally scheduled expiration date and can provide up to a maximum of fifteen years of marketing exclusivity for a drug. In certain circumstances, these periods may be extended for six additional months if pediatric exclusivity is obtained, which is described in detail below. Although SPCs are available throughout the European Union, sponsors must apply on a country-by-country basis. Similar patent term extension rights exist in certain other foreign jurisdictions outside the European Union.

Periods of authorization and renewals

A marketing authorization is valid for five years, in principle, and it may be renewed after five years on the basis of a reevaluation of the risk-benefit balance by the EMA or by the competent authority of the authorizing member state. To that end, the marketing authorization holder must provide the EMA or the competent authority with a consolidated version of the file in respect of quality, safety and efficacy, including all variations introduced since the marketing authorization was granted, at least six months before the marketing authorization ceases to be valid. Once renewed, the marketing authorization is valid for an unlimited period,

unless the European Commission or the competent authority decides, on justified grounds relating to pharmacovigilance, to proceed with one additional five-year renewal period. Any authorization that is not followed by the placement of the drug on the European Union market (in the case of the centralized procedure) or on the market of the authorizing member state within three years after authorization ceases to be valid.

Regulatory requirements after marketing authorization

Following approval, the holder of the marketing authorization is required to comply with a range of requirements applicable to the manufacturing, marketing, promotion and sale of the medicinal product. These include compliance with the European Union's stringent pharmacovigilance or safety reporting rules, pursuant to which post-authorization studies and additional monitoring obligations can be imposed. In addition, the manufacturing of authorized products, for which a separate manufacturer's license is mandatory, must also be conducted in strict compliance with the EMA's GMP requirements and comparable requirements of other regulatory bodies in the European Union, which mandate the methods, facilities and controls used in manufacturing, processing and packing of drugs to assure their safety and identity. Finally, the marketing and promotion of authorized products, including industry-sponsored continuing medical education and advertising directed toward the prescribers of drugs and/or the general public, are strictly regulated in the European Union under Directive 2001/83EC, as amended.

Orphan drug designation and exclusivity

Regulation (EC) No 141/2000 and Regulation (EC) No. 847/2000 provide that a product can be designated as an orphan drug by the European Commission if its sponsor can establish: that the product is intended for the diagnosis, prevention or treatment of (1) a life-threatening or chronically debilitating condition affecting not more than five in ten thousand persons in the European Union when the application is made, or (2) a life-threatening, seriously debilitating or serious and chronic condition in the European Union and that without incentives it is unlikely that the marketing of the drug in the European Union would generate sufficient return to justify the necessary investment. For either of these conditions, the applicant must demonstrate that there exists no satisfactory method of diagnosis, prevention or treatment of the condition in question that has been authorized in the European Union or, if such method exists, the drug will be of significant benefit to those affected by that condition.

An orphan drug designation provides a number of benefits, including fee reductions, regulatory assistance and the possibility to apply for a centralized European Union marketing authorization. Marketing authorization for an orphan drug leads to a ten-year period of market exclusivity. During this market exclusivity period, neither the EMA nor the European Commission or the member states can accept an application or grant a marketing authorization for a "similar medicinal product." A "similar medicinal product" is defined as a medicinal product containing a similar active substance or substances as contained in an authorized orphan medicinal product, and which is intended for the same therapeutic indication. The market exclusivity period for the authorized therapeutic indication may, however, be reduced to six years if, at the end of the fifth year, it is established that the product no longer meets the criteria for orphan drug designation because, for example, the product is sufficiently profitable not to justify market exclusivity.

Pediatric exclusivity

If an applicant obtains a marketing authorization in all EU Member States, or a marketing authorization granted in the centralized procedure by the European Commission, and the study results for the pediatric population are included in the product information, even when negative, the medicine is then eligible for an additional six-month period of qualifying patent protection through extension of the term of the Supplementary Protection Certificate, or SPC.

Review and approval of medical devices

The European Union has adopted numerous directives and standards regulating, among other things, the design, manufacture, clinical trials, labeling, approval and adverse event reporting for medical devices. Medical devices must comply with the Essential Requirements in Annex I to the currently applicable EU Medical Devices Directive (Council Directive 93/42/EEC) and in-vitro diagnostic medical devices must comply with the Essential Requirements in Annex I to the currently applicable EU In-Vitro Diagnostic Medical Devices Directive (Directive 98/79/EC), or the Essential Requirements. Compliance with these requirements is a prerequisite to be able to affix the CE Mark of Conformity to medical devices or in-vitro diagnostic medical devices, without which they cannot be marketed or sold in the European Economic Area, or EEA, comprised of the European Union member states plus Norway, Iceland, and Liechtenstein.

To demonstrate compliance with the Essential Requirements a manufacturer must undergo a conformity assessment procedure, which varies according to the type of medical device and its classification. Except for low risk medical devices, where the manufacturer can issue a CE Declaration of Conformity based on a self-assessment of the conformity of its products with the Essential Requirements, a conformity assessment procedure requires the intervention of a third-party organization designated by competent authorities of a European Union country to conduct conformity assessments, or a Notified Body. For companion diagnostics, which are regulated as in-vitro diagnostic devices in the EU, if the medicinal product component falls within the centralized procedure the Notified Body must seek a scientific opinion from the EMA on the suitability of the companion diagnostic to the medicinal product concerned. Notified Bodies are independent testing houses, laboratories, or product certifiers typically based within the EU and authorized by the European member states to perform the required conformity assessment tasks, such as quality system audits and device compliance testing.

The legal framework currently applicable for medical devices in the European Union will soon be amended by Medical Devices Regulation (Regulation (EU) 2017/745) adopted in 2017, which repeals and replaces the EU Medical Devices Directive. Unlike directives, which must be implemented into the national laws of the EEA member states, the Medical Devices Regulation (MDR) will be directly applicable (i.e., without the need for adoption of EEA member state laws implementing them) in all EEA member states and are intended to eliminate current differences in the regulation of medical devices among EEA member states. The Medical Devices Regulation, among other things, is intended to establish a uniform, transparent, predictable and sustainable regulatory framework across the EEA for medical and ensure a high level of safety and health. In addition, the In Vitro Diagnostic Regulation (IVDR) (EU) 2017/746, which entered into force on May 25, 2017, will replace the EU In Vitro Diagnostics Directive (IVDD) 98/79/EC. Manufacturers wishing to apply to a notified body for a conformity assessment of their in vitro diagnostic medical device have until the date of application of the IVDR in May 2022 to update their technical documentation to meet the requirements and comply with the new, more stringent regulation.

Currently, the MDR is scheduled to become applicable on May 26, 2021 and the IVDR will become applicable in May 2022. Once applicable, these regulations will, among other things:

- strengthen the rules on placing devices on the market and reinforce surveillance once they are available;
- establish explicit provisions on manufacturers' responsibilities for the follow-up of the quality, performance and safety of devices placed on the market;
- improve the traceability of medical devices throughout the supply chain to the end-user or patient through a unique identification number;
- set up a central database to provide patients, healthcare professionals and the public with comprehensive information on products available in the EU; and

- strengthen rules for the assessment of certain high-risk devices, such as implants, which may have to undergo an additional check by experts before they are placed on the market.

Brexit and the regulatory framework in the United Kingdom

On June 23, 2016, the electorate in the United Kingdom voted in favor of leaving the European Union, commonly referred to as Brexit. Following protracted negotiations, the United Kingdom left the European Union on January 31, 2020. Pursuant to the formal withdrawal arrangements agreed between the United Kingdom and the European Union, the United Kingdom was subject to a transition period until December 31, 2020, during which European Union rules continued to apply. A trade and cooperation agreement, or the Trade and Cooperation Agreement, which outlines the future trading relationship between the United Kingdom and the European Union was agreed in December 2020. Great Britain is no longer covered by the European Union's procedures for the grant of marketing authorizations (Northern Ireland is covered by the centralized authorization procedure and can be covered under the decentralized or mutual recognition procedures). A separate marketing authorization will be required to market drugs in Great Britain. For two years from 1 January 2021, the Medicines and Healthcare products Regulatory Agency, or MHRA, may adopt decisions taken by the European Commission on the approval of new marketing authorizations through the centralized procedure, and the MHRA will have regard to marketing authorizations approved in a country in the European Economic Area (although in both cases a marketing authorization will only be granted if any Great Britain-specific requirements are met). Various national procedures are now available to place a drug on the market in the United Kingdom, Great Britain, or Northern Ireland, with the main national procedure having a maximum timeframe of 150 days (excluding time taken to provide any further information or data required). The data exclusivity periods in the United Kingdom are currently in line with those in the European Union, but the Trade and Cooperation Agreement provides that the periods for both data and market exclusivity are to be determined by domestic law, and so there could be divergence in the future. It is currently unclear whether the MHRA in the United Kingdom is sufficiently prepared to handle the increased volume of marketing authorization applications that it is likely to receive.

Also, notwithstanding the United Kingdom's withdrawal from the European Union, by operation of the so-called 'UK GDPR' (i.e., the EU General Data Protection Regulation, or GDPR, as it continues to form part of the law of the United Kingdom by virtue of section 3 of the EU (Withdrawal) Act 2018 and as subsequently amended) the GDPR continues to apply in substantially equivalent form to processing operations carried out in the context of an establishment in the United Kingdom and any processing relating to the offering of goods or services to individuals in the United Kingdom and/or monitoring of their behavior in the United Kingdom.

However, it is still unclear whether transfers of data from the EEA to the United Kingdom will remain lawful under the GDPR. The Trade and Cooperation Agreement provides for a transitional period during which the UK will be treated like an EU member state in relation to processing and transfers of personal data for four months from January 1, 2021. This may be extended by two further months. After such period, the United Kingdom will be a "third country" under the GDPR (and transfers of data from the EEA to the United Kingdom will require a 'transfer mechanism' such as the Standard Contractual Clauses) unless the European Commission adopts an adequacy decision in respect of transfers of personal data to the United Kingdom. While the European Commission has published draft adequacy decisions in respect of the United Kingdom, these are subject to further review and it remains to be seen whether or when any such decisions will be adopted. The UK government has already determined that it considers all EU 27 and EEA member states to be adequate for the purposes of data protection, ensuring that data flows from the United Kingdom to the European Union and EEA remain unaffected. We may, however, incur liabilities, expenses, costs and other operational losses under GDPR and applicable European Union Member States and the United Kingdom privacy laws in connection with any measures we take to comply with them. Furthermore, in general terms, there will now be increasing scope for divergence in application, interpretation and enforcement of the data protection law as between the United Kingdom and EEA.

General Data Protection Regulation

The collection, use, disclosure, transfer or other processing of personal data in the context of the activities of an establishment in the European Economic Area and/or regarding the offering of goods or services to, and/or the monitoring of the behavior of individuals in the European Economic Area, including health data, is subject to the GDPR, which became effective on May 25, 2018. As noted above, by operation of the so-called 'UK GDPR,' the GDPR continues to apply in substantially equivalent form in the context of the UK, UK establishments and UK-focused processing operations—so, when we refer to the GDPR in this section, we are also making reference to the UK GDPR in the context of the United Kingdom, unless the context requires otherwise.

The GDPR is wide-ranging in scope and imposes numerous, significant and complex requirements on companies that process personal data, such as: requiring the establishment of a legal basis for processing personal data; broadening the definition of personal data (including to capture 'pseudonymized' or key-coded data that is commonly processed in a clinical trial-related context); creating obligations for controllers and processors to appoint data protection officers in certain circumstances; increasing transparency obligations to data subjects; establishing limitations on the retention of personal data; introducing obligations to honor increased rights for data subjects; formalizing a heightened standard of data subject consent; establishing obligations to implement certain technical and organizational safeguards to protect the security and confidentiality of personal data; introducing obligations to agree to certain specific contractual terms and to take certain measures when working with third-party processors or joint controllers; introducing the obligation to provide notice of certain significant personal data breaches to the relevant supervisory authority(ies) and affected individuals; and mandating the appointment of representatives in the UK and/or EU in certain circumstances. In particular, the processing of "special category personal data" (such as personal data related to health and genetic information), which will be relevant to our operations in the context of clinical trials, imposes heightened compliance burdens under the GDPR and is a topic of active interest among relevant regulators. In addition, the GDPR provides that EEA member states may introduce specific requirements related to the processing of special categories of personal data such as health data that we may process in connection with clinical trials or otherwise. In the UK, the UK Data Protection Act 2018 complements the UK GDPR in this regard. More broadly, European data protection authorities may interpret the GDPR and national laws differently and impose additional requirements, which contributes to the complexity of processing personal data in or from the EEA and/or United Kingdom. Guidance on implementation and compliance practices is often updated or otherwise revised. This fact may lead to greater divergence on the law that applies to the processing of personal data across the EEA and/or UK, which may increase our costs and overall compliance risk. Such country-specific regulations could also limit our ability to process relevant personal data in the context of our EEA and/or UK operations ultimately having an adverse impact on our business, and harming our business and financial condition.

The GDPR also imposes strict rules on the transfer of personal data to countries outside Europe, including to the United States, unless the parties to the transfer have implemented specific safeguards to protect the transferred personal data. Certain previously available safeguards have been invalidated, and reliance on alternative safeguards may be complex or not possible in certain circumstances, following a recent ruling of the Court of Justice of the European Union and subsequent regulatory guidance. If we are unable to implement a valid solution for personal data transfers from the EEA/United Kingdom, including, for example, obtaining individuals' explicit consent to transfer their personal data to the United States or other countries, we will face increased exposure to regulatory actions, substantial fines and injunctions against transferring personal data from EEA/United Kingdom. Inability to export personal data from the EEA/United Kingdom may also: restrict our activities outside EEA/United Kingdom; limit our ability to collaborate with partners as well as other service providers, contractors and other companies outside of EEA/United Kingdom; and/or require us to increase our processing capabilities within the EEA and/or United Kingdom at significant expense or otherwise cause us to

change the geographical location or segregation of our relevant systems and operations—any or all of which could adversely affect our operations or financial results. Additionally, other countries outside of EEA/United Kingdom have enacted or are considering enacting similar cross-border data transfer restrictions and laws requiring local data residency, which could increase the cost and complexity of delivering our services and operating our business.

The GDPR also provides for more robust regulatory enforcement and permits supervisory authorities to impose greater penalties for violations than under previous European data protection laws, including potential fines of up to €20 million or 4% of annual global revenues for the preceding financial year, whichever is greater. In addition to administrative fines, a wide variety of other potential enforcement powers are available to supervisory authorities in respect of potential and suspected violations of the GDPR, including extensive audit and inspection rights, and powers to order temporary or permanent bans on all or some processing of personal data carried out by noncompliant actors. The GDPR also confers a private right of action on data subjects and consumer associations to lodge complaints with supervisory authorities, seek judicial remedies and obtain compensation for damages resulting from violations of the GDPR. Compliance with the GDPR will be a rigorous and time-intensive process that may increase the cost of doing business or require companies to change their business practices to ensure full compliance. Additionally, the transposition of the EU GDPR into UK domestic law by way of the UK GDPR could expose us to two parallel regimes where the UK GDPR and EU GDPR both apply, each of which potentially authorizes similar fines and other potentially divergent enforcement actions for certain violations.

If we fail, or are perceived to have failed, to address or comply with the GDPR, in addition to regulatory enforcement action (including as described above), individuals or other relevant stakeholders could bring a variety of claims against us for our actual or perceived failure to comply. Any of these events could have a material adverse effect on our reputation, business, or financial condition, and could lead to a loss of actual or prospective customers, collaborators or partners; interrupt or stop clinical trials; result in an inability to process personal information or to operate in certain jurisdictions; limit our ability to develop or commercialize our products; or require us to revise or restructure our operations.

Coverage, pricing and reimbursement

Significant uncertainty exists as to the coverage and reimbursement status of any product candidates for which we may seek regulatory approval by the FDA or other government authorities. In the United States and markets in other countries, patients who are prescribed treatments for their conditions and providers performing the prescribed services generally rely on third-party payers to reimburse all or part of the associated healthcare costs. Patients are unlikely to use any product candidates we may develop unless coverage is provided and reimbursement is adequate to cover a significant portion of the cost of such product candidates. Even if any product candidates we may develop are approved, sales of such product candidates will depend, in part, on the extent to which third-party payers, including government health programs in the United States such as Medicare and Medicaid, commercial health insurers and managed care organizations, provide coverage and establish adequate reimbursement levels for, such product candidates. The process for determining whether a payer will provide coverage for a product may be separate from the process for setting the price or reimbursement rate that the payer will pay for the product once coverage is approved. Third-party payers are increasingly challenging the prices charged, examining the medical necessity, and reviewing the cost-effectiveness of medical products and services and imposing controls to manage costs. Third-party payers may limit coverage to specific products on an approved list, also known as a formulary, which might not include all of the approved products for a particular indication.

In order to secure coverage and reimbursement for any product that might be approved for sale, a company may need to conduct expensive pharmacoeconomic studies in order to demonstrate the medical necessity and cost-effectiveness of the product, in addition to the costs required to obtain FDA or other comparable marketing approvals. Nonetheless, product candidates may not be considered medically necessary or cost effective. A decision by a third-party payer not to cover any product candidates we may develop could reduce physician utilization of such product candidates once approved and have a material adverse effect on our sales, results of operations and financial condition. Additionally, a payer's decision to provide coverage for a product does not imply that an adequate reimbursement rate will be approved. Further, one payer's determination to provide coverage for a product does not assure that other payers will also provide coverage and reimbursement for the product, and the level of coverage and reimbursement can differ significantly from payer to payer. Third-party reimbursement and coverage may not be available to enable us to maintain price levels sufficient to realize an appropriate return on our investment in product development. In addition, any companion diagnostic tests require coverage and reimbursement separate and apart from the coverage and reimbursement for their companion pharmaceutical or biological products. Similar challenges to obtaining coverage and reimbursement, applicable to pharmaceutical or biological products, will apply to any companion diagnostics.

The containment of healthcare costs also has become a priority of federal, state and foreign governments and the prices of pharmaceuticals have been a focus in this effort. Governments have shown significant interest in implementing cost-containment programs, including price controls, restrictions on reimbursement and requirements for substitution of generic products. Adoption of price controls and cost-containment measures, and adoption of more restrictive policies in jurisdictions with existing controls and measures, could further limit a company's revenue generated from the sale of any approved products. Coverage policies and third-party reimbursement rates may change at any time. Even if favorable coverage and reimbursement status is attained for one or more products for which a company or its collaborators receive marketing approval, less favorable coverage policies and reimbursement rates may be implemented in the future.

If we obtain approval in the future to market in the United States any product candidates we may develop, we may be required to provide discounts or rebates under government healthcare programs or to certain government and private purchasers in order to obtain coverage under federal healthcare programs such as Medicaid. Participation in such programs may require us to track and report certain drug prices. We may be subject to fines and other penalties if we fail to report such prices accurately.

Outside the United States, ensuring adequate coverage and payment for any product candidates we may develop will face challenges. Pricing of prescription pharmaceuticals is subject to governmental control in many countries. Pricing negotiations with governmental authorities can extend well beyond the receipt of regulatory marketing approval for a product and may require us to conduct a clinical trial that compares the cost effectiveness of any product candidates we may develop to other available therapies. The conduct of such a clinical trial could be expensive and result in delays in our commercialization efforts.

In the European Union, pricing and reimbursement schemes vary widely from country to country. Some countries provide that products may be marketed only after a reimbursement price has been agreed. Some countries may require the completion of additional studies that compare the cost-effectiveness of a particular product candidate to currently available therapies (so called health technology assessments) in order to obtain reimbursement or pricing approval. For example, the European Union provides options for its member states to restrict the range of products for which their national health insurance systems provide reimbursement and to control the prices of medicinal products for human use. European Union member states may approve a specific price for a product or it may instead adopt a system of direct or indirect controls on the profitability of the company placing the product on the market. Other member states allow companies to fix their own prices for products but monitor and control prescription volumes and issue guidance to physicians to limit prescriptions. Recently, many countries in the European Union have increased the amount of discounts required on

pharmaceuticals and these efforts could continue as countries attempt to manage healthcare expenditures, especially in light of the severe fiscal and debt crises experienced by many countries in the European Union. The downward pressure on healthcare costs in general, particularly prescription products, has become intense. As a result, increasingly high barriers are being erected to the entry of new products. Political, economic and regulatory developments may further complicate pricing negotiations and pricing negotiations may continue after reimbursement has been obtained. Reference pricing used by various European Union member states, and parallel trade (arbitrage between low-priced and high-priced member states), can further reduce prices. There can be no assurance that any country that has price controls or reimbursement limitations for pharmaceutical products will allow favorable reimbursement and pricing arrangements for any of our products, if approved in those countries.

Healthcare law and regulation

Health care providers and third-party payors play a primary role in the recommendation and prescription of drug products that are granted marketing approval. Arrangements with providers, consultants, third-party payors and customers are subject to broadly applicable fraud and abuse, anti-kickback, false claims laws, patient privacy laws and regulations and other health care laws and regulations that may constrain business and/or financial arrangements.

Restrictions under applicable federal and state health care laws and regulations, include the federal Anti-Kickback Statute, which prohibits, among other things, persons and entities from knowingly and willfully soliciting, offering, paying, receiving or providing remuneration, directly or indirectly, in cash or in kind, to induce or reward either the referral of an individual for, or the purchase, order or recommendation of, any good or service, for which payment may be made, in whole or in part, under a federal health care program such as Medicare and Medicaid; the federal civil and criminal false claims laws, including the civil False Claims Act, and civil monetary penalties laws, which prohibit individuals or entities from, among other things, knowingly presenting, or causing to be presented, to the federal government, claims for payment that are false, fictitious or fraudulent or knowingly making, using or causing to made or used a false record or statement to avoid, decrease or conceal an obligation to pay money to the federal government; HIPAA, which created additional federal criminal statutes that prohibit, among other things, a person from knowingly and willfully executing, or attempting to execute, a scheme to defraud any healthcare benefit program, including private third-party payors and knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false, fictitious or fraudulent statement in connection with the delivery of or payment for healthcare benefits, items or services; the Foreign Corrupt Practices Act, or FCPA, which prohibits companies and their intermediaries from making, or offering or promising to make, improper payments to non-U.S. officials for the purpose of obtaining or retaining business or otherwise seeking favorable treatment; and the federal transparency requirements known as the federal Physician Payments Sunshine Act, which requires certain manufacturers of drugs, devices, biologics and medical supplies to report annually to the Centers for Medicare & Medicaid Services, or CMS, within the United States Department of Health and Human Services, information related to payments and other transfers of value made by that entity to physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors), and teaching hospitals, as well as ownership and investment interests held by physicians and their immediate family members, and, beginning in 2022, will require applicable manufacturers to report information regarding payments and other transfers of value provided during the previous year to physician assistants, nurse practitioners, clinical nurse specialists, certified registered nurse anesthetists, anesthesiologist assistants, and certified nurse midwives.

Further, some state laws require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government in addition to requiring manufacturers to report information related to payments to physicians and other health care providers or marketing expenditures. Additionally, some state and local laws require the registration of pharmaceutical sales representatives in the jurisdiction. State and foreign laws also govern the privacy and security of health information in some circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

Efforts to ensure that our business arrangements comply with applicable healthcare laws involve substantial costs. It is possible that governmental and enforcement authorities will conclude that our business practices do not comply with current or future statutes, regulations or case law interpreting applicable fraud and abuse or other healthcare laws and regulations. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, we may be subject to significant penalties, including administrative, civil and criminal penalties, damages, fines, exclusion from participation in United States federal or state health care programs, such as Medicare and Medicaid, disgorgement, imprisonment, integrity oversight and reporting obligations, and the curtailment or restructuring of our operations.

Healthcare reform

A primary trend in the U.S. healthcare industry and elsewhere is cost containment. There have been a number of federal and state proposals during the last few years regarding the pricing of pharmaceutical and biopharmaceutical products, limiting coverage and reimbursement for drugs and other medical products, government control and other changes to the healthcare system in the United States.

In March 2010, the United States Congress enacted the ACA, which, among other things, includes changes to the coverage and payment for drug products under government health care programs. Other legislative changes have been proposed and adopted since the ACA was enacted. In August 2011, the Budget Control Act of 2011, among other things, created measures for spending reductions by Congress. A Joint Select Committee on Deficit Reduction, tasked with recommending a targeted deficit reduction of at least $1.2 trillion for the years 2013 through 2021, was unable to reach required goals, thereby triggering the legislation's automatic reduction to several government programs. These changes included aggregate reductions to Medicare payments to providers of up to 2% per fiscal year, which went into effect in April 2013 and will remain in effect through 2030, with the exception of a temporary suspension from May 1, 2020 through December 31, 2021, unless additional Congressional action is taken. The American Taxpayer Relief Act of 2012, among other things, reduced Medicare payments to several providers and increased the statute of limitations period for the government to recover overpayments to providers from three to five years. These laws may result in additional reductions in Medicare and other healthcare funding and otherwise affect the prices we may obtain for any of our product candidates for which we may obtain regulatory approval or the frequency with which any such product candidate is prescribed or used.

Since enactment of the ACA, there have been, and continue to be, numerous legal challenges and Congressional actions to repeal and replace provisions of the law. For example, legislation enacted in 2017, informally titled the Tax Cuts and Jobs Act of 2017, repealed the "individual mandate." The repeal of this provision, which requires most Americans to carry a minimal level of health insurance, became effective in 2019. Further, on December 14, 2018, a U.S. District Court judge in the Northern District of Texas ruled that the individual mandate portion of the ACA is an essential and inseverable feature of the ACA, and therefore because the mandate was repealed as part of the Tax Cuts and Jobs Act, the remaining provisions of the ACA are invalid as well. On December 18, 2019, the Court of Appeals for the Fifth Circuit court affirmed the lower court's ruling that the individual mandate portion of the ACA is unconstitutional and it remanded the case to the district court for reconsideration of the severability question and additional analysis of the provisions of the ACA. Thereafter,

the U.S. Supreme Court agreed to hear this case. Oral argument in the case took place on November 10, 2020. On February 10, 2021, the Biden administration withdrew DOJ's support for this lawsuit. A ruling by the Court is expected sometime this year. Litigation and legislation over the ACA are likely to continue, with unpredictable and uncertain results.

The Trump administration also took executive actions to undermine or delay implementation of the ACA, including directing federal agencies with authorities and responsibilities under the ACA to waive, defer, grant exemptions from, or delay the implementation of any provision of the ACA that would impose a fiscal or regulatory burden on states, individuals, healthcare providers, health insurers, or manufacturers of pharmaceuticals or medical devices. On January 28, 2021, however, President Biden revoked those orders and issued a new Executive Order which directs federal agencies to reconsider rules and other policies that limit Americans' access to health care, and consider actions that will protect and strengthen that access. Under this Order, federal agencies are directed to re-examine: policies that undermine protections for people with pre-existing conditions, including complications related to COVID-19; demonstrations and waivers under Medicaid and the ACA that may reduce coverage or undermine the programs, including work requirements; policies that undermine the Health Insurance Marketplace or other markets for health insurance; policies that make it more difficult to enroll in Medicaid and the ACA; and policies that reduce affordability of coverage or financial assistance, including for dependents.

The costs of prescription pharmaceuticals have also been the subject of considerable discussion in the United States. To date, there have been several recent U.S. Congressional inquiries, as well as proposed and enacted state and federal legislation designed to, among other things, bring more transparency to drug pricing, review the relationship between pricing and manufacturer patient programs, reduce the costs of drugs under Medicare and reform government program reimbursement methodologies for drug products. To those ends, President Trump issued seven executive orders intended to lower the costs of prescription drug products but it is unclear whether, and to what extent, these orders will remain in force under the Biden administration. Further, on September 24, 2020, the Trump administration finalized a rule allowing states or certain other non-federal government entities to submit importation program proposals to the FDA for review and approval. Applicants are required to demonstrate that their importation plans pose no additional risk to public health and safety and will result in significant cost savings for consumers. The FDA has issued draft guidance that would allow manufacturers to import their own FDA-approved drugs that are authorized for sale in other countries (multi-market approved products).

At the state level, individual states are increasingly aggressive in passing legislation and implementing regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing. In addition, regional health care organizations and individual hospitals are increasingly using bidding procedures to determine what pharmaceutical products and which suppliers will be included in their prescription drug and other health care programs. These measures could reduce the ultimate demand for our products, once approved, or put pressure on our product pricing. We expect that additional state and federal healthcare reform measures will be adopted in the future, any of which could limit the amounts that federal and state governments will pay for healthcare products and services, which could result in reduced demand for our product candidates or additional pricing pressures. It is also possible that additional governmental action will be taken in response to the COVID-19 pandemic.

Employees and human capital resources

As of March 31, 2021, we had 56 full-time employees, including 25 employees with M.D., Pharm.D. or Ph.D. degrees. Of these full-time employees, 46 are engaged in research and development activities and 10 are engaged in general and administrative activities. None of our employees is represented by a labor union or covered by a collective bargaining agreement. We consider our relationship with our employees to be good.

Our human capital resources objectives include, as applicable, identifying, recruiting, retaining, incentivizing and integrating our existing and additional employees. The principal purposes of our equity incentive plans are to attract, retain and motivate selected employees, consultants and directors through the granting of stock-based compensation awards.

Properties and facilities

We occupy 19,823 square feet of office and laboratory space in Cambridge, Massachusetts under a sublease that expires in August 2022 with an option to extend for an additional three months. We believe that our facilities are sufficient to meet our current needs and that suitable additional space will be available as and when needed.

Legal proceedings

We are currently not a party to any material legal proceedings.

Management

Executive officers and directors

The following table sets forth the name, age as of March 31, 2021 and position of each of our executive officers and directors.

Name	Age	Position
Executive officers		
Sekar Kathiresan, M.D.	49	Chief Executive Officer, Director
Andrew Ashe, J.D.	54	President and Chief Operating Officer
Andrew Bellinger, M.D., Ph.D.	43	Chief Scientific Officer
Non-employee directors		
Burt Adelman, M.D.	68	Chairman of the Board of Directors
John Evans	43	Director
Anthony Philippakis, M.D., Ph.D.	45	Director
Krishna Yeshwant, M.D.	42	Director

(1) Member of the Audit Committee.

(2) Member of the Compensation Committee.

(3) Member of the Nominating and Corporate Governance Committee.

Executive officers

Sekar Kathiresan, M.D. has served as our chief executive officer since July 2019. Prior to joining our company, Dr. Kathiresan was a cardiologist at Massachusetts General Hospital (MGH) from July 1997 to July 2019. Dr. Kathiresan served as director of the MGH Center for Genomic Medicine from April 2016 to June 2019 and was the Ofer and Shelly Nemirovsky MGH Research Scholar from 2013 to 2018. He also served as director of the Cardiovascular Disease Initiative at The Broad Institute from 2014 to June 2019 and was professor of medicine at Harvard Medical School from June 2018 to June 2019. Dr. Kathiresan holds a B.A. in history from the University of Pennsylvania and an M.D. from Harvard Medical School. He completed his clinical training in internal medicine and cardiology at MGH and his postdoctoral research training in human genetics at the Framingham Heart Study and The Broad Institute. We believe that Dr. Kathiresan's leadership, experience in the life sciences industry and his extensive knowledge of our company based on his current role as our chief executive officer qualify him to serve on our board of directors.

Andrew Ashe, J.D. has served as our president and chief operating officer since August 2018. Prior to joining our company, Mr. Ashe served as general counsel of Applied Genetic Technologies Corporation, a biotechnology company, from August 2017 to August 2018. Mr. Ashe was a consultant for Shire plc, or Shire, a pharmaceutical company, following Shire's acquisition of Dyax Corporation, or Dyax, a commercial-stage biotechnology company, from January 2016 until September 2016. He served in various roles at Dyax from June 2003 until its acquisition by Shire in January 2016, including general counsel and executive vice president, operations and administration from January 2013 to January 2016, general counsel and senior vice president, administration from January 2007 to January 2013 and associate general counsel from June 2003 to December 2006. Earlier in his career, Mr. Ashe served as a trading specialist and senior analyst at the American and New York Stock Exchanges. Mr. Ashe's expertise includes legal affairs as well as financial and operations management. Mr. Ashe

holds a B.B.A. in finance from the Isenberg School of Management at the University of Massachusetts, Amherst and a J.D. from The George Washington University Law School.

Andrew Bellinger, M.D., Ph.D. has served as our chief scientific officer since October 2019. Dr. Bellinger has been a cardiologist at Brigham and Women's Hospital since August 2015 and is board-certified in cardiovascular medicine and internal medicine. Dr. Bellinger previously served as chief scientific officer of Lyndra Therapeutics, Inc., a clinical-stage biotechnology company, which he co-founded, from July 2015 to September 2019. Prior to Lyndra, Dr. Bellinger served as chief scientific officer of Cocoon Biotech, Inc., a biotechnology company, from February 2014 to February 2015. Dr. Bellinger has served on the board of directors of Corner Therapeutics, Inc., a biotechnology company that he co-founded, since September 2019. Dr. Bellinger's scientific expertise includes translational medicine, drug delivery, biomedical engineering and clinical strategy. Dr. Bellinger holds an A.B. in physics from Princeton University, an M.S. in mathematics from New York University and an M.D. and Ph.D. from Columbia University.

Non-employee directors

Burt Adelman, M.D. has served on our board of directors since February 2018. Dr. Adelman has served as a senior advisor at Novo Ventures US Inc., a venture capital firm, since September 2017. Previously, Dr. Adelman was executive vice president, research and development and chief medical officer of Dyax from February 2012 until its acquisition by Shire plc in January 2016. Prior to joining Dyax, he worked at Sesen Bio, Inc. (formerly known as Eleven Biotherapeutics Inc.), a biotechnology company, where he served as interim president of research and development from 2010 to 2011 and as senior advisor from February 2011 until December 2011. From 1991 to 2007, Dr. Adelman held positions of increasing responsibility at Biogen Inc., a global biotechnology company, ultimately as executive vice president, portfolio strategy. From 1998 through 2020, Dr. Adelman served as a lecturer in medicine at Harvard Medical School and as an associate physician at Brigham and Women's Hospital. Dr. Adelman previously served on the board of directors of Catabasis Pharmaceuticals, Inc., a pharmaceuticals company, from April 2016 to January 2021. Dr. Adelman holds a B.S. in biology from Trinity College and an M.D. from Cornell Medical College. He completed residency training and a hematology fellowship at the Peter Bent Brigham Hospital. We believe that Dr. Adelman is qualified to serve on our board of directors because of his broad experience in drug development and his depth of knowledge of our company based on his role as a co-founder.

John Evans has served on our board of directors since August 2018. Mr. Evans has served as chief executive officer of Beam Therapeutics Inc., a biotechnology company, since January 2018 and served as the interim chief executive officer from April 2017 to January 2018. Mr. Evans has also served as a venture partner with ARCH Venture Partners, a venture capital firm, since April 2017. Mr. Evans was previously employed at Agios Pharmaceuticals, Inc., a biopharmaceutical company, from September 2009 to March 2017, most recently serving as senior vice president for corporate development and portfolio leadership. At Agios, Mr. Evans also served as IDH portfolio executive. Prior to joining Agios, Mr. Evans worked at Infinity Pharmaceuticals, Inc., a biopharmaceutical company, McKinsey & Company Inc.'s pharmaceuticals practice and MedImmune, LLC, the global biologics research and development arm of AstraZeneca plc, a biopharmaceutical company. Mr. Evans also serves on the board of directors of Beam Therapeutics Inc. Mr. Evans holds a B.A. in English from Yale University, an M.S. in biotechnology from the University of Pennsylvania and an M.B.A. in healthcare management from the Wharton School of the University of Pennsylvania. We believe Mr. Evans is qualified to serve on our board of directors because of his extensive experience in the pharmaceutical industry.

Anthony Philippakis, M.D., Ph.D. has served on our board of directors since August 2018. Dr. Philippakis has been a venture partner at GV (formerly known as Google Ventures), a venture capital firm, since 2012. He has served as the chief data officer at The Broad Institute since July 2015. Dr. Philippakis studied mathematics as an undergraduate at Yale University and received a master's degree in mathematics at Cambridge University. He

received an M.D. from Harvard Medical School and a Ph.D. in biophysics from Harvard University. Dr. Philippakis completed his medical residency and cardiology fellowship at Brigham and Women's Hospital. We believe Dr. Philippakis is qualified to serve on our board of directors because of his experience as an investor in biopharmaceutical and life sciences companies, medical and scientific background and training and other experience in the life sciences industry.

Krishna Yeshwant, M.D. has served on our board of directors since August 2018. Dr. Yeshwant has served as a managing partner at GV since June 2009 and has been working with GV since June 2008. Dr. Yeshwant has also been employed by Partners Healthcare, a not-for-profit health care system, as an Internal Medicine physician at Brigham and Women's Hospital since 2009. Before joining GV, Dr. Yeshwant founded Stanford Students Consulting, an electronic data interchange company that was acquired by The Hewlett-Packard Company in 2000. In 2000, he founded Recourse Technologies, Inc., a network security company that was acquired by Symantec Corporation in 2002. Dr. Yeshwant previously served on the board of directors of Foundation Medicine, Inc., a molecular information company, from 2011 to July 2018. Dr. Yeshwant received a B.S. in computer science from Stanford University, an M.D. from Harvard Medical School and an M.B.A. from Harvard Business School. We believe Dr. Yeshwant is qualified to serve on our board of directors because of his medical experience as a physician, his experience working with and serving on the boards of directors of life sciences companies and his experience working in the venture capital industry.

Board composition and election of directors

Board composition

Our board of directors currently consists of six members. Our directors hold office until their successors have been elected and qualified or until the earlier of their death, resignation or removal.

Our certificate of incorporation and bylaws that will become effective upon the closing of this offering provide that the authorized number of directors may be changed only by resolution of our board of directors. Our certificate of incorporation and bylaws will also provide that our directors may be removed only for cause by the affirmative vote of the holders of 75% of our shares of capital stock present in person or by proxy and entitled to vote, and that any vacancy on our board of directors, including a vacancy resulting from an enlargement of our board of directors, may be filled only by vote of a majority of our directors then in office.

In accordance with the terms of our certificate of incorporation and bylaws that will become effective upon the closing of this offering, our board of directors will be divided into three classes, class I, class II and class III, with members of each class serving staggered three-year terms. As a result, only one class of directors will be elected at each annual meeting of our stockholders, with the other classes continuing for the remainder of their respective three-year terms. Upon the closing of this offering, the members of the classes will be divided as follows:

- the class I directors will be and , and their term will expire at the annual meeting of stockholders to be held in 2022;
- the class II directors will and , and their term will expire at the annual meeting of stockholders to be held in 2023; and
- the class III directors will be and , and their term will expire at the annual meeting of stockholders to be held in 2024.

Upon the expiration of the term of a class of directors, directors in that class will be eligible to be elected for a new three-year term at the annual meeting of stockholders in the year in which their term expires.

The classification of our board of directors may have the effect of delaying or preventing changes in our control or management. See "Description of capital stock—Delaware anti-takeover law and certain charter and bylaw provisions."

Director independence

Applicable Nasdaq rules require a majority of a listed company's board of directors to be comprised of independent directors within one year of listing. In addition, Nasdaq rules require that, subject to specified exceptions, each member of a listed company's audit, compensation and nominating and corporate governance committees be independent under the Securities Exchange Act of 1934, as amended, or the Exchange Act. Audit committee members must also satisfy the independence criteria set forth in Rule 10A-3 under the Exchange Act and compensation committee members must also satisfy the independence criteria set forth in Rule 10C-1 under the Exchange Act. Under applicable Nasdaq rules, a director will only qualify as an "independent director" if, in the opinion of the listed company's board of directors, that person does not have a relationship that would interfere with the exercise of independent judgment in carrying out the responsibilities of a director. In order to be considered independent for purposes of Rule 10A-3, a member of an audit committee of a listed company may not, other than in his or her capacity as a member of the audit committee, the board of directors or any other board committee, accept, directly or indirectly, any consulting, advisory or other compensatory fee from the listed company or any of its subsidiaries or otherwise be an affiliated person of the listed company or any of its subsidiaries. In order to be considered independent for purposes of Rule 10C-1, the board must consider, for each member of a compensation committee of a listed company, all factors specifically relevant to determining whether a director has a relationship to such company which is material to that director's ability to be independent from management in connection with the duties of a compensation committee member, including, but not limited to: (1) the source of compensation of the director, including any consulting advisory or other compensatory fee paid by such company to the director; and (2) whether the director is affiliated with the company or any of its subsidiaries or affiliates.

In 2021, our board of directors undertook a review of the composition of our board of directors and its committees and the independence of each director. Based upon information requested from and provided by each director concerning his or her background, employment and affiliations, including family relationships, our board of directors has determined that each of our directors, with the exception of Dr. Kathiresan, is an "independent director" as defined under applicable Nasdaq rules, including, in the case of all the members of our audit committee, the independence criteria set forth in Rule 10A-3 under the Exchange Act, and in the case of all the members of our compensation committee, the independence criteria set forth in Rule 10C-1 under the Exchange Act. In making such determination, our board of directors considered the relationships that each such non-employee director has with our company and all other facts and circumstances that our board of directors deemed relevant in determining his or her independence, including the beneficial ownership of our capital stock by each non-employee director. Dr. Kathiresan is not an independent director under these rules because he is our chief executive officer.

There are no family relationships among any of our directors or executive officers.

Board committees

Our board of directors has established an audit committee, a compensation committee and a nominating and corporate governance committee, each of which will operate under a charter to be adopted by our board of directors. The composition of each committee will be effective as of the date of this prospectus.

Audit committee

The members of our audit committee are , and . is the chair of the audit committee. Effective at the time of this offering, our audit committee's responsibilities will include:

- appointing, approving the compensation of, and assessing the independence of our registered public accounting firm;
- overseeing the work of our independent registered public accounting firm, including through the receipt and consideration of reports from that firm;
- reviewing and discussing with management and our independent registered public accounting firm our annual and quarterly financial statements and related disclosures;
- monitoring our internal control over financial reporting, disclosure controls and procedures and code of business conduct and ethics;
- overseeing our internal audit function;
- overseeing our risk assessment and risk management policies;
- establishing policies regarding hiring employees from our independent registered public accounting firm and procedures for the receipt and retention of accounting-related complaints and concerns;
- meeting independently with our internal auditing staff, if any, our independent registered public accounting firm and management;
- reviewing and approving or ratifying any related person transactions; and
- preparing the audit committee report required by Securities and Exchange Commission, or SEC, rules.

All audit and non-audit services, other than *de minimis* non-audit services, to be provided to us by our independent registered public accounting firm must be approved in advance by our audit committee.

Our board of directors has determined that is an "audit committee financial expert" as defined in applicable SEC rules and that each of the members of our audit committee possesses the financial sophistication required for audit committee members under Nasdaq rules. We believe that the composition of our audit committee will meet the requirements for independence under current Nasdaq and SEC rules and regulations.

Compensation committee

The members of our compensation committee are , and . is the chair of the compensation committee. Effective at the time of this offering, our compensation committee's responsibilities will include:

- reviewing and approving, or making recommendations to our board of directors with respect to, the compensation of our chief executive officer and our other executive officers;
- overseeing an evaluation of our senior executives;
- overseeing and administering our cash and equity incentive plans;
- reviewing and making recommendations to our board of directors with respect to director compensation;

- reviewing and discussing annually with management our “Compensation Discussion and Analysis” disclosure if and to the extent then required by SEC rules; and
- preparing the compensation committee report if and to the extent then required by SEC rules.

We believe that the composition of our compensation committee will meet the requirements for independence under current Nasdaq and SEC rules and regulations.

Nominating and corporate governance committee

The members of our nominating and corporate governance committee are , and . is the chair of the nominating and corporate governance committee. Effective at the time of this offering, our nominating and corporate governance committee’s responsibilities will include:

- recommending to our board of directors the persons to be nominated for election as directors and to each of our board’s committees;
- reviewing and making recommendations to our board with respect to our board leadership structure;
- reviewing and making recommendations to our board with respect to management succession planning;
- developing and recommending to our board of directors corporate governance principles; and
- overseeing a periodic evaluation of our board of directors.

We believe that the composition of our nominating and corporate governance committee will meet the requirements for independence under current Nasdaq and SEC rules and regulations.

Compensation committee interlocks and insider participation

None of our executive officers serves as a member of the board of directors or compensation committee, or other committee serving an equivalent function, of any other entity that has one or more of its executive officers serving as a member of our board of directors or our compensation committee. None of the members of our compensation committee is, or has ever been, an officer or employee of our company.

Code of business conduct and ethics

We intend to adopt a written code of business conduct and ethics that applies to our directors, officers and employees, including our principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions. We intend to post a current copy of the code on our website, www.vervetx.com. In addition, we intend to post on our website all disclosures that are required by law or Nasdaq listing standards concerning any amendments to, or waivers from, any provision of the code.

Executive compensation

The following discussion relates to the compensation of Sekar Kathiresan, M.D., our chief executive officer, Andrew Bellinger, M.D., Ph.D., our chief scientific officer, and Andrew Ashe, J.D., our president and chief operating officer. Dr. Kathiresan, Mr. Ashe and Dr. Bellinger are collectively referred to in this prospectus as our named executive officers.

In preparing to become a public company, we have begun a thorough review of all elements of our executive compensation program, including the function and design of our equity incentive programs. We have begun, and expect to continue in the coming months, to evaluate the need for revisions to our executive compensation program to ensure that our program is competitive with the companies with which we compete for executive talent and is appropriate for a public company. This discussion may contain forward-looking statements that are based on our current plans, considerations, expectations and determinations regarding future compensation programs.

Summary compensation table

The following table sets forth information regarding compensation awarded to, earned by or paid to each of our named executive officers for the year ended December 31, 2020.

Name and principal position	Year	Salary($)	Bonus($)(1)	Option awards ($)(2)	All other compensation($)	Total($)
Sekar Kathiresan, M.D. *Chief Executive Officer*	2020	480,000	230,400	1,687,500	11,592(3)	2,409,492
Andrew Bellinger, M.D., Ph.D. *Chief Scientific Officer*	2020	350,000	126,000	540,000	11,592(3)	1,027,592
Andrew Ashe, J.D. *President and Chief Operating Officer*	2020	375,000	157,500	410,295	192(4)	942,987

(1) Except where noted otherwise, the amounts reported in the “Bonus” column reflect discretionary annual cash bonuses paid to our executive officers for their performance.

(2) The amounts reported in the “Option awards” column reflect the aggregate fair value of stock options awarded during the year computed in accordance with the provisions of Financial Accounting Standards Board, or FASB, Accounting Standards Codification, or ASC, Topic 718. See Note 12 to our consolidated financial statements appearing elsewhere in this prospectus regarding assumptions underlying the valuation of equity awards.

(3) Consists of $11,400 in 401(k) plan matching contributions and $192 in health and life insurance premiums.

(4) Consists of health and life insurance premiums.

Narrative to summary compensation table

Base salary. In 2020, we paid Dr. Kathiresan a base salary of $480,000, Dr. Bellinger a base salary of $350,000 and Mr. Ashe a base salary of $375,000.

We use base salaries to recognize the experience, skills, knowledge and responsibilities required of all our employees, including our named executive officers. None of our named executive officers is currently party to an employment agreement or other agreement or arrangement that provides for automatic or scheduled increases in base salary.

Annual bonus. Our board of directors may, in its discretion, award bonuses to our named executive officers from time to time. Our letter agreements with our named executive officers provide that they will be eligible for

annual performance-based bonuses up to a specified percentage of their salary (40% for Dr. Kathiresan, 30% for Dr. Bellinger and 35% for Mr. Ashe), subject to approval by our board of directors. Performance-based bonuses, which are calculated as a percentage of base salary, are designed to motivate our employees to achieve annual goals based on our strategic, financial and operating performance objectives. From time to time, our board of directors has approved discretionary annual cash bonuses to our named executive officers with respect to their prior year performance. The bonus for Dr. Kathiresean was guaranteed for the period beginning on his employment commencement date and ending on the one-year anniversary of July 24, 2019.

With respect to 2020, our board of directors awarded bonuses of $230,400, $126,000 and $157,500 to Dr. Kathiresan, Dr. Bellinger and Mr. Ashe, respectively.

Equity incentives. Although we do not have a formal policy with respect to the grant of equity incentive awards to our executive officers, or any formal equity ownership guidelines applicable to them, we believe that equity grants provide our executives with a strong link to our long-term performance, create an ownership culture and help to align the interests of our executives and our stockholders. In addition, we believe that equity grants with a time-based vesting feature promote executive retention because this feature incents our executive officers to remain in our employment during the vesting period. Accordingly, our board of directors periodically reviews the equity incentive compensation of our named executive officers and from time to time may grant equity incentive awards to them in the form of stock options.

In September 2020, we granted options to purchase 6,250,000, 2,000,000, and 1,519,611 shares of our common stock to Dr. Kathiresan, Dr. Bellinger and Mr. Ashe, respectively, at an exercise price per share of $0.31. These options vest as to 25% of the shares underlying the option on the first anniversary of the vesting commencement date and as to an additional 2.0833% of the original number of shares underlying the option monthly thereafter, subject to continued service.

Prior to this offering, our executive officers were eligible to participate in our 2018 Equity Incentive Plan, as amended, or the 2018 Plan. All stock options were granted pursuant to the 2018 Plan. We did not grant any restricted stock awards during 2020. Following this offering, our employees and executive officers will be eligible to receive stock options and other equity awards pursuant to our 2021 Stock Incentive Plan, or the 2021 Plan.

We have used stock options to compensate our executive officers in the form of initial grants in connection with the commencement of employment. Prior to this offering, awards of stock options and restricted stock to our executive officers have been made by our board of directors. The options and restricted stock that we have granted to our executive officers are typically subject to time-based vesting, generally over four years following the vesting commencement date. Upon certain terminations of employment in connection with a change of control, vesting is fully accelerated; upon other involuntary terminations, 25% of the unvested portion of each grant will vest as of the date of the termination. Prior to the exercise of a stock option, the holder has no rights as a stockholder with respect to the shares subject to such option, including no voting rights and no right to receive dividends or dividend equivalents.

We have historically awarded stock options with exercise prices that are equal to the fair market value of our common stock on the date of grant as determined by our board of directors.

Outstanding equity awards at December 31, 2020

The following table sets forth information regarding all outstanding equity awards for each of our named executive officers as of December 31, 2020.

	Option Awards				Stock Awards	
Name	Number of securities underlying unexercised options (#) exercisable	Number of securities underlying unexercised options (#) unexercisable	Option exercise price ($)	Option expiration date	Number of shares of stock that have not vested (#)	Market value of shares of stock that have not vested ($)(1)
Sekar Kathiresan, M.D.	1,593,750	2,906,250(2)	$ 0.15	4/14/2029	1,185,292(3)	
	—	1,750,000(4)	$ 0.15	4/14/2029		
	—	6,250,000(5)	$ 0.31	9/15/2030		
Andrew Bellinger, M.D., Ph.D.	200,000	—(6)	$ 0.15	6/24/2029		
	116,666	283,334(7)	$ 0.16	9/16/2029		
	437,500	1,062,500(8)	$ 0.16	9/16/2029		
	—	2,000,000(9)	$ 0.31	9/15/2030		
Andrew Ashe, J.D.	987,743	592,646(10)	$ 0.15	11/7/2028		
	354,166	645,834(11)	$ 0.16	9/16/2029		
	—	1,519,611(12)	$ 0.31	9/15/2030		

(1) The market value of our common stock is based on an assumed initial public offering price of $ per share, which is the midpoint of the price range set forth on the cover page of this prospectus.

(2) This option to purchase 4,500,000 shares of our common stock vests over four years, with 25% of the shares having vested on July 22, 2020 and 2.0833% of the original number of shares vesting thereafter in equal monthly installments through July 22, 2023, subject to continued service.

(3) This restricted stock award for 4,741,167 shares vests over four years, in equal monthly installments through December 31, 2021, subject to continued service.

(4) This option to purchase 1,750,000 shares of our common stock vests over four years, with 25% of the shares vested on March 25, 2021 and 2.0833% of the original number of shares vesting thereafter in equal monthly installments through March 25, 2024, subject to continued service.

(5) This option to purchase 6,250,000 shares of our common stock vests over four years, with 25% of the shares vesting on September 16, 2021 and 2.0833% of the original number of shares vesting thereafter in equal monthly installments through September 16, 2024, subject to continued service.

(6) This option to purchase 200,000 shares of our common stock was fully vested as of May 1, 2020.

(7) This option to purchase 400,000 shares of our common stock vests over four years, with 25% of the shares having vested on October 1, 2020 and 2.0833% of the original number of shares vesting thereafter in equal monthly installments through October 1, 2023, subject to continued service.

(8) This option to purchase 1,500,000 shares of our common stock vests over four years, in equal monthly installments, through October 1, 2023, subject to continued service.

(9) This option to purchase 2,000,000 shares of our common stock vests over four years, with 25% of the shares vested on September 16, 2021 and 2.0833% of the original number of shares vesting thereafter in equal monthly installments through September 16, 2024, subject to continued service.

(10) This option to purchase 1,580,389 shares of our common stock vests over four years, with 10% of the shares having vested on August 20, 2018 and 1.875% of the original number of shares vesting thereafter in equal monthly installments through August 20, 2022, subject to continued service.

(11) This option to purchase 1,000,000 shares of our common stock vests over four years, in equal monthly installments, through July 26, 2023, subject to continued service.

(12) This option to purchase 1,519,611 shares of our common stock vests over four years, with 25% of the shares vesting on September 16, 2021 and 2.0833% of the original number of shares vesting thereafter in equal monthly installments through September 16, 2024, subject to continued service.

Employment agreements

Letter agreement with Sekar Kathiresan, M.D.

In connection with our initial hiring of Dr. Kathiresan as our chief executive officer, we entered into a letter agreement with him dated April 16, 2019. Dr. Kathiresan is an at-will employee, and his employment with us can

be terminated by him or us at any time and for any reason. The letter agreement provides that Dr. Kathiresan is entitled to an annualized base salary of $480,000, subject to adjustment in accordance with normal business practices and at our sole discretion, during his employment with us and that he is eligible, at our sole discretion, to earn an annual bonus targeted at 40% of his base salary. The foregoing notwithstanding, such bonus was guaranteed for the period beginning on his employment commencement date (July 24, 2019) and ending on the one-year anniversary thereof. Dr. Kathiresan's letter agreement also provided that he was entitled to the grant of an option to purchase 4,500,000 shares, subject to a four-year vesting schedule, which option was granted in April 2019, and to an additional grant of an option to purchase 1,750,000 shares, subject to a four-year vesting schedule and conditioned on completion of our Series A financing, which option was granted in April 2019.

Under the letter agreement, Dr. Kathiresan is entitled, subject to his execution and nonrevocation of a release of claims in our favor, in the event of the termination of his employment by us without cause or by him for good reason, each as defined in his letter agreement with us, to (i) a lump sum payment equal to his full annual base salary and target bonus, (ii) our continuing to pay, for a period of 12 months, the share of the premiums for COBRA continuation coverage that we pay for active and similarly situated employees who receive the same type of coverage, provided he is eligible for and elects COBRA coverage and (iii) one year of additional vesting of any outstanding equity awards. The letter agreement also provides that in the event of a change in control, as defined in his letter agreement with us, all equity awards granted to Dr. Kathiresan shall vest in full.

Letter agreement with Andrew Bellinger, M.D., Ph.D.

In connection with our initial hiring of Dr. Bellinger as our chief scientific officer, we entered into a letter agreement with him dated July 26, 2019. Dr. Bellinger is an at-will employee, and his employment with us can be terminated by him or us at any time and for any reason. The letter agreement provides that Dr. Bellinger is entitled to an annualized base salary of $350,000, subject to adjustment in accordance with normal business practices and at our sole discretion, during his employment with us and that he is eligible, at our sole discretion, to earn an annual bonus targeted at 30% of his base salary. Dr. Bellinger's letter agreement also provided that he was entitled to the grant of an option to purchase 1,500,000 shares, subject to a four-year vesting schedule, which option was granted in September 2019, and to an additional grant of an option to purchase 400,000 shares, subject to a four-year vesting schedule, which option was granted in September 2019.

Under the letter agreement, Dr. Bellinger is entitled, subject to his execution and nonrevocation of a release of claims in our favor, in the event of the termination of his employment by us without cause or by him for good reason, each as defined in his letter agreement with us, to (i) a lump sum payment equal to two-thirds of his annual base salary and target bonus, (ii) our continuing to pay, for a period of nine months, the share of the premiums for COBRA continuation coverage that we pay for active and similarly situated employees who receive the same type of coverage, provided he is eligible for and elects COBRA coverage and (iii) nine months of additional vesting of any outstanding equity awards (but only if a stock option had commenced vesting (that is, had reached at least its first scheduled vesting date) on or prior to such termination date). The letter agreement also provides that in the event of a change in control, as defined in his letter agreement with us, all equity awards granted to Dr. Bellinger shall vest in full.

Letter agreement with Andrew Ashe, J.D.

On July 26, 2019, we entered into a letter agreement with Mr. Ashe. Mr. Ashe is an at-will employee, and his employment with us can be terminated by him or us at any time and for any reason. The letter agreement provides that Mr. Ashe is entitled to an annualized base salary of $375,000, subject to adjustment in accordance with normal business practices and at our sole discretion, during his employment with us and that

he is eligible, at our sole discretion, to earn an annual bonus targeted at 35% of his base salary. Mr. Ashe's letter agreement also provided that he was entitled to the grant of an option to purchase 1,000,000 shares, subject to a four-year vesting schedule, which option was granted in September 2019.

Under the letter agreement, Mr. Ashe is entitled, subject to his execution and nonrevocation of a release of claims in our favor, in the event of the termination of his employment by us without cause or by him for good reason, each as defined in his letter agreement with us, to (i) a lump sum payment equal to his full annual base salary and target bonus, (ii) our continuing to pay, for a period of 12 months, the share of the premiums for COBRA continuation coverage that we pay for active and similarly situated employees who receive the same type of coverage, provided he is eligible for and elects COBRA coverage and (iii) one year of additional vesting of any outstanding equity awards (but only if a stock option had commenced vesting (that is, had reached at least its first scheduled vesting date) on or prior to such termination date). The letter agreement also provides that in the event of a change in control, as defined in his letter agreement with us, all equity awards granted to Mr. Ashe shall vest in full.

Employee non-competition, non-solicitation, confidentiality and assignment of inventions agreements

Each of our named executive officers has entered into a standard form agreement with respect to non-competition, non-solicitation, confidential information and assignment of inventions. Under this agreement, each of our named executive officers has agreed not to compete with us during his employment and for a period of one year after the termination of his employment, not to solicit our employees, consultants, customers, business or prospective customers during his employment and for a period of one year after the termination of his employment, and to protect our confidential and proprietary information indefinitely. In addition, under this agreement, each named executive officer has agreed that we own all inventions that are developed by such executive officer during his employment with us that (i) are related to our business or our customers or suppliers or any of our products or services being researched, developed, manufactured or sold by us or which may be used with such products or services, (ii) result from tasks assigned to the executive officer by us or (iii) result from the use of our premises or personal property (whether tangible or intangible) owned, leased or contracted for by us.

Incentive shares and stock option and other compensation plans

In this section we describe our 2018 Plan, our 2021 Plan and our 2021 Employee Stock Purchase Plan, or the 2021 ESPP. Prior to this offering, we granted awards to eligible participants under the 2018 Plan. Following the effectiveness of the 2021 Plan, no additional awards will be granted under the 2018 Plan and we expect to grant awards to eligible participants from time to time only under the 2021 Plan.

2018 Equity incentive plan

Our 2018 Plan was initially approved by our board of directors and stockholders on August 6, 2018 and subsequently amended on April 10, 2020 and January 13, 2021, solely to increase the number of shares available for issuance under the 2018 Plan. Our 2018 Plan allows us to provide incentive stock options, within the meaning of Section 422 of the U.S. Internal Revenue Code of 1986, as amended, which we refer to as the Code, nonstatutory stock options, stock appreciation rights, restricted stock awards and restricted stock units, each of which we refer to as an award and the recipient of such award, a participant. Eligible employees, directors and consultants, including employees and consultants of any of our parent or subsidiary companies, are eligible to receive awards under the 2018 Plan; however, incentive stock options may only be granted to our or our subsidiaries' employees.

Subject to adjustment in the event of certain changes in our capitalization (as described below), the maximum number of shares of common stock authorized for issuance under our 2018 Plan is 63,757,710 shares, all of

which may be issued as incentive stock options. As of March 31, 2021, stock options to purchase 48,043,456 shares of our common stock were outstanding under our 2018 Plan and there were no stock appreciation rights, restricted stock awards or restricted stock units outstanding under our 2018 Plan. No further awards will be made under the 2018 Plan on or after the effective date of the 2021 Plan described below; however, awards outstanding under the 2018 Plan will continue to be governed by their existing terms.

Different committees may administer our 2018 Plan with respect to different groups of service providers. Otherwise, the 2018 Plan is administered by our board of directors or by a committee of our board of directors or of other individuals satisfying applicable laws appointed by the board or by a duly authorized compensation committee of the board. Subject to the provisions of the 2018 Plan, and in the case of a committee, subject to the specific duties delegated by our board of directors to the committee, the administrator of the 2018 Plan has the authority to construe and interpret the terms of our 2018 Plan and the awards granted under our 2018 Plan, prescribe, amend and rescind rules and regulations relating to our 2018 Plan, including rules and regulations relating to sub-plans established for the purpose of satisfying applicable foreign laws or for qualifying for favorable tax treatment under applicable foreign laws, and make all other determinations deemed necessary or advisable for administering the 2018 Plan. The administrator's decisions, determinations and interpretations are final and binding on all participants and any other persons holding awards.

The administrator of the 2018 Plan selects the recipients of awards and, among other things, determines:

- the number of shares of our common stock covered by each award granted under the 2018 Plan;
- the terms and conditions, not inconsistent with the terms of the 2018 Plan, of any award granted under the 2018 Plan, which terms and conditions include, but are not limited to, the exercise price, which, in the case of options, may not be less than the fair market value of a share of common stock on the date of grant, the time or times when awards may be exercised (which may be based on performance criteria), any vesting acceleration or waiver of forfeiture restrictions, and any restriction or limitation regarding an award or the shares of common stock relating to the award, based in each case on the factors the administrator determines;
- the duration of options, which may not be in excess of ten years; and
- the forms of consideration for exercising options, including the method of payment.

Unless determined otherwise by the administrator, awards may not be sold, pledged, assigned, hypothecated or otherwise transferred in any manner other than by will or by the laws of descent and distribution. In addition, during an applicable participant's lifetime, only that participant may exercise his or her award. If the administrator makes an award transferable, such award may only be transferred (i) by will, (ii) by the laws of descent and distribution or (iii) as permitted by Rule 701 of the Securities Act of 1933, as amended, or the Securities Act.

Certain adjustments

If there is a dividend or other distribution (whether in the form of cash, shares of our common stock, other securities or other property), recapitalization, stock split, reverse stock split, reorganization, merger, consolidation, split-up, spin-off, combination, repurchase, exchange of shares of common stock or our other securities or other change in our corporate structure affecting the shares of our common stock, the administrator, in order to prevent diminution or enlargement of the benefits or potential benefits intended to be made available under the 2018 Plan will adjust the number and class of shares that may be delivered under our 2018 Plan and/or the number, class and price of shares of stock covered by each outstanding award.

Dissolution or liquidation

In the event of our proposed dissolution or liquidation, the administrator will notify each participant as soon as practicable prior to the effective date of such proposed transaction. To the extent it has not been previously exercised, an award will terminate immediately prior to the consummation of such proposed action.

Merger and change in control

In the event of our merger with or into another corporation or entity or a "change in control" (as defined in our 2018 Plan), each outstanding award will be treated as the administrator determines without a participant's consent, including, without limitation, that (i) awards will be assumed, or substantially equivalent awards will be substituted, by the acquiring or succeeding corporation (or its affiliate) with appropriate adjustments as to the number and kind of shares and prices; (ii) upon written notice to a participant, the participant's awards will terminate upon or immediately prior to the consummation of such merger or change in control; (iii) outstanding awards will vest and become exercisable, realizable or payable, or restrictions applicable to an award will lapse, in whole or in part, prior to or upon consummation of such merger or change in control, and, to the extent the administrator determines, terminate upon or immediately prior to the effectiveness of such merger or change in control; (iv) (1) the termination of an award in exchange for an amount of cash and/or property, if any, equal to the amount that would have been attained upon the exercise of such award or realization of the participant's rights as of the date of the occurrence of the transaction (and, for the avoidance of doubt, if as of the date of the occurrence of the transaction the administrator determines in good faith that no amount would have been attained upon the exercise of such award or realization of the participant's rights, then such award may be terminated by us without payment) or (2) the replacement of such award with other rights or property selected by the administrator in its sole discretion; or (v) any combination of the foregoing. The administrator is not be obligated to treat all awards, all awards a participant holds or all awards of the same type, similarly. Notwithstanding the foregoing, if a payment under an award agreement is subject to Section 409A of the Code and if the definition of change in control contained in the applicable award agreement does not comply with the definition of "change of control" for purposes of a distribution under Section 409A of the Code, then any payment of an amount that is otherwise accelerated pursuant to this paragraph will be delayed until the earliest time that payment would be permissible under Section 409A of the Code without triggering any penalties applicable under Section 409A of the Code.

Amendment and termination

The administrator has the authority to modify or amend any award, subject to obtaining the participant's agreement to such modification or amendment if the modification or amendment would impair the rights of the participant. Our board of directors may, at any time, amend, alter, suspend or terminate our 2018 Plan. To the extent necessary and desirable to comply with applicable laws (including any applicable stock exchange rules), we will obtain stockholder approval of any amendment to our 2018 Plan. No amendment, alteration, suspension or termination of our 2018 Plan will impair the rights of a participant, unless mutually agreed otherwise between the participant and the administrator in writing.

2021 Stock incentive plan

We expect our board of directors to adopt and our stockholders to approve the 2021 Plan, which will become effective immediately prior to the effectiveness of the registration statement of which this prospectus is a part. The 2021 Plan provides for the grant of incentive stock options, nonstatutory stock options, stock appreciation rights, awards of restricted stock, restricted stock units and other stock-based awards. Upon effectiveness of the 2021 Plan, the number of shares of our common stock that will be reserved for issuance under the 2021 Plan will be the sum of: (1) ; plus (2) the number of shares as is equal to the sum of (x) the number of shares of our common stock reserved for issuance under the 2018 Plan that remain available for grant under

the 2018 Plan immediately prior to the effectiveness of the registration statement for this offering and (y) the number of shares of our common stock subject to outstanding awards granted under the 2018 Plan that expire, terminate or are otherwise surrendered, cancelled, forfeited or repurchased by us at their original issuance price pursuant to a contractual repurchase right; plus (3) an annual increase, to be added on the first day of each fiscal year, commencing on January 1, 2022 and continuing until, and including, January 1, 2031, equal to the lesser of (i) % of the number of shares of our common stock outstanding on such date and (ii) the number of shares of our common stock determined by our board of directors. Subject to adjustment in the event of certain changes in our capitalization, up to of the shares of our common stock available for issuance under the 2021 Plan may be issued as incentive stock options.

Our employees, officers, directors, consultants and advisors will be eligible to receive awards under the 2021 Plan; however, incentive stock options may only be granted to our employees.

Pursuant to the terms of the 2021 Plan, our board of directors (or a committee delegated by our board of directors) will administer the 2021 Plan and, subject to any limitations set forth in the 2021 Plan, will select the recipients of awards and determine:

- the number of shares of our common stock covered by options and the dates upon which the options become exercisable;
- the type of options to be granted;
- the duration of options, which may not be in excess of ten years;
- the exercise price of options, which must be at least equal to the fair market value of our common stock on the date of grant;
- the methods of payment of the exercise price of options; and
- the number of shares of our common stock subject to and the terms and conditions of any stock appreciation rights, awards of restricted stock, restricted stock units or other stock-based awards, including conditions for repurchase, measurement price, issue price and repurchase price (though the measurement price of stock appreciation rights must be at least equal to the fair market value of our common stock on the date of grant and the duration of such awards may not be in excess of ten years) and any performance conditions.

If our board of directors delegates authority to one or more of our officers to grant awards under the 2021 Plan, the officers will have the power to make awards to all of our employees, except officers and executive officers (as such terms are defined in the 2021 Plan). Our board of directors will fix the terms of the awards to be granted by any such officer, the maximum number of shares subject to awards that any such officer may grant, and the time period in which such awards may be granted.

The 2021 Plan contains limits on compensation that may be paid to our non-employee directors. The maximum aggregate amount of cash and value (calculated based on grant date fair value for financial reporting purposes) of awards under the 2021 Plan granted in any calendar year to any individual non-employee director in his or her capacity as a non-employee director may not exceed $, or $ in the case of a non-employee director during his or her first year of service. Fees paid by us on behalf of any non-employee director in connection with regulatory compliance and any amounts paid to a non-employee director as reimbursement of an expense will not count against this limit. Our board of directors may make additional exceptions to this limit for individual non-employee directors in extraordinary circumstances, provided that the non-employee director receiving such additional compensation may not participate in the decision to award such compensation. The limitation does not apply to cash or awards granted to a non-employee director in his or her capacity as a consultant or advisor to us.

Effect of certain changes in capitalization

In the event of any stock split, reverse stock split, stock dividend, recapitalization, combination of shares, reclassification of shares, spin-off or other similar change in capitalization or event, or any dividend or distribution to holders of our common stock other than an ordinary cash dividend, we are required by the 2021 Plan to make equitable adjustments (or make substitute awards, if applicable), in the manner determined by our board of directors, to:

- the number and class of securities available under the 2021 Plan, and the number and class of securities available for issuance under the 2021 Plan that may be issued as incentive stock options;
- the share counting rules of the 2021 Plan;
- the number and class of securities and exercise price per share of each outstanding option;
- the share and per-share provisions and the measurement price of each outstanding stock appreciation right;
- the number of shares and the repurchase price per share subject to each outstanding award of restricted stock; and
- the share and per-share related provisions and purchase price, if any, of each outstanding restricted stock unit award and each outstanding other stock-based award.

Effect of certain corporate transactions

Upon the occurrence of a merger or other reorganization event (as defined in the 2021 Plan), our board of directors may, on such terms as our board of directors determines (except to the extent specifically provided otherwise in an applicable award agreement or other agreement between the participant and us), take any one or more of the following actions pursuant to the 2021 Plan as to all or any (or any portion of) outstanding awards, other than awards of restricted stock:

- provide that outstanding awards will be assumed, or substantially equivalent awards will be substituted, by the acquiring or succeeding corporation (or an affiliate of the acquiring or succeeding corporation);
- upon written notice to a participant, provide that all of the participant's unvested awards will be forfeited immediately prior to the consummation of the reorganization event and/or that all of the participant's vested but unexercised awards will terminate immediately prior to the consummation of such transaction unless exercised, to the extent exercisable, by the participant within a specified period following the date of such notice;
- provide that outstanding awards will become exercisable, realizable or deliverable, or restrictions applicable to an award will lapse, in whole or in part, prior to or upon the reorganization event;
- in the event of a reorganization event pursuant to which holders of our common stock will receive a cash payment for each share surrendered in the reorganization event, make or provide for a cash payment to participants with respect to each award held by a participant equal to (1) the number of shares of our common stock subject to the vested portion of the award (after giving effect to any acceleration of vesting that occurs upon or immediately prior to such reorganization event) multiplied by (2) the excess, if any, of the cash payment for each share surrendered in the reorganization event over the exercise, measurement or purchase price of such award and any applicable tax withholdings, in exchange for the termination of such award;

- provide that, in connection with our liquidation or dissolution, awards will convert into the right to receive liquidation proceeds (if applicable, net of the exercise, measurement or purchase price thereof and any applicable tax withholdings); or
- any combination of the foregoing.

Our board of directors is not obligated by the 2021 Plan to treat all awards, all awards held by a participant, or all awards of the same type, identically.

In the case of certain restricted stock units, no assumption or substitution is permitted, and the restricted stock units will instead be settled in accordance with the terms of the applicable restricted stock unit agreement.

Upon the occurrence of a reorganization event other than our liquidation or dissolution, our repurchase and other rights with respect to outstanding awards of restricted stock will continue for the benefit of the succeeding company and will, unless our board of directors determines otherwise, apply to the cash, securities or other property which our common stock is converted into or exchanged for pursuant to the reorganization event in the same manner and to the same extent as they applied to the common stock subject to the restricted stock award. However, our board of directors may provide for the termination or deemed satisfaction of such repurchase or other rights under the restricted stock award agreement or any other agreement between a participant and us, either initially or by amendment. Upon the occurrence of a reorganization event involving our liquidation or dissolution, all restrictions and conditions on each outstanding restricted stock award will automatically be deemed terminated or satisfied, unless otherwise provided in the agreement evidencing the restricted stock award or in any other agreement between the participant and us.

Our board of directors may, at any time, provide that any award under the 2021 Plan will become immediately exercisable in whole or in part, free of some or all restrictions or conditions, or otherwise realizable in whole or in part, as the case may be.

Except with respect to certain actions requiring stockholder approval under the e Code, or Nasdaq rules, our board of directors may amend, modify or terminate any outstanding award under the 2021 Plan, including but not limited to, substituting for the award another award of the same or a different type, changing the date of exercise or realization, and converting an incentive stock option to a nonstatutory stock option, subject to certain participant consent requirements. However, unless our stockholders approve such action, the 2021 Plan provides that we may not (except as otherwise permitted in connection with a change in capitalization or reorganization event):

- amend any outstanding stock option or stock appreciation right granted under the 2021 Plan to provide an exercise or measurement price per share that is lower than the then-current exercise or measurement price per share of such outstanding award;
- cancel any outstanding stock option or stock appreciation right (whether or not granted under the 2021 Plan) and grant a new award under the 2021 Plan in substitution for the canceled award (other than substitute awards permitted in connection with a merger or consolidation of an entity with us or our acquisition of property or stock of another entity) covering the same or a different number of shares of our common stock and having an exercise or measurement price per share lower than the then-current exercise or measurement price per share of the canceled award;
- cancel in exchange for a cash payment any outstanding option or stock appreciation right with an exercise or measurement price per share above the then-current fair market value of our common stock (valued in the manner determined by (or in the manner approved by) our board of directors); or
- take any other action that constitutes a “repricing” within the meaning of Nasdaq rules or the rules of any other exchange or marketplace on which our common stock is listed or traded.

No award may be granted under the 2021 Plan on or after the date that is ten years from the effectiveness of the registration statement of which this prospectus is a part. Our board of directors may amend, suspend or terminate the 2021 Plan at any time, except that stockholder approval will be required to comply with applicable law or stock market requirements.

2021 Employee stock purchase plan

We expect our board of directors to adopt and our stockholders to approve the 2021 ESPP, which will become effective immediately prior to the effectiveness of the registration statement of which this prospectus is a part. The 2021 ESPP will be administered by our board of directors or by a committee appointed by our board of directors. The 2021 ESPP initially provides participating employees with the opportunity to purchase up to an aggregate of shares of our common stock. The number of shares of our common stock reserved for issuance under the 2021 ESPP will automatically increase on the first day of each fiscal year, commencing on January 1, 2022 and continuing for each fiscal year until, and including, January 1, 2032, in an amount equal to the lowest of (1) shares of our common stock, (2) % of the number of shares of our common stock outstanding on such date and (3) an amount determined by our board of directors.

All of our employees and employees of any designated subsidiary, as defined in the 2021 ESPP, are eligible to participate in the 2021 ESPP, provided that:

- such person is customarily employed by us or a designated subsidiary for more than 20 hours a week and for more than five months in a calendar year;
- such person has been employed by us or by a designated subsidiary for at least three months prior to enrolling in the 2021 ESPP; and
- such person was our employee or an employee of a designated subsidiary on the first day of the applicable offering period under the 2021 ESPP.

We retain the discretion to determine which eligible employees may participate in an offering under applicable regulations.

We expect to make one or more offerings to our eligible employees to purchase stock under the 2021 ESPP beginning at such time and on such dates as our board of directors may determine, or on the first business day thereafter. Each offering will consist of a six-month offering period during which payroll deductions will be made and held for the purchase of our common stock at the end of the offering period. Our board of directors or a committee designated by the board of directors may, at its discretion, choose a different period of not more than 12 months for offerings.

On each offering commencement date, each participant will be granted an option to purchase, on the last business day of the offering period, up to a number of shares of our common stock determined by multiplying $2,083 by the number of full months in the offering period and dividing that product by the closing price of our common stock on the first day of the offering period. No employee may be granted an option under the 2021 ESPP that permits the employee's rights to purchase shares under the 2021 ESPP and any other employee stock purchase plan of ours or of any of our subsidiaries to accrue at a rate that exceeds $25,000 of the fair market value of our common stock (determined as of the first day of each offering period) for each calendar year in which the option is outstanding. In addition, no employee may purchase shares of our common stock under the 2021 ESPP that would result in the employee owning 5% or more of the total combined voting power or value of our stock or the stock of any of our subsidiaries.

On the commencement date of each offering period, each eligible employee may authorize up to a maximum of 15% of his or her compensation to be deducted by us during the offering period. Each employee who continues

to be a participant in the 2021 ESPP on the last business day of the offering period will be deemed to have exercised an option to purchase from us the number of whole shares of our common stock that his or her accumulated payroll deductions on such date will pay for, not in excess of the maximum numbers set forth above. Under the terms of the 2021 ESPP, the purchase price will be determined by our board of directors or the committee for each offering period and will be at least 85% of the applicable closing price of our common stock. If our board of directors or the committee does not make a determination of the purchase price, the purchase price will be 85% of the lesser of the closing price of our common stock on the first business day of the offering period or on the last business day of the offering period.

An employee may at any time prior to the close of business on the fifteenth business day prior to the end of an offering period (or such other number of days as is determined by us), and for any reason, permanently withdraw from participating in an offering and permanently withdraw the balance accumulated in the employee's account. Partial withdrawals are not permitted. If an employee elects to discontinue his or her payroll deductions during an offering period but does not elect to withdraw his or her funds, funds previously deducted will be applied to the purchase of common stock at the end of the offering period. If a participating employee's employment ends before the last business day of an offering period, no additional payroll deductions will be taken and the balance in the employee's account will be paid to the employee.

We will be required to make equitable adjustments to the extent determined by our board of directors or a committee thereof to the number and class of securities available under the 2021 ESPP, the share limitations under the 2021 ESPP, and the purchase price for an offering period under the 2021 ESPP to reflect stock splits, reverse stock splits, stock dividends, recapitalizations, combinations of shares, reclassifications of shares, spin-offs and other similar changes in capitalization or events or any dividends or distributions to holders of our common stock other than ordinary cash dividends.

In connection with a merger or other reorganization event, as defined in the 2021 ESPP, our board of directors or a committee of our board of directors may take any one or more of the following actions as to outstanding options to purchase shares of our common stock under the 2021 ESPP on such terms as our board of directors or committee thereof determines:

- provide that options will be assumed, or substantially equivalent options will be substituted, by the acquiring or succeeding corporation (or an affiliate of the acquiring or succeeding corporation);
- upon written notice to employees, provide that all outstanding options will be terminated immediately prior to the consummation of such reorganization event and that all such outstanding options will become exercisable to the extent of accumulated payroll deductions as of a date specified by our board of directors or committee thereof in such notice, which date will not be less than ten days preceding the effective date of the reorganization event;
- upon written notice to employees, provide that all outstanding options will be canceled as of a date prior to the effective date of the reorganization event and that all accumulated payroll deductions will be returned to participating employees on such date;
- in the event of a reorganization event under the terms of which holders of our common stock will receive upon consummation thereof a cash payment for each share surrendered in the reorganization event, change the last day of the offering period to be the date of the consummation of the reorganization event and make or provide for a cash payment to each employee equal to (1) the cash payment for each share surrendered in the reorganization event times the number of shares of our common stock that the employee's accumulated payroll deductions as of immediately prior to the reorganization event could purchase at the applicable purchase price, where the cash payment for each share surrendered in the reorganization event is treated as the fair market value of our common stock on the last day of the applicable offering period for purposes of

determining the purchase price and where the number of shares that could be purchased is subject to the applicable limitations under the 2021 ESPP minus (2) the result of multiplying such number of shares by the purchase price; and/or

- provide that, in connection with our liquidation or dissolution, options will convert into the right to receive liquidation proceeds (net of the purchase price thereof).

Our board of directors may at any time, and from time to time, amend or suspend the 2021 ESPP or any portion of the 2021 ESPP. We will obtain stockholder approval for any amendment if such approval is required by Section 423 of the Code. Further, our board of directors may not make any amendment that would cause the 2021 ESPP to fail to comply with Section 423 of the Code. The 2021 ESPP may be terminated at any time by our board of directors. Upon termination, we will refund all amounts in the accounts of participating employees.

Health/welfare plans

All of our full-time employees, including our named executive officers, are eligible to participate in our health and welfare plans, including medical and dental benefits, short-term and long-term disability insurance, and life insurance. We believe these benefits are necessary and appropriate to provide a competitive compensation package to our named executive officers.

401(k) Plan

We maintain a defined contribution employee retirement plan for our employees, including our named executive officers. The plan is intended to qualify as a tax-qualified 401(k) plan so that contributions to the 401(k) plan, and income earned on such contributions, are not taxable to participants until withdrawn or distributed from the 401(k) plan (except in the case of contributions under the 401(k) plan designated as Roth contributions). Under the 401(k) plan, each employee is fully vested in his or her deferred salary contributions and our discretionary match. Employee contributions are held and invested by the plan's trustee as directed by participants. The 401(k) plan provides us with the discretion to match employee contributions, but to date we have not provided any employer matching contributions.

Limitation of liability and indemnification

Our certificate of incorporation that will become effective upon the closing of this offering limits the personal liability of directors for breach of fiduciary duty to the maximum extent permitted by the Delaware General Corporation Law, or the DGCL, and provides that no director will have personal liability to us or to our stockholders for monetary damages for breach of fiduciary duty as a director. However, these provisions do not eliminate or limit the liability of any of our directors:

- for any breach of the director's duty of loyalty to us or our stockholders;
- for acts or omissions not in good faith or that involve intentional misconduct or a knowing violation of law;
- for voting for or assenting to unlawful payments of dividends, stock repurchases or other distributions; or
- for any transaction from which the director derived an improper personal benefit.

Any amendment to or repeal of these provisions will not eliminate or reduce the effect of these provisions in respect of any act, omission or claim that occurred or arose prior to such amendment or repeal. If the DGCL is amended to provide for further limitations on the personal liability of directors of corporations, then the personal liability of our directors will be further limited to the greatest extent permitted by the DGCL.

In addition, our certificate of incorporation that will become effective upon the closing of this offering provides that we must indemnify our directors and officers and we must advance expenses, including attorneys' fees, to our directors and officers in connection with legal proceedings, subject to very limited exceptions.

We maintain a general liability insurance policy that covers specified liabilities of our directors and officers arising out of claims based on acts or omissions in their capacities as directors or officers. In addition, we intend to enter into indemnification agreements with all of our executive officers and directors prior to the completion of this offering. These indemnification agreements require us, among other things, to indemnify each such executive officer or director for some expenses, including attorneys' fees, judgments, fines and settlement amounts incurred by him or her in any action or proceeding arising out of his or her service as one of our executive officers or directors.

Some of our non-employee directors may, through their relationships with their employers, be insured or indemnified against specified liabilities incurred in their capacities as members of our board of directors.

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, executive officers or persons controlling us, in the opinion of the SEC, such indemnification is against public policy as expressed in the Securities Act and is therefore unenforceable.

Rule 10b5-1 sales plans

Our directors and executive officers may adopt written plans, known as Rule 10b5-1 plans, in which they will contract with a broker to buy or sell shares of our common stock on a periodic basis. Under a Rule 10b5-1 plan, a broker executes trades pursuant to parameters established by the director or officer when entering into the plan, without further direction from the director or officer. It also is possible that the director or officer could amend or terminate the plan when not in possession of material, nonpublic information. In addition, our directors and executive officers may buy or sell additional shares outside of a Rule 10b5-1 plan when they are not in possession of material, nonpublic information.

Director compensation

The table below shows all compensation to our non-employee directors during the year ended December 31, 2020.

Name	Fees earned or paid in cash ($)	Option awards($)(1)(2)	All other compensation($)	Total ($)
Burt Adelman, M.D.	—	—	60,000(3)	60,000
John Evans	25,000	53,246	—	78,246
Anthony Philippakis, M.D., Ph.D.	—	—	—	—
Krishna Yeshwant, M.D.	—	—	—	—

(1) The amounts reported represent the aggregate grant date fair value of stock options awarded in 2020, calculated in accordance with FASB ASC Topic 718. The assumptions used in calculating the grant date fair value are set forth in Note 12 to our consolidated financial statements appearing elsewhere in this prospectus. These amounts reflect the accounting cost for these stock options and do not reflect the actual economic value that may be realized by the directors upon the vesting of the stock options, the exercise of the stock options or the sale of the common underlying such stock options.

(2) As of December 31, 2020, the aggregate number of stock options held by non-employee directors was as follows:

Director	Aggregate number of option awards
Burt Adelman, M.D.	—
John Evans	200,000
Anthony Philippakis, M.D., Ph.D.	—
Krishna Yeshwant, M.D.	—

(3) Represents consulting fees paid to Dr. Adelman in connection with his consulting arrangement.

Prior to this offering, we paid cash fees and granted equity awards to certain of our non-employee directors for their service on our board of directors pursuant to a non-employee director compensation policy adopted in April 2021. Each non-employee director not affiliated with GV received an annual fee of $50,000 relating to such director's service on the board of directors, and the chairperson of the board received an additional annual fee of $10,000. In connection with his or her initial election to the board of directors and upon approval of the board, each such director also received an option under our 2018 Plan to purchase 400,000 shares of common stock, which option vests quarterly over four years in equal installments, subject to continued service. Prior to April 2021, we compensated Burt Adelman, M.D., the chairman of our board of directors and one of our co-founders, pursuant to a consulting agreement dated August 7, 2018. The consulting agreement, which was terminated in April 2021, entitled Dr. Adelman to consulting fees of $15,000 per calendar quarter. We have historically reimbursed our non-employee directors for reasonable travel and out-of-pocket expenses incurred in connection with attending board of director and committee meetings.

Dr. Kathiresan, one of our directors who also serves as our chief executive officer, does not receive any additional compensation for his service as a director. Dr. Kathiresan is one of our named executive officers and, accordingly, the compensation that we pay to Dr. Kathiresan is discussed above under "—Summary compensation table" and "—Narrative to summary compensation table."

In , 2021, our board of directors approved a director compensation program that will become effective on the effective date of the registration statement of which this prospectus is a part. Under this director compensation program, we will pay our non-employee directors a cash retainer for service on the board of directors and for service on each committee on which the director is a member. The chairperson of the board and of each committee will receive higher retainers for such service. These fees are payable in arrears in four equal quarterly installments on the last day of each quarter, provided that the amount of such payment will be prorated for any portion of such quarter that the director is not serving on our board of directors and no fee will be payable in respect of any period prior to the completion of this offering. The fees paid to non-employee directors for service on the board of directors and for service on each committee of the board of directors on which the director is a member are as follows:

	Member annual fee	Chairperson incremental annual fee
Board of Directors	$	$
Audit Committee	$	$
Compensation Committee	$	$
Nominating and Corporate Governance Committee	$	$

We also will continue to reimburse our non-employee directors for reasonable travel and other expenses incurred in connection with attending meetings of our board of directors and any committee of our board of directors on which they serve.

In addition, under our director compensation program to be effective on the effective date of the registration statement of which this prospectus is a part, each non-employee director will receive, upon his or her initial election or appointment to our board of directors, an option to purchase shares of our common stock under the 2021 Plan. Each of these options will vest as to % of the shares of our common stock underlying such option at the end of each successive one month period following the grant date until the third anniversary of the grant date, subject to the non-employee director's continued service as a director. Further, on the date of the first board meeting held after each annual meeting of stockholders, each non-employee director that has served on our board of directors for at least six months will receive, under the 2021 Plan, an option to purchase shares of our common stock under the 2021 Plan. Each of these options will vest with respect to all of the shares underlying such option on the first anniversary of the grant date or, if earlier, immediately prior to the first annual meeting of stockholders occurring after the grant date, subject to the non-employee director's continued service as a director. All options issued to our non-employee directors under our director compensation program will be issued at exercise prices equal to the fair market value of our common stock on the date of grant and will become exercisable in full upon specified change in control events.

Transactions with related persons

Since January 1, 2018, we have engaged in the following transactions in which the amounts involved exceeded $120,000 and any of our directors, executive officers or holders of more than 5% of our voting securities, or any member of the immediate family of, or person sharing the household with, the foregoing persons, had or will have a direct or indirect material interest. We believe that all of these transactions were on terms as favorable as could have been obtained from unrelated third parties.

Series A preferred stock financing

In August 2018, we issued an aggregate of 16,722,408 shares of our Series A preferred stock at a price per share of $0.5980 in cash, for an aggregate purchase price of $10.0 million. The following table sets forth the aggregate number of shares of our Series A preferred stock that we issued to our directors, officers and 5% stockholders and their affiliates and the aggregate amount of consideration for such shares:

Purchaser	Number of shares of Series A preferred stock	Cash purchase price
GV 2017, L.P.(1)(2)	11,705,686	$ 7,000,000
Biomatics Capital Partners, L.P.	2,842,809	1,700,000
Beam Therapeutics Inc.(3)	501,672	300,000

(1) Krishna Yeshwant, a member of our board of directors, is a managing partner of GV.

(2) Anthony Philippakis, a member of our board of directors, is a venture partner of GV.

(3) John Evans, a member of our board of directors, is the chief executive officer and a member of the board of directors of Beam Therapeutics Inc.

In December 2018, we issued an aggregate of 2,842,809 shares of our Series A preferred stock to entities affiliated with ARCH Venture Partners, a 5% stockholder, at a price per share of $0.5980 in cash, for an aggregate purchase price of $1.7 million. John Evans, a member of our board of directors, is a venture partner of ARCH Venture Partners.

In August 2019, we issued an aggregate of 29,347,825 shares of our Series A preferred stock at a price per share of $0.5980 in cash, for an aggregate purchase price of $17.5 million. The following table sets forth the aggregate number of shares of our Series A preferred stock that we issued to our directors, officers and 5% stockholders and their affiliates and the aggregate amount of consideration for such shares:

Purchaser	Number of shares of Series A preferred stock	Cash purchase price
GV 2017, L.P.(1)(2)	17,558,528	$10,500,000
Entities affiliated with ARCH Venture Partners(3)	4,264,214	2,550,000
Biomatics Capital Partners, L.P.	4,264,214	2,550,000
Beam Therapeutics Inc.(4)	752,508	450,000

(1) Krishna Yeshwant, a member of our board of directors, is a managing partner of GV.

(2) Anthony Philippakis, a member of our board of directors, is a venture partner of GV.

(3) John Evans, a member of our board of directors, is a venture partner of ARCH Venture Partners.

(4) John Evans, a member of our board of directors, is the chief executive officer and a member of the board of directors of Beam Therapeutics Inc.

In March 2020, we issued an aggregate of 49,749,167 shares of our Series A preferred stock at a price per share of $0.5980 in cash, for an aggregate purchase price of $29.8 million. The following table sets forth the aggregate number of shares of our Series A preferred stock that we issued to our directors, officers and 5% stockholders and their affiliates and the aggregate amount of consideration for such shares:

Purchaser	Number of shares of Series A preferred stock	Cash purchase price
GV 2017, L.P.(1)(2)	29,264,214	$17,500,000
Entities affiliated with ARCH Venture Partners(3)	7,107,024	4,250,000
Biomatics Capital Partners, L.P.	7,107,024	4,250,000
Beam Therapeutics Inc.(4)	1,254,181	750,000

(1) Krishna Yeshwant, a member of our board of directors, is a managing partner of GV.

(2) Anthony Philippakis, a member of our board of directors, is a venture partner of GV.

(3) John Evans, a member of our board of directors, is a venture partner of ARCH Venture Partners.

(4) John Evans, a member of our board of directors, is the chief executive officer and a member of the board of directors of Beam Therapeutics Inc.

Harvard/Broad license agreements

In March 2019, we entered into license agreements with The Broad Institute, Inc., or Broad, and the President and Fellows of Harvard College, or Harvard (as amended, the Cas9 License Agreement) and with Broad (the CpF1 License Agreement and, together with the Cas9 License Agreement, the Harvard/Broad License Agreements) for certain base editing technologies pursuant to which we received exclusive, worldwide, sublicensable, royalty-bearing licenses under specified patent rights to develop and commercialize licensed products and nonexclusive, worldwide, sublicensable, royalty-bearing licenses under certain patent rights to research and develop licensed products. Anthony Philippakis, a member of our board of directors, is chief data officer of Broad.

In connection with the Cas9 License Agreement, we paid $0.1 million in non-refundable upfront license fees and issued 2,556,322 shares of our common stock to Broad and Harvard. In connection with the CpF1 License Agreement, we paid $0.1 million in non-refundable upfront license fees and also issued 1,278,161 shares of our common stock to Broad.

In February 2021, we provided written notice to Broad of our intent to terminate the CpF1 License Agreement, which termination would be effective in June 2021.

Under the Cas9 License Agreement, upon the first to occur of certain events, we are required to issue to Broad and Harvard additional shares of our comment stock, as further described under “Description of capital stock—License agreement with The Broad Institute and the President and Fellows of Harvard College —Expected issuance of shares in a private placement in connection with this offering.”

We are also required to make success payments under the Harvard/Broad License Agreements as further described under “Business—License and collaboration agreements—Cas9 license agreement with The Broad Institute and President and Fellows of Harvard College license agreement.”

See “Business—License and collaboration agreements—Cas9 license agreement with The Broad Institute and President and Fellows of Harvard College License Agreement” for additional information regarding the Cas9 License Agreement.

Collaboration and license agreement

In April 2019, we entered into a collaboration and license agreement, or the Beam Agreement, with Beam Therapeutics Inc., or Beam. John Evans, a member of our board of directors, is the chief executive officer and a member of the board of directors of Beam. Under the terms of the Beam Agreement, we received exclusive access to Beam's base editing technology, gene editing and delivery technologies for human therapeutic applications against certain cardiovascular targets. We granted Beam a non-exclusive license under know-how and patents controlled by us and an interest in joint collaboration technology.

In connection with the Beam Agreement, we issued 2,556,322 shares of our common stock to Beam.

We are required to pay milestone payments for certain clinical and regulatory events and Beam has the option, after the completion of Phase 1 trials, to participate in future development and commercialization and share 50 percent of U.S. profits and losses for any product directed against these targets.

Either party may owe the other party other milestone payments for certain clinical and regulatory events related to the delivery technology products.

Royalty payments may become due by either party to the other based on the net sales of any commercialized delivery technology products under the agreement.

See "Business—License and collaboration agreements—Collaboration and license agreement with Beam Therapeutics" for additional information regarding this agreement.

Series A-2 preferred stock financing

In April 2020, we issued an aggregate of 56,584,999 shares of our Series A-2 preferred stock at a price per share of $0.8041 in cash, for an aggregate purchase price of $45.5 million. The following table sets forth the aggregate number of shares of our Series A-2 preferred stock that we issued to our directors, officers and 5% stockholders and their affiliates and the aggregate amount of consideration for such shares:

Purchaser	Number of shares of Series A-2 preferred stock	Cash purchase price
GV 2019, L.P. (1)(2)	37,308,792	$30,000,000
Biomatics Capital Partners, L.P.	9,016,291	7,250,000
Entities affiliated with ARCH Venture Partners(3)	9,016,290	7,250,000

(1) Krishna Yeshwant, a member of our board of directors, is a managing partner of GV.

(2) Anthony Philippakis, a member of our board of directors, is a venture partner of GV.

(3) John Evans, a member of our board of directors, is a venture partner of ARCH Venture Partners.

In June 2020, we issued an aggregate of 21,763,462 shares of our Series A-2 preferred stock at a price per share of $0.8041 in cash, for an aggregate purchase price of $17.5 million. The following table sets forth the aggregate number of shares of our Series A-2 preferred stock that we issued to our directors, officers and 5% stockholders and their affiliates and the aggregate amount of consideration for such shares:

Purchaser	Number of shares of Series A-2 preferred stock	Cash purchase price
Wellington Biomedical Innovation Master Investors (Cayman) I L.P.	12,436,264	$10,000,000
Casdin Partners Master Fund, L.P.	9,327,198	7,500,000

Series B preferred stock financing

In January 2021, we issued an aggregate of 77,163,022 shares of our Series B preferred stock at a price per share of $1.2182 in cash, for an aggregate purchase price of $94 million. The following table sets forth the aggregate number of shares of our Series B preferred stock that we issued to our directors, officers and 5% stockholders and their affiliates and the aggregate amount of consideration for such shares:

Purchaser	Number of shares of Series B preferred stock	Cash purchase price
Wellington Biomedical Innovation Master Investors (Cayman) I L.P.	10,671,482	$13,000,000
Entities affiliated with Casdin Capital	8,619,274	10,500,000
GV 2019, L.P.(1)(2)	4,104,416	5,000,000
Novo Holdings A/S(3)	4,104,416	5,000,000
Biomatics Capital Partners, L.P.	820,883	1,000,000

(1) Krishna Yeshwant, a member of our board of directors, is a managing partner of GV.

(2) Anthony Philippakis, a member of our board of directors, is a venture partner of GV.

(3) Burt Adelman, a member of our board of directors, is a senior advisor to Novo Ventures.

Registration rights

We are a party to an investors' rights agreement with the holders of our preferred stock, including our 5% stockholders and their affiliates and entities affiliated with some of our directors. This investors' rights agreement provides these holders the right, subject to certain conditions, beginning six months following the completion of this offering, to demand that we file a registration statement or to request that their shares be covered by a registration statement that we are otherwise filing.

See "Description of capital stock—Registration rights" for additional information regarding these registration rights.

Indemnification agreements

Our certificate of incorporation that will become effective upon the closing of this offering provides that we will indemnify our directors and officers to the fullest extent permitted by Delaware law. In addition, we intend to enter into new indemnification agreements with all of our directors and executive officers prior to the completion of this offering. These indemnification agreements require us, among other things, to indemnify each such director or executive officer for some expenses, including attorneys' fees, judgments, fines and settlement amounts incurred by him or her in any action or proceeding arising out of his or her service as one of our directors or executive officers.

Employment agreements

We have entered into employment agreements with our named executive officers. For more information regarding these agreements, see the section entitled "Executive compensation— Employment agreements."

Policies and procedures for related person transactions

Our board of directors intends to adopt written policies and procedures for the review of any transaction, arrangement or relationship in which our company is a participant, the amount involved exceeds $120,000, and one of our executive officers, directors, director nominees or 5% stockholders, or their immediate family members, each of whom we refer to as a "related person," has a direct or indirect material interest.

If a related person proposes to enter into such a transaction, arrangement or relationship, which we refer to as a "related person transaction," the related person must report the proposed related person transaction to our chief executive officer. The policy calls for the proposed related person transaction to be reviewed and, if

deemed appropriate, approved by our audit committee. Whenever practicable, the reporting, review and approval will occur prior to entry into the transaction. If advance review and approval is not practicable, the audit committee will review, and, in its discretion, may ratify the related person transaction. The policy also permits the chairperson of the audit committee to review and, if deemed appropriate, approve proposed related person transactions that arise between committee meetings, subject to ratification by the committee at its next meeting. Any related person transactions that are ongoing in nature will be reviewed annually.

A related person transaction reviewed under the policy will be considered approved or ratified if it is authorized by the audit committee after full disclosure of the related person's interest in the transaction. As appropriate for the circumstances, the audit committee will review and consider:

- the related person's interest in the related person transaction;
- the approximate dollar value of the amount involved in the related person transaction;
- the approximate dollar value of the amount of the related person's interest in the transaction without regard to the amount of any profit or loss;
- whether the transaction was undertaken in the ordinary course of our business;
- whether the terms of the transaction are no less favorable to us than terms that could have been reached with an unrelated third party;
- the purpose, and the potential benefits to us, of the transaction; and
- any other information regarding the related person transaction or the related person in the context of the proposed transaction that would be material to investors in light of the circumstances of the particular transaction.

Our audit committee may approve or ratify the transaction only if it determines that, under all of the circumstances, the transaction is in, or is not inconsistent with, our best interests. Our audit committee may impose any conditions on the related person transaction that it deems appropriate.

In addition to the transactions that are excluded by the instructions to the SEC's related person transaction disclosure rule, our board of directors has determined that the following transactions do not create a material direct or indirect interest on behalf of related persons and, therefore, are not related person transactions for purposes of this policy:

- interests arising solely from the related person's position as an executive officer of another entity, whether or not the person is also a director of such entity, that is a participant in the transaction where the related person and all other related persons own in the aggregate less than a 10% equity interest in such entity, the related person and his or her immediate family members are not involved in the negotiation of the terms of the transaction and do not receive any special benefits as a result of the transaction and the amount involved in the transaction is less than the greater of $200,000 or 5% of the annual gross revenues of the company receiving payment under the transaction; and
- a transaction that is specifically contemplated by provisions of our certificate of incorporation or bylaws.

The policy provides that transactions involving compensation of executive officers shall be reviewed and approved by our compensation committee in the manner specified in the compensation committee's charter.

We did not have a written policy regarding the review and approval of related person transactions prior to this offering. Nevertheless, with respect to such transactions, it has been the practice of our board of directors to consider the nature of and business reasons for such transactions, how the terms of such transactions compared to those which might be obtained from unaffiliated third parties and whether such transactions were otherwise fair to and in the best interests of, or not contrary to, our best interests.

Principal stockholders

The following table sets forth information with respect to the beneficial ownership of our common stock as of March 31, 2021 by:

- each of our directors;
- each of our named executive officers;
- all of our directors and executive officers as a group; and
- each person, or group of affiliated persons, who is known by us to beneficially own more than 5% of our common stock.

The column entitled “Percentage of shares beneficially owned—Before offering” is based on a total of 29,372,698 shares of our common stock outstanding as of March 31, 2021, including 3,733,669 shares of unvested restricted stock subject to a repurchase option, and assuming the automatic conversion of all outstanding shares of our preferred stock into an aggregate of 256,682,054 shares of our common stock upon the closing of this offering. The column entitled “Percentage of shares beneficially owned—After offering” is based on shares of our common stock to be outstanding after this offering, including the shares of our common stock that we are selling in this offering, our expected issuance of an aggregate of shares of common stock to The Broad Institute and the President and Fellows of Harvard College upon the closing of this offering pursuant to our Cas9 License Agreement, based on our issuance and sale of shares of our common stock in this offering and assuming our post-money valuation exceeds $500 million as further described under “Description of capital stock” and the 3,733,669 shares of unvested restricted stock subject to a repurchase option, but not including any additional shares issuable upon exercise of outstanding options or any additional shares issuable upon the underwriters’ option to purchase additional shares.

Beneficial ownership is determined in accordance with the rules and regulations of the SEC and includes voting or investment power with respect to our common stock. Shares of our common stock that an individual has a right to acquire within 60 days after March 31, 2021 are considered outstanding and beneficially owned by the person holding such right for the purpose of calculating the percentage ownership of that person but not for the purpose of calculating the percentage ownership of any other person, except with respect to the percentage ownership of all directors and executive officers. Except as otherwise noted, the persons and entities in this table have sole voting and investing power with respect to all of the shares of our common stock beneficially owned by them, subject to community property laws, where applicable. Unless otherwise indicated, the address of each beneficial owner is c/o Verve Therapeutics, Inc., 500 Technology Square, Suite 901, Cambridge, Massachusetts 02139.

Name of beneficial owner	Number of shares beneficially owned	Percentage of shares beneficially owned: Before offering (%)	Percentage of shares beneficially owned: After offering (%)
5% Stockholders			
Entities affiliated with GV 2017, L.P.(1)	99,941,636	35.0	
Biomatics Capital Partners, L.P.(2)	24,051,221	8.4	
Entities affiliated with ARCH Venture Partners(3)	23,230,337	8.1	
Wellington Biomedical Innovation Master Investors (Cayman) I L.P.(4)	23,107,746	8.1	
Entities affiliated with Casdin Capital (5)	17,946,472	6.3	
Directors and named executive officers			
Sekar Kathiresan, M.D.(6)	7,314,083	2.5	
Andrew Ashe, J.D.(7)	1,594,237	*	
Andrew Bellinger, M.D., Ph.D.(8)	952,083	*	
Burt Adelman, M.D.(9)	3,792,934	1.3	
John Evans(10)	23,280,337	8.1	
Anthony Philippakis, M.D., Ph.D.(1)(11)	99,941,636	35.0	
Krishna Yeshwant, M.D.(1)(12)	99,941,636	35.0	
All current executive officers and directors as a group (7 persons)(13)	136,875,310	47.0	

* Less than one percent

(1) Consists of (i) 58,528,428 shares of common stock issuable upon the automatic conversion of shares of our preferred stock upon the closing of this offering held by GV 2017, L.P. and (ii) 41,413,208 shares of common stock issuable upon conversion of shares of our preferred stock upon the closing of this offering held by GV 2019, L.P. GV 2017 GP, L.P. (the general partner of GV 2017, L.P.), GV 2017 GP, L.L.C. (the general partner of GV 2017 GP, L.P.), Alphabet Holdings LLC (the managing member of GV 2017 GP, L.L.C.), XXVI Holdings Inc. (the managing member of Alphabet Holdings LLC) and Alphabet Inc. (the controlling stockholder of XXVI Holdings Inc.) may each be deemed to have sole power to vote or dispose of the shares held directly by GV 2017, L.P. GV 2019 GP, L.P. (the general partner of GV 2019, L.P.), GV 2019 GP, L.L.C. (the general partner of GV 2019 GP, L.P.), Alphabet Holdings LLC (the managing member of GV 2019 GP, L.L.C.), XXVI Holdings Inc. (the managing member of Alphabet Holdings LLC) and Alphabet Inc. (the controlling stockholder of XXVI Holdings Inc.) may each be deemed to have sole power to vote or dispose of the shares held directly by GV 2019, L.P. The principal business address of GV 2017, L.P., GV 2017 GP, L.P., GV 2017 GP, L.L.C., GV 2019, L.P., GV 2019 GP, L.P., GV 2019 GP, L.L.C., Alphabet Holdings LLC, XXVI Holdings Inc. and Alphabet Inc. is 1600 Amphitheatre Parkway, Mountain View, CA 94043.

(2) Consists of 24,051,221 shares of common stock issuable upon the automatic conversion of shares of our preferred stock upon the closing of this offering held by Biomatics Capital Partners, L.P. Biomatics Capital Management, L.L.C. (the general partner of Biomatics Capital Partners, L.P.) may be deemed to have sole power to vote or dispose of the shares held directly by Biomatics Capital Partners, L.P. The principal business address of Biomatics Capital Partners, L.P. and Biomatics Capital Management, L.L.C. is 188 E Blaine Street, Suite 126, Seattle, WA 98102.

(3) Consists of (i) 11,615,168 shares of common stock issuable upon the automatic conversion of shares of our preferred stock upon the closing of this offering held by ARCH Venture Fund X, L.P., or ARCH X, and (ii) 11,615,169 shares of common stock issuable upon the automatic conversion of shares of our preferred stock upon the closing of this offering held by ARCH Venture Fund X Overage, L.P., or ARCH X Overage. ARCH Venture Partners X, L.P., or AVP X LP, is the sole general partner of ARCH X. ARCH Venture Partners X Overage, L.P., or AVP X Overage LP, is the sole general partner of ARCH X Overage. ARCH Venture Partners X, LLC, or AVP X LLC, is the sole general partner of each of AVP X LP and AVP X Overage LP. As members of the investment committee of AVP X LLC, each of Keith Crandell, Kristina Burow, Steven Gillis and Robert Nelsen (the “Committee Members”) may also be deemed to share the power to direct the disposition and vote of the ARCH X and ARCH X Overage shares. AVP X LP and AVP X Overage LP may be deemed to beneficially own the shares held by ARCH X and ARCH X Overage, respectively, AVP X LLC may be deemed to beneficially own the shares held by ARCH X and ARCH X Overage, and each of the Committee Members may be deemed to share the power to direct the disposition and vote of the shares held by ARCH X and ARCH X Overage. AVP X LP, AVP X Overage LP, AVP X LLC, and the Committee Members each disclaim beneficial ownership, except, in each case, to the extent of any pecuniary interest therein. The principal business address of ARCH X, ARCH X Overage, AVP X LP, AVP X Overage LP, AVP X LLC and the Committee Members is 8755 Higgins Road, Suite 1025, Chicago, IL 60631.

(4) Consists of 23,107,746 shares of common stock issuable upon the automatic conversion of shares of our preferred stock upon the closing of this offering held by Wellington Biomedical Innovation Master Investors (Cayman) I L.P., or Wellington Biomedical Fund. Wellington Management Company LLP, a registered investment company under the Investment Company Act of 1940, as amended, is the investment advisor to Wellington Biomedical Fund, and Wellington Alternative Investments LLC is its general partner. Wellington Management Investment, Inc. is the managing member of Wellington Alternative Investments LLC. Wellington Management Company LLP is an indirect subsidiary of Wellington Management Group LLP. Wellington Management Group LLP and Wellington Management Company LLP may be deemed beneficial owners with

shared voting and investment power over the shares held by Wellington Biomedical Fund. The principal business address of Wellington Biomedical Fund, Wellington Management Company LLP, Wellington Alternative Investments LLC, Wellington Management Investment, LLP and Wellington Management Group LLP is 280 Congress Street, Boston, MA 02210.

(5) Consists of (i) 12,200,289 shares of our common stock issuable upon the automatic conversion of shares of our preferred stock upon the closing of this offering held by Casdin Partners Master Fund, L.P. and (ii) 5,746,183 shares of our common stock issuable upon the automatic conversion of shares of our preferred stock upon the closing of this offering held by Casdin Private Growth Equity Fund, L.P. Casdin Capital, LLC is the investment adviser to Casdin Partners Master Fund, L.P. and Casdin Private Growth Equity Fund, L.P. Casdin Partners GP, LLC is the general partner of Casdin Partners Master Fund, L.P. Casdin Partners Private Growth Equity Fund GP, LLC is the general partner of Casdin Private Growth Equity Fund, L.P. Eli Casdin is the managing member of Casdin Capital, LLC, Casdin Partners GP, LLC and Casdin Partners Private Growth Equity Fund GP, LLC. Each of Casdin Capital, LLC, Casdin Partners GP, LLC and Eli Casdin may be deemed to indirectly beneficially own shares held by Casdin Partners Master Fund, L.P. Each of Casdin Capital, LLC, Casdin Partners Private Growth Equity Fund GP, LLC and Eli Casdin may be deemed to indirectly beneficially own shares held by Casdin Private Growth Equity Fund, L.P. Each of Casdin Capital, LLC, Casdin Partners GP, LLC, Casdin Partners Private Growth Equity Fund, L.P. and Eli Casdin disclaims beneficial ownership of such securities except to the extent of their respective pecuniary interest therein. The principal business address of Casdin Capital is 1350 Avenue of the Americas, Suite 2600, New York, NY 10019.

(6) Consists of 4,741,167 shares of common stock held by Dr. Kathiresan, of which 790,195 remain subject to vesting 60 days after March 31, 2021, and 2,572,916 shares of common stock underlying options held by Dr. Kathiresan that are exercisable as of March 31, 2021 or will become exercisable within 60 days after such date.

(7) Consists of 1,594,237 shares of common stock underlying options held by Mr. Ashe that are exercisable as of March 31, 2021 or will become exercisable within 60 days after such date.

(8) Consists of 952,083 shares of common stock underlying options held by Dr. Bellinger that are exercisable as of March 31, 2021 or will become exercisable within 60 days after such date.

(9) Consists of 3,792,934 shares of common stock held by Dr. Adelman, of which 632,156 remain subject to vesting 60 days after March 31, 2021.

(10) Consists of 50,000 shares of common stock underlying options held by Mr. Evans that are exercisable as of March 31, 2021 or will become exercisable within 60 days after such date. Mr. Evans, a member of our board of directors, is a venture partner of ARCH Venture Partners. Mr. Evans does not have voting or dispositive power over any of the shares directly held by ARCH X or ARCH X Overage referenced in footnote (3) above. Mr. Evans is the also the chief executive officer of Beam Therapeutics Inc. Mr. Evans does not have voting or dispositive power over any of the shares directly held by Beam Therapeutics Inc., which includes (i) 2,556,322 shares of common stock and (ii) 2,508,361 shares of common stock issuable upon the automatic conversion of shares of our preferred stock upon the closing of this offering.

(11) Dr. Philippakis, a member of our board of directors, is a venture partner of GV. Dr. Philippakis does not have voting or dispositive power over any of the shares directly held by GV 2017, L.P. or GV 2019, L.P. referenced in footnote (1) above.

(12) Dr. Yeshwant, a member of our board of directors, is a managing partner of GV. Dr. Yeshwant does not have voting or dispositive power over any of the shares directly held by GV 2017, L.P. or GV 2019, L.P. referenced in footnote (1) above.

(13) Consists of (i) 8,534,101 shares of common stock, of which 1,422,351 remain subject to vesting 60 days after March 31, 2021, (ii) 123,171,973 shares of common stock underlying shares of preferred stock, and (iii) 5,169,236 shares of common stock underlying options that are exercisable as of March 31, 2021 or will become exercisable within 60 days after such date.

Description of capital stock

The following description of our capital stock and provisions of our certificate of incorporation and bylaws are summaries and are qualified by reference to the certificate of incorporation and bylaws that will become effective upon the closing of this offering. We will file copies of these documents with the SEC as exhibits to our registration statement of which this prospectus is a part. The description of the capital stock reflects changes to our capital structure that will occur upon the closing of this offering.

Upon the closing of this offering, our authorized capital stock will consist of shares of our common stock, par value $0.001 per share, and shares of our preferred stock, par value $0.001 per share, all of which preferred stock will be undesignated.

As of March 31, 2021, we had issued and outstanding:

- 29,372,698 shares of common stock held by 21 holders of record, which includes 3,733,669 shares of unvested restricted stock subject to a repurchase option;
- 101,170,571 shares of Series A preferred stock held by 9 holders of record that are convertible into 101,170,571 shares of common stock;
- 78,348,461 shares of Series A-2 preferred stock held by 7 holders of record that are convertible into 78,348,461 shares of common stock; and
- 77,163,022 shares of Series B preferred stock held by 22 holders of record that are convertible into 77,163,022 shares of common stock.

Upon the closing of this offering, all of the outstanding shares of our preferred stock will automatically convert into an aggregate of 256,682,054 shares of our common stock.

Common stock

Holders of our common stock are entitled to one vote for each share held on all matters submitted to a vote of stockholders and do not have cumulative voting rights. Each election of directors by our stockholders will be determined by a plurality of the votes cast by the stockholders entitled to vote on the election. Holders of common stock are entitled to receive proportionately any dividends as may be declared by our board of directors, subject to any preferential dividend rights of outstanding preferred stock.

In the event of our liquidation or dissolution, the holders of our common stock are entitled to receive proportionately all assets available for distribution to stockholders after the payment of all debts and other liabilities and subject to the prior rights of any of our outstanding preferred stock. Holders of our common stock have no preemptive, subscription, redemption or conversion rights. The rights, preferences and privileges of holders of our common stock are subject to and may be adversely affected by the rights of the holders of shares of any series of our preferred stock that we may designate and issue in the future.

Preferred stock

Under the terms of our certificate of incorporation that will become effective upon the closing of this offering, our board of directors is authorized to issue shares of preferred stock in one or more series without stockholder approval. Our board of directors has the discretion to determine the rights, preferences, privileges and restrictions, including voting rights, dividend rights, conversion rights, redemption privileges and liquidation preferences, of each series of preferred stock.

The purpose of authorizing our board of directors to issue preferred stock and determine its rights and preferences is to eliminate delays associated with a stockholder vote on specific issuances. The issuance of preferred stock, while providing flexibility in connection with possible acquisitions, future financings and other corporate purposes, could have the effect of making it more difficult for a third party to acquire, or could discourage a third party from seeking to acquire, a majority of our outstanding voting stock. Upon the closing of this offering, there will be no shares of preferred stock outstanding, and we have no present plans to issue any shares of preferred stock.

Options and unvested restricted common stock

As of March 31, 2021, options to purchase an aggregate of 48,043,456 shares of our common stock were outstanding under our 2018 Plan, at a weighted average exercise price of $ 0.41 per share, and 3,733,669 shares of unvested restricted common stock were outstanding. See “Executive compensation—Employee benefit and equity compensation plans” for additional information regarding the terms of our 2018 Plan.

Delaware anti-takeover law and certain charter and bylaw provisions

Delaware law

We are subject to Section 203 of the DGCL. Subject to certain exceptions, Section 203 prevents a publicly held Delaware corporation from engaging in a “business combination” with any “interested stockholder” for three years following the date that the person became an interested stockholder, unless either the interested stockholder attained such status with the approval of our board of directors, the business combination is approved by our board of directors and stockholders in a prescribed manner or the interested stockholder acquired at least 85% of our outstanding voting stock in the transaction in which it became an interested stockholder. A “business combination” includes, among other things, a merger or consolidation involving us and the “interested stockholder” and the sale of more than 10% of our assets. In general, an “interested stockholder” is any entity or person beneficially owning 15% or more of our outstanding voting stock and any entity or person affiliated with or controlling or controlled by such entity or person. The restrictions contained in Section 203 are not applicable to any of our existing stockholders that will own 15% or more of our outstanding voting stock upon the closing of this offering.

Staggered board; removal of directors

Our certificate of incorporation and our bylaws to be effective upon the closing of this offering divide our board of directors into three classes with staggered three-year terms. In addition, our certificate of incorporation and our bylaws to be effective upon the closing of this offering provide that directors may be removed only for cause and only by the affirmative vote of the holders of at least 75% of our shares of capital stock present in person or by proxy and entitled to vote. Under our certificate of incorporation and our bylaws to be effective upon the closing of this offering, any vacancy on our board of directors, including a vacancy resulting from an enlargement of our board of directors, may be filled only by vote of a majority of our directors then in office. Furthermore, our certificate of incorporation to be effective upon the closing of this offering provides that the authorized number of directors may be changed only by the resolution of our board of directors. The classification of our board of directors and the limitations on the ability of our stockholders to remove directors, change the authorized number of directors and fill vacancies could make it more difficult for a third party to acquire, or discourage a third party from seeking to acquire, control of our company.

Stockholder action; special meeting of stockholders; advance notice requirements for stockholder proposals and director nominations

Our certificate of incorporation and our bylaws to be effective upon the closing of this offering provide that any action required or permitted to be taken by our stockholders at an annual meeting or special meeting of stockholders may only be taken if it is properly brought before such meeting and may not be taken by written action in lieu of a meeting. Our certificate of incorporation and our bylaws to be effective upon the closing of this offering also provide that, except as otherwise required by law, special meetings of the stockholders can only be called by our board of directors. In addition, our bylaws to be effective upon the closing of this offering establish an advance notice procedure for stockholder proposals to be brought before an annual meeting of stockholders, including proposed nominations of candidates for election to our board of directors. Stockholders at an annual meeting may only consider proposals or nominations specified in the notice of meeting or brought before the meeting by or at the direction of our board of directors, or by a stockholder of record on the record date for the meeting who is entitled to vote at the meeting and who has delivered timely written notice in proper form to our secretary of the stockholder's intention to bring such business before the meeting. These provisions could have the effect of delaying until the next stockholder meeting stockholder actions that are favored by the holders of a majority of our outstanding voting securities. These provisions also could discourage a third party from making a tender offer for our common stock because even if the third party acquired a majority of our outstanding voting stock, it would be able to take action as a stockholder, such as electing new directors or approving a merger, only at a duly called stockholders meeting and not by written consent.

Super-majority voting

The DGCL provides generally that the affirmative vote of a majority of the shares entitled to vote on any matter is required to amend a corporation's certificate of incorporation or bylaws unless a corporation's certificate of incorporation or bylaws, as the case may be, requires a greater percentage. Our bylaws to be effective upon the closing of this offering may be amended or repealed by a majority vote of our board of directors or the affirmative vote of the holders of at least 75% of the votes that all our stockholders would be entitled to cast in any annual election of directors. In addition, the affirmative vote of the holders of at least 75% of the votes that all our stockholders would be entitled to cast in any election of directors is required to amend or repeal or to adopt any provisions inconsistent with any of the provisions of our certificate of incorporation described above.

Exclusive forum selection

Our certificate of incorporation to be effective upon the closing of this offering provides that, unless we consent in writing to the selection of an alternative forum, the Court of Chancery of the State of Delaware (or, if the Court of Chancery of the State of Delaware does not have jurisdiction, the federal district court for the District of Delaware) shall be the sole and exclusive forum for the following types of proceedings: (1) any derivative action or proceeding brought on behalf of our company, (2) any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers, employees or stockholders to our company or our stockholders, (3) any action asserting a claim arising pursuant to any provision of the General Corporation Law of the State of Delaware or as to which the General Corporation Law of the State of Delaware confers jurisdiction on the Court of Chancery of the State of Delaware, or (4) any action asserting a claim arising pursuant to any provision of our certificate of incorporation or amended and restated bylaws (in each case, as they may be amended from time to time) or governed by the internal affairs doctrine. These choice of forum provisions will not apply to suits brought to enforce a duty or liability created by the Exchange Act. Furthermore, Section 22 of the Securities Act creates concurrent jurisdiction for federal and state courts over all such Securities Act actions. Accordingly, both state and federal courts have jurisdiction to entertain such claims. To prevent having to litigate claims in multiple jurisdictions and the threat of inconsistent or contrary rulings by different courts, among other considerations, our certificate of incorporation that will become effective upon the closing of this offering

provides that, unless we consent in writing to the selection of an alternative forum, the federal district courts of the United States of America shall, to the fullest extent permitted by law, be the sole and exclusive forum for the resolution of any claims arising under the Securities Act. While the Delaware courts have determined that such choice of forum provisions are facially valid, a stockholder may nevertheless seek to bring a claim in a venue other than those designated in the exclusive forum provisions. In such instance, we would expect to vigorously assert the validity and enforceability of the exclusive forum provisions of our certificate of incorporation. This may require significant additional costs associated with resolving such action in other jurisdictions and there can be no assurance that the provisions will be enforced by a court in those other jurisdictions.

Registration rights

We have entered into a second amended and restated investors' rights agreement dated as of January 14, 2021 or the investors' rights agreement, with holders of our preferred stock. Beginning 180 days after this offering, holders of a total of 259,298,376 shares of our common stock will have the right to require us to register these shares under the Securities Act upon demand and in connection with any registration statement that we plan to file, as described below under "—Demand registration rights" and "—Incidental registration rights." We refer to the shares with these registration rights as registrable securities. After registration pursuant to these rights, the registrable securities will become freely tradable without restriction under the Securities Act.

Demand registration rights

Beginning 180 days after the effective date of the registration statement of which this prospectus is a part, subject to specified limitations set forth in the investors' rights agreement, at any time, the holders of the then outstanding registrable securities may demand that we register at least 40% of the registrable securities then outstanding under the Securities Act for purposes of a public offering. We are not obligated to file a registration statement pursuant to this provision on more than two occasions.

In addition, subject to specified limitations set forth in the investors' rights agreement, at any time after we become eligible to file a registration statement on Form S-3, the holders of at least 20% of the then outstanding registrable securities may request that we register their registrable securities on Form S-3 for purposes of a public offering for which the reasonably anticipated aggregate offering price to the public of at least $5 million, net of selling expenses. We are not obligated to file a registration statement pursuant to this provision on more than two occasions in any 12-month period.

Incidental registration rights

If, at any time after the closing of this offering, we propose to register for our own account any of our securities under the Securities Act, the holders of registrable securities will be entitled to notice of the registration and, subject to specified exceptions, have the right to require us to register all or a portion of the registrable securities then held by them in that registration. We have the right to terminate or withdraw any registration initiated by us before the effective date of such registration.

In the event that any registration in which the holders of registrable securities participate pursuant to our investors' rights agreement is an underwritten public offering, we have agreed to enter into an underwriting agreement in usual and customary form.

Expenses

Pursuant to the investors' rights agreement, we are required to pay all registration expenses, including all registration, filing and qualification fees, printing and accounting expenses, and reasonable fees and

disbursements, not to exceed $75,000, of one counsel selected by the selling stockholders to represent the selling stockholders, but excluding underwriting discounts, selling commissions, stock transfer taxes applicable to the sale of any registrable securities and the fees and disbursements of the selling stockholders' own counsel (other than the counsel selected to represent all selling stockholders). If a registration is withdrawn at the request of the stockholders initiating the registration, then the stockholders will bear the expenses of the registration.

The investors' rights agreement contains customary cross-indemnification provisions, pursuant to which we are obligated to indemnify the selling stockholders in the event of material misstatements or omissions in the registration statement attributable to us or any violation or alleged violation whether by action or inaction by us under the Securities Act, the Exchange Act, any state securities or Blue Sky law or any rule or regulation promulgated under the Securities Act, the Exchange Act or any state securities or Blue Sky law in connection with such registration statement or the qualification or compliance of the offering, and they are obligated to indemnify us for material misstatements or omissions in the registration statement attributable to them.

License agreement with The Broad Institute and the President and Fellows of Harvard College

Expected issuance of shares in a private placement in connection with this offering

Under our license agreement with The Broad Institute, Inc., or Broad, and the President and Fellows of Harvard College, or Harvard, upon the first to occur of certain events, we are required to issue to Broad and Harvard additional shares of our common stock, such that the sum of the total number of shares we have issued to Broad and Harvard pursuant to the license agreement represents 2% of our capital stock on a fully diluted basis. Among the events that could trigger this obligation are (i) this initial public offering, if the post-money valuation (calculated as the price per share at which shares are sold in this offering multiplied by the fully diluted number of shares of capital stock outstanding following the closing of this offering), exceeds $500 million, which we refer to as the Valuation Trigger, or (ii) following this initial public offering and after we have filed a Form 10-Q under the Exchange Act, if and when our market capitalization equals at least $500 million.

Assuming this initial public offering is the Valuation Trigger, we expect to issue an aggregate of an additional shares of common stock to Broad and Harvard upon the closing of this offering, based on our assumed issuance and sale of shares of our common stock in this offering.

Success payments and registration rights

Under our license agreement with the Broad and Harvard, we are also obligated to make certain success payments as described in "Business—License and collaboration agreements—Cas9 license agreement with The Broad Institute and President and Fellows of Harvard College license agreement", which payments may be made, at our election, in cash or by the issuance of shares of our common stock. In the event that we issue shares of our common stock to Broad and Harvard to satisfy any or all of our success payment obligations, we have agreed to register the resale of such shares by Broad and Harvard on a Form S-1 or Form S-3, as applicable, and to cover all registration expenses related thereto.

Transfer agent and registrar

The transfer agent and registrar for our common stock will be .

Nasdaq Global Market

We intend to apply to have our common stock listed on the Nasdaq Global Market under the symbol "VERV."

Shares eligible for future sale

Prior to this offering, there has been no public market for our common stock, and a liquid trading market for our common stock may not develop or be sustained after this offering. Future sales of substantial amounts of our common stock in the public market, including shares issued upon exercise of outstanding options, or the anticipation of these sales, could adversely affect market prices prevailing from time to time and could impair our ability to raise capital through sales of equity securities.

Upon the closing of this offering, we will have outstanding shares of our common stock, based on the 29,372,698 shares of our common stock that were outstanding on March 31, 2021, including 3,733,669 shares of unvested restricted stock subject to a repurchase option, and after giving effect to (i) the issuance of shares of our common stock in this offering, assuming no exercise by the underwriters of their option to purchase additional shares of our common stock, (ii) the expected issuance of an aggregate of shares of common stock to The Broad Institute and the President and Fellows of Harvard College upon the closing of this offering pursuant to our Cas9 License Agreement, based on our issuance and sale of shares of our common stock in this offering and assuming our post-money valuation exceeds $500 million as further described under “Description of capital stock—License agreement with The Broad Institute and the President and Fellows of Harvard College,” and (iii) the automatic conversion of all outstanding shares of our preferred stock into an aggregate of 256,682,054 shares of our common stock upon the closing of this offering. Of these shares, all shares sold in this offering will be freely tradable without restriction or further registration under the Securities Act unless purchased by our “affiliates,” as that term is defined in Rule 144 under the Securities Act.

The remaining shares of our common stock will be “restricted securities” under Rule 144, and we expect that substantially all of these restricted securities will be subject to the 180-day lock-up period under the lock-up agreements as described below. These restricted securities may be sold in the public market upon release or waiver of any applicable lock-up agreements and only if registered or pursuant to an exemption from registration, such as Rule 144 or Rule 701 under the Securities Act.

Rule 144

In general, under Rule 144, beginning 90 days after the date of this prospectus, any person who is not our affiliate and has held their shares for at least six months, including the holding period of any prior owner other than one of our affiliates, may sell those shares without restriction, subject to the availability of current public information about us. In addition, under Rule 144, any person who is not our affiliate and has not been our affiliate at any time during the preceding three months and has held their shares for at least one year, including the holding period of any prior owner other than one of our affiliates, would be entitled to sell an unlimited number of shares immediately upon the closing of this offering without regard to whether current public information about us is available.

Beginning 90 days after the date of this prospectus, a person who is our affiliate or who was our affiliate at any time during the preceding three months and who has beneficially owned restricted securities for at least six months, including the holding period of any prior owner other than one of our affiliates, is entitled to sell a number of shares within any three-month period that does not exceed the greater of:

- 1% of the number of shares of our common stock then outstanding, which will equal approximately shares immediately after this offering; and
- the average weekly trading volume in our common stock on the Nasdaq Global Market during the four calendar weeks preceding the date of filing of a Notice of Proposed Sale of Securities Pursuant to Rule 144 with respect to the sale.

Sales under Rule 144 by our affiliates are also subject to manner of sale provisions and notice requirements and to the availability of current public information about us.

Upon waiver or expiration of the 180-day lock-up period described below, approximately shares of our common stock will be eligible for sale under Rule 144. We cannot estimate the number of shares of our common stock that our existing stockholders will elect to sell under Rule 144.

Rule 701

In general, under Rule 701 of the Securities Act, any of our employees, consultants or advisors, other than our affiliates, who purchased shares from us in connection with a qualified compensatory stock plan or other written agreement is eligible to resell these shares 90 days after the date of this prospectus in reliance on Rule 144, but without compliance with the various restrictions, including the availability of public information about us, holding period and volume limitations, contained in Rule 144. Substantially all Rule 701 shares are subject to the 180-day lock-up period described below and will be eligible for sale in accordance with Rule 701 upon expiration of the restrictions set forth in those agreements.

Lock-up agreements

We and each of our executive officers and directors and the holders of substantially all of our outstanding stock have agreed that, without the prior written consent of J.P. Morgan Securities LLC, Jefferies LLC, Guggenheim Securities, LLC and William Blair & Company, L.L.C. on behalf of the underwriters, we and they will not, subject to limited exceptions, during the period ending 180 days after the date of this prospectus:

- offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, lend, or otherwise transfer or dispose of, directly or indirectly, any shares of our common stock beneficially owned (as such term is used in Rule 13d-3 of the Securities Exchange Act of 1934, as amended) or any other securities so owned convertible into or exercisable or exchangeable for our common stock, or make any public announcement of an intention to do any of the foregoing; or
- enter into any hedging, swap or other agreement or transaction that transfers, in whole or in part, any of the economic consequences of ownership of our common stock or any other securities so owned convertible into or exercisable or exchangeable for our common stock.

These agreements are subject to certain exceptions, as described in the section of this prospectus entitled “Underwriting.”

Registration rights

Beginning 180 days after this offering, the holders of an aggregate of 259,298,376 shares of our common stock will have rights, subject to certain conditions, to require us to file registration statements covering their shares or to include their shares in registration statements that we may file for ourselves or other stockholders. After registration pursuant to these rights, these shares will become freely tradable without restriction under the Securities Act. See “Description of capital stock—Registration rights” for additional information regarding these registration rights.

Stock options and Form S-8 registration statement

Following this offering, we intend to file one or more registration statements on Form S-8 under the Securities Act to register all of the shares of our common stock subject to outstanding awards and reserved for future issuance under the 2018 Plan, the 2021 Plan and the 2021 ESPP. See “Executive compensation—Incentive shares and stock option and other compensation plans” for additional information regarding these plans. Accordingly, shares of our common stock registered under the registration statements will be available for sale in the open market, subject to Rule 144 volume limitations applicable to affiliates, and subject to any vesting restrictions and lock-up agreements applicable to these shares.

Material U.S. federal tax considerations for non-U.S. holders of common stock

The following is a discussion of material U.S. federal income and estate tax considerations relating to ownership and disposition of our common stock by a non-U.S. holder. For purposes of this discussion, the term “non-U.S. holder” means a beneficial owner (other than a partnership or other entity or arrangement treated as a pass-through entity) of our common stock that is not, for U.S. federal income tax purposes:

- an individual who is a citizen or resident of the United States;
- a corporation, or other entity treated as a corporation for U.S. federal income tax purposes, created or organized in or under the laws of the United States, any state thereof or the District of Columbia;
- an estate, the income of which is subject to U.S. federal income taxation regardless of its source; or
- a trust, if a U.S. court is able to exercise primary supervision over the administration of the trust and one or more U.S. persons have authority to control all substantial decisions of the trust or if the trust has a valid election in effect to be treated as a U.S. person under applicable U.S. Treasury Regulations.

This discussion is based on current provisions of the Code, existing and proposed U.S. Treasury Regulations promulgated thereunder, current administrative rulings and judicial decisions, each as in effect as of the date of this prospectus, and all of which are subject to change or to differing interpretation, possibly with retroactive effect. Any such change or different interpretation could alter the tax considerations to non-U.S. holders described in this prospectus. In addition, there can be no assurance that the Internal Revenue Service, or the IRS, will not challenge one or more of the tax considerations described in this prospectus or that any such challenge would not be sustained by a court.

This discussion addresses only non-U.S. holders that hold shares of our common stock as a capital asset within the meaning of Section 1221 of the Code (generally, property held for investment). This discussion does not address all aspects of U.S. federal income and estate taxation that may be relevant to a particular non-U.S. holder in light of that non-U.S. holder’s individual circumstances nor does it address the alternative minimum tax, the Medicare contribution tax on net investment income or any aspects of U.S. state, local or non-U.S. taxes. This discussion also does not consider any specific facts or circumstances that may apply to a non-U.S. holder and does not address the special tax rules applicable to particular non-U.S. holders, such as:

- insurance companies;
- tax-exempt organizations or governmental organizations;
- financial institutions;
- brokers or dealers in securities;
- pension plans;
- controlled foreign corporations;
- passive foreign investment companies;
- corporations that accumulate earnings to avoid U.S. federal income tax;
- “qualified foreign pension funds” as defined in Section 897(l)(2) of the Code and entities of all of the interests of which are held by qualified foreign pension funds;

- persons that own, or are deemed to own, more than 5% of our capital stock;
- owners that hold our common stock as part of a straddle, hedge, conversion transaction, synthetic security, or other integrated investment; and
- certain U.S. expatriates and former citizens or long-term residents of the United States.

In addition, this discussion does not address the tax treatment of partnerships or persons who hold their common stock through partnerships or other entities or arrangements that are treated as pass-through entities for U.S. federal income tax purposes. A partner in a partnership or other pass-through entity that will hold our common stock should consult his, her, or its own tax advisor regarding the tax consequences of the purchase, ownership, and disposition of our common stock through a partnership or other pass-through entity, as applicable.

Prospective investors should consult their own tax advisors regarding the U.S. federal, state, local, and non-U.S. income and other tax considerations of acquiring, holding, and disposing of our common stock in light of their particular situations.

Dividends

If we pay distributions on our common stock, those distributions generally will constitute dividends for U.S. federal income tax purposes to the extent paid from our current or accumulated earnings and profits, as determined under U.S. federal income tax principles. If a distribution exceeds our current and accumulated earnings and profits, the excess will be treated as a tax-free return of the non-U.S. holder's investment, up to such holder's tax basis in the common stock. Any remaining excess will be treated as capital gain, subject to the tax treatment described below under the heading "—Gain on Disposition of Common Stock."

Dividends paid to a non-U.S. holder generally will be subject to withholding of U.S. federal income tax at a 30% rate or such lower rate as may be specified by an applicable income tax treaty between the United States and such holder's country of residence. A non-U.S. holder of our common stock who claims the benefit of an applicable income tax treaty between the United States and such holder's country of residence generally will be required to provide a properly executed IRS Form W-8BEN or W-8BEN-E (or successor form) and satisfy applicable certification and other requirements. A non-U.S. holder that is eligible for a reduced rate of U.S. withholding tax under an income tax treaty may obtain a refund or credit of any excess amounts withheld by timely filing an appropriate claim with the IRS. Non-U.S. holders are urged to consult their own tax advisors regarding their entitlement to benefits under a relevant income tax treaty.

Dividends that are treated as effectively connected with a trade or business conducted by a non-U.S. holder within the United States and, if an applicable income tax treaty so provides, that are attributable to a permanent establishment or a fixed base maintained by the non-U.S. holder within the United States are generally exempt from the 30% withholding tax if the non-U.S. holder delivers a properly executed IRS Form W-8ECI, stating that the dividends are so connected and satisfies other applicable certification and disclosure requirements. However, such U.S. effectively connected income is taxed on a net income basis at the same U.S. federal income tax rates applicable to United States persons (as defined in the Code). Any U.S. effectively connected income received by a non-U.S. holder that is a corporation may also, under certain circumstances, be subject to an additional "branch profits tax" at a 30% rate or such lower rate as may be specified by an applicable income tax treaty between the United States and such holder's country of residence.

See also the section below entitled "—FATCA" for additional withholding rules that may apply to dividends paid to certain foreign financial institutions or non-financial foreign entities.

Gain on disposition of common stock

Subject to the discussions below under the sections entitled "—Information reporting and backup withholding" and "—FATCA," a non-U.S. holder generally will not be subject to U.S. federal income tax on gain recognized on a disposition of our common stock unless:

- the gain is effectively connected with the non-U.S. holder's conduct of a trade or business in the United States and, if an applicable income tax treaty so provides, the gain is attributable to a permanent establishment or fixed base maintained by the non-U.S. holder in the United States; in these cases, the non-U.S. holder will be taxed on a net income basis at the same U.S. federal income tax rates applicable to United States persons (as defined in the Code), and if the non-U.S. holder is a foreign corporation, an additional branch profits tax at a 30% rate, or such lower rate as may be specified by an applicable income tax treaty, may also apply;
- the non-U.S. holder is a nonresident alien present in the United States for 183 days or more in the taxable year of the disposition and certain other conditions are met, in which case the non-U.S. holder will be subject to a 30% tax (or such lower rate as may be specified by an applicable income tax treaty) on the net gain derived from the disposition, which may be offset by U.S.-source capital losses of the non-U.S. holder provided the non-U.S. holder has timely filed U.S. federal income tax returns with respect to such losses, if any; or
- we are, or have been at any time during the five-year period preceding such disposition (or the non-U.S. holder's holding period, if shorter), a "U.S. real property holding corporation," unless our common stock is regularly traded on an established securities market and the non-U.S. holder held no more than 5% of our outstanding common stock, directly or indirectly, during the shorter of the five year period ending on the date of the disposition or the period that the non-U.S. holder held our common stock. If we are determined to be a U.S. real property holding corporation and the foregoing exception does not apply, then the non-U.S. holder generally will be taxed on its net gain derived from the disposition at the U.S. federal income tax rates applicable to United States persons (as defined in the Code). Generally, a corporation is a "U.S. real property holding corporation" if the fair market value of its "U.S. real property interests" equals or exceeds 50% of the sum of the fair market value of its worldwide real property interests plus its other assets used or held for use in a trade or business. Although there can be no assurance, we believe that we are not currently, and we do not anticipate becoming, a "U.S. real property holding corporation" for U.S. federal income tax purposes. No assurance can be provided that our common stock will be regularly traded on an established securities market for purposes of the rule described above.

Information reporting and backup withholding

We must report annually to the IRS and to each non-U.S. holder the gross amount of the distributions on our common stock paid to such holder and the tax withheld, if any, with respect to such distributions. Non-U.S. holders may have to comply with specific certification procedures to establish that the holder is not a U.S. person (as defined in the Code) in order to avoid backup withholding at the applicable rate with respect to dividends on our common stock. Generally, a non-U.S. holder will comply with such procedures if it provides a properly executed IRS Form W-8BEN or W-8BEN-E (or other applicable Form W-8) or otherwise meets documentary evidence requirements for establishing that it is a non-U.S. holder, or otherwise establishes an exemption. Dividends paid to non-U.S. holders subject to withholding of U.S. federal income tax, as described above under the heading "—Dividends," will generally be exempt from U.S. backup withholding.

Information reporting and backup withholding generally will apply to the proceeds of a disposition of our common stock by a non-U.S. holder effected by or through the U.S. office of any broker, U.S. or foreign, unless the holder certifies its status as a non-U.S. holder and satisfies certain other requirements, or otherwise

establishes an exemption. Generally, information reporting and backup withholding will not apply to a payment of disposition proceeds to a non-U.S. holder where the transaction is effected outside the United States through a non-U.S. office of a broker. However, for information reporting purposes, dispositions effected through a non-U.S. office of a broker with substantial U.S. ownership or operations generally will be treated in a manner similar to dispositions effected through a U.S. office of a broker. Non-U.S. holders should consult their own tax advisors regarding the application of the information reporting and backup withholding rules to them.

Copies of information returns may be made available to the tax authorities of the country in which the non-U.S. holder resides or is incorporated under the provisions of a specific treaty or agreement.

Backup withholding is not an additional tax. Rather, any amounts withheld under the backup withholding rules from a payment to a non-U.S. holder can be refunded or credited against the non-U.S. holder's U.S. federal income tax liability, if any, provided that an appropriate claim is timely filed with the IRS.

FATCA

Sections 1471 to 1474 of the Code commonly referred to as the Foreign Account Tax Compliance Act, or FATCA, generally impose a 30% U.S. federal withholding tax on dividends on, and gross proceeds from the sale or other disposition of, our common stock if paid to a foreign entity unless (i) if the foreign entity is a "foreign financial institution," the foreign entity undertakes certain due diligence, reporting, withholding, and certification obligations, (ii) if the foreign entity is not a "foreign financial institution," the foreign entity identifies certain of its U.S. investors, or (iii) the foreign entity is otherwise excepted under FATCA.

Withholding under FATCA generally will apply to payments of dividends on our common stock. While under the applicable Treasury Regulations and administrative guidance, withholding under FATCA would also apply to payments of gross proceeds from a sale or other disposition of our common stock, under proposed U.S. Treasury Regulations, withholding on payments of gross proceeds is not required. Although such regulations are not final, the preamble to the proposed regulations specifies that taxpayers, including applicable withholding agents, are permitted to rely on such proposed regulations until final regulations are issued.

If withholding under FATCA is required on any payment related to our common stock, investors not otherwise subject to withholding (or that otherwise would be entitled to a reduced rate of withholding) on such payment may be required to seek a refund or credit from the IRS. An intergovernmental agreement between the United States and an applicable foreign country may modify the requirements described in this section. Non-U.S. holders should consult their own tax advisors regarding the possible implications of FATCA on their investment in our common stock and the entities through which they hold our common stock.

U.S. federal estate tax

Common stock owned or treated as owned by an individual who is a non-U.S. holder (as specially defined for U.S. federal estate tax purposes) at the time of death will be included in the individual's gross estate for U.S. federal estate tax purposes and, therefore, may be subject to U.S. federal estate tax, unless an applicable estate tax or other treaty provides otherwise. Non-U.S. holders are urged to consult their own tax advisors regarding the U.S. federal estate tax consequences of the ownership or disposition of our common stock.

The preceding discussion of material U.S. federal tax considerations is for prospective investors' information only. It is not tax advice. Prospective investors should consult their own tax advisors regarding their particular U.S. federal, state, local, and non-U.S. tax consequences of purchasing, holding, and disposing of our common stock.

Underwriting

We are offering the shares of common stock described in this prospectus through a number of underwriters. J.P. Morgan Securities LLC, Jefferies LLC, Guggenheim Securities, LLC and William Blair & Company, L.L.C. are acting as joint book-running managers of the offering and as representatives of the underwriters. We have entered into an underwriting agreement with the underwriters. Subject to the terms and conditions of the underwriting agreement, we have agreed to sell to the underwriters, and each underwriter has severally agreed to purchase, at the public offering price less the underwriting discounts and commissions set forth on the cover page of this prospectus, the number of shares of common stock listed next to its name in the following table:

Name	Number of Shares
J.P. Morgan Securities LLC	
Jefferies LLC	
Guggenheim Securities, LLC	
William Blair & Company, L.L.C.	
Total	

The underwriters are committed to purchase all the common shares offered by us if they purchase any shares. The underwriting agreement also provides that if an underwriter defaults, the purchase commitments of non-defaulting underwriters may also be increased or the offering may be terminated.

The underwriters propose to offer the common shares directly to the public at the initial public offering price set forth on the cover page of this prospectus and to certain dealers at that price less a concession not in excess of $ per share. After the initial offering of the shares to the public, if all of the shares of common stock are not sold at the initial public offering price, the underwriters may change the offering price and the other selling terms. Sales of any shares made outside of the United States may be made by affiliates of the underwriters.

The underwriters have an option to buy up to additional shares of common stock from us to cover sales of shares by the underwriters which exceed the number of shares specified in the table above. The underwriters have 30 days from the date of this prospectus to exercise this option to purchase additional shares. If any shares are purchased with this option to purchase additional shares, the underwriters will purchase shares in approximately the same proportion as shown in the table above. If any additional shares of common stock are purchased, the underwriters will offer the additional shares on the same terms as those on which the shares are being offered.

The underwriting fee is equal to the public offering price per share of common stock less the amount paid by the underwriters to us per share of common stock. The underwriting fee is $ per share. The following table shows the per share and total underwriting discounts and commissions to be paid to the underwriters assuming both no exercise and full exercise of the underwriters' option to purchase additional shares.

	Without option to purchase additional shares exercise	With full option to purchase additional shares exercise
Per Share	$	$
Total	$	$

We estimate that the total expenses of this offering, including registration, filing and listing fees, printing fees and legal and accounting expenses, but excluding the underwriting discounts and commissions, will be approximately $. We have agreed to reimburse the underwriters for expenses relating to the clearance of this offering with the Financial Industry Regulatory Authority, Inc. in an amount up to $.

A prospectus in electronic format may be made available on the web sites maintained by one or more underwriters, or selling group members, if any, participating in the offering. The underwriters may agree to allocate a number of shares to underwriters and selling group members for sale to their online brokerage account holders. Internet distributions will be allocated by the representatives to underwriters and selling group members that may make Internet distributions on the same basis as other allocations.

We have agreed that we will not (i) offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, lend or otherwise transfer or dispose of, directly or indirectly, or submit to, or file with, the Securities and Exchange Commission a registration statement under the Securities Act relating to, any shares of our common stock or securities convertible into or exercisable or exchangeable for any shares of our common stock, or publicly disclose the intention to undertake the foregoing, or (ii) enter into any swap hedging or other agreement that transfers, in whole or in part, any of the economic consequences of ownership of any shares of common stock or any such other securities (whether any such transaction described in clause (i) or (ii) above is to be settled by delivery of common stock or such other securities, in cash or otherwise), without the prior written consent of J.P. Morgan Securities LLC, Jefferies LLC, Guggenheim Securities, LLC and William Blair & Company, L.L.C. for a period of 180 days after the date of this prospectus, other than the shares of our common stock to be sold in this offering.

The restrictions on our actions, as described above, do not apply to (i) the issuance of shares of common stock or securities convertible into or exercisable for shares of our common stock pursuant to the conversion or exchange of convertible or exchangeable securities or the exercise of warrants or options (including net exercise) or the settlement of RSUs (including net settlement), in each case outstanding on the date of the underwriting agreement and described in this prospectus; (ii) grants of stock options, stock awards, restricted stock, RSUs, or other equity awards and the issuance of shares of our common stock or securities convertible into or exercisable or exchangeable for shares of our common stock (whether upon the exercise of stock options or otherwise) to our employees, officers, directors, advisors, or consultants pursuant to the terms of an equity compensation plan in effect as of the closing of this offering and described in this prospectus, provided that such recipients enter into a lock-up agreement with the underwriters; or (iii) our filing of any registration statement on Form S-8 relating to securities granted or to be granted pursuant to any plan in effect on the date of the underwriting agreement and described in this prospectus or any assumed benefit plan pursuant to an acquisition or similar strategic transaction.

Our directors and executive officers, and substantially all of our stockholders (such persons, the “lock-up parties”) have entered into lock-up agreements with the underwriters prior to the commencement of this offering pursuant to which each lock-up party, with limited exceptions, for a period of 180 days after the date of this prospectus (such period, the “restricted period”), may not (and may not cause any of their direct or indirect affiliates to), without the prior written consent of J.P. Morgan Securities LLC, Jefferies LLC, Guggenheim Securities, LLC and William Blair & Company, L.L.C., (1) offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, lend, or otherwise transfer or dispose of, directly or indirectly, any shares of our common stock or any securities convertible into or exercisable or exchangeable for our common stock (including, without limitation, common stock or such other securities which may be deemed to be beneficially owned by such lock-up parties in accordance with the rules and regulations of the SEC and securities which may be issued upon exercise of a stock option or warrant) (collectively with the common stock, the “lock-up securities”)), (2) enter into any hedging, swap or other agreement or transaction that transfers, in whole or in part, any of the economic

consequences of ownership of the lock-up securities, whether any such transaction described in clause (1) or (2) above is to be settled by delivery of lock-up securities, in cash or otherwise, (3) make any demand for or exercise any right with respect to, the registration of any lock-up securities, or (4) publicly disclose the intention to do any of the foregoing. Such persons or entities have acknowledged and agreed that the foregoing precludes them from engaging in any hedging or other transactions or arrangements (including, without limitation, any short sale or the purchase or sale of, or entry into, any put or call option, or combination thereof, forward, swap or any other derivative transaction or instrument, however described or defined) designed or intended, or which could reasonably be expected to lead to or result in, a sale or disposition or transfer (whether by the lock-up parties or any other person or entity) of any economic consequences of ownership, in whole or in part, directly or indirectly, of any lock-up securities, whether any such transaction or arrangement (or instrument provided for thereunder) would be settled by delivery of lock-up securities, in cash or otherwise.

The restrictions described in the immediately preceding paragraph and contained in the lock-up agreements between the underwriters and the lock-up parties do not apply, subject in certain cases to various conditions, to certain transactions, including (a) transfers or dispositions of lock-up securities: (i) as a bona fide gift or gifts, or for bona fide estate planning purposes, (ii) by will, other testamentary document or intestacy, (iii) to any trust for the direct or indirect benefit of the lock-up party or the immediate family of such lock-up party, or if the lock-up party is a trust, to a trustor or beneficiary of the trust or to the estate of a beneficiary of such trust (iv) to a corporation, partnership, limited liability company, trust or other entity of which the lock-up party and/ or one or more members of the immediate family of such lock-up party are, directly or indirectly, the legal and beneficial owner of all of the outstanding equity securities or similar interests, (v) to a nominee or custodian of a person or entity to whom a disposition or transfer would be permissible under clauses (i) through (iv) above, (vi) if the lock-up party is a corporation, partnership, limited liability company, trust or other business entity, (A) to another corporation, partnership, limited liability company, trust or other business entity that is an affiliate of the lock-up party, or to any investment fund or other entity controlling, controlled by, managing or managed by or under common control with the lock-up party or its affiliates, or (B) as part of a distribution or other transfer to general or limited partners, members or stockholders of, or other holders of equity in, the lock-up party; (vii) by operation of law, such as pursuant to a qualified domestic order, divorce settlement, divorce decree, separation agreement or court order, (viii) to us from an employee or other service provider of us upon death, disability or termination of employment or service relationship, in each case, of such employee or service provider, (ix) as part of a sale of a lock-up party's lock-up securities acquired in this offering (other than, in the case of an officer or director of us, any securities such officer or director may purchase in this offering) or in open market transactions after the completion of this offering, (x) to us in connection with the vesting, settlement or exercise of restricted stock units, options, warrants or other rights to purchase shares of our common stock (including, in each case, by way of "net" or "cashless" exercise), including for the payment of exercise price and tax and remittance payments due as a result of the vesting, settlement or exercise of such restricted stock units, options, warrants or rights, provided that any such shares of our common stock received upon such exercise, vesting or settlement shall be subject to the terms of such lock-up agreements, and provided further that any such restricted stock units, options, warrants or rights are held by the lock-up parties pursuant to an agreement or equity award granted under a stock incentive plan or other equity award plan or other arrangement, each such agreement, plan or arrangement which is described in this prospectus, or (xi) pursuant to a bona fide third-party tender offer, merger, consolidation or other similar transaction that is approved by our board of directors and made to all stockholders involving a change in control, provided that if such transaction is not completed, all such lock-up securities would remain subject to the restrictions in the immediately preceding paragraph; provided that (A) in the case of any transfer, disposition or distribution pursuant to clause (a)(i), (ii), (iii), (iv), (v) and (vi), such transfer shall not involve a disposition for value and, each donee, devisee, transferee or distributee shall execute and deliver to the Representatives a lock-up letter,

(B) in the case of any transfer or distribution pursuant to clause (a) (i), (ii), (iii), (iv), (v), (vi) and (ix), no filing by any party (donor, donee, devisee, transferor, transferee, distributer or distributee) under the Exchange Act, or other public announcement shall be required or shall be made voluntarily in connection with such transfer or distribution (other than a filing on a Form 5 or any required Schedule 13F, Schedule 13G or Schedule 13G/A, in each case made after the expiration of the restricted period referred to above) and (C) in the case of any transfer, disposition or distribution pursuant to clause (a) (vii), (viii) and (x) it shall be a condition to such transfer that no public filing, report or announcement shall be voluntarily made and if any filing under Section 16(a) of the Exchange Act, or other public filing, report or announcement reporting a reduction in beneficial ownership of common stock in connection with such transfer or distribution shall be legally required during the restricted period, such filing, report or announcement shall clearly indicate in the footnotes thereto the nature of such transfer; (b) exercise outstanding options, settle restricted stock units or other equity awards granted pursuant to plans or other equity compensation arrangements or exercise warrants, in each case described in this prospectus, provided that any lock-up securities received upon such exercise, vesting or settlement would be subject to restrictions similar to those in the immediately preceding paragraph; (c) exercise or convert outstanding preferred stock, warrants to acquire preferred stock or convertible securities or warrants to acquire shares of our common stock into shares of our common stock, provided that any such shares of common stock or warrants received upon such exercise or conversion would be subject to restrictions similar to those in the immediately preceding paragraph; and (d) the establishment by lock-up parties of trading plans under Rule 10b5-1 under the Exchange Act, provided that (1) such plans do not provide for the transfer or disposition of lock-up securities during the restricted period and (2) no filing by any party under the Exchange Act or other public announcement shall be required or made voluntarily in connection with such trading plan.

J.P. Morgan Securities LLC, Jefferies LLC, Guggenheim Securities, LLC and William Blair & Company, L.L.C., in their sole discretion, may release the securities subject to any of the lock-up agreements with the underwriters described above, in whole or in part at any time.

We have agreed to indemnify the underwriters against certain liabilities, including liabilities under the Securities Act.

We will apply to have our common stock approved for listing/quotation on the Nasdaq Global Market under the symbol “VERV”.

In connection with this offering, the underwriters may engage in stabilizing transactions, which involves making bids for, purchasing and selling shares of common stock in the open market for the purpose of preventing or retarding a decline in the market price of the common stock while this offering is in progress. These stabilizing transactions may include making short sales of common stock, which involves the sale by the underwriters of a greater number of shares of common stock than they are required to purchase in this offering, and purchasing shares of common stock on the open market to cover positions created by short sales. Short sales may be “covered” shorts, which are short positions in an amount not greater than the underwriters’ option to purchase additional shares referred to above, or may be “naked” shorts, which are short positions in excess of that amount. The underwriters may close out any covered short position either by exercising their option to purchase additional shares, in whole or in part, or by purchasing shares in the open market. In making this determination, the underwriters will consider, among other things, the price of shares available for purchase in the open market compared to the price at which the underwriters may purchase shares through the option to purchase additional shares. A naked short position is more likely to be created if the underwriters are concerned that there may be downward pressure on the price of the common stock in the open market that could adversely affect investors who purchase in this offering. To the extent that the underwriters create a naked short position, they will purchase shares in the open market to cover the position.

The underwriters have advised us that, pursuant to Regulation M of the Securities Act, they may also engage in other activities that stabilize, maintain or otherwise affect the price of the common stock, including the imposition of penalty bids. This means that if the representatives of the underwriters purchase common stock in the open market in stabilizing transactions or to cover short sales, the representatives can require the underwriters that sold those shares as part of this offering to repay the underwriting discount received by them.

These activities may have the effect of raising or maintaining the market price of the common stock or preventing or retarding a decline in the market price of the common stock, and, as a result, the price of the common stock may be higher than the price that otherwise might exist in the open market. If the underwriters commence these activities, they may discontinue them at any time. The underwriters may carry out these transactions on the Nasdaq Global Market, in the over-the-counter market or otherwise.

Prior to this offering, there has been no public market for our common stock. The initial public offering price will be determined by negotiations between us and the representatives of the underwriters. In determining the initial public offering price, we and the representatives of the underwriters expect to consider a number of factors including:

- the information set forth in this prospectus and otherwise available to the representatives;
- our prospects and the history and prospects for the industry in which we compete;
- an assessment of our management;
- our prospects for future earnings;
- the general condition of the securities markets at the time of this offering;
- the recent market prices of, and demand for, publicly traded common stock of generally comparable companies; and
- other factors deemed relevant by the underwriters and us.

Neither we nor the underwriters can assure investors that an active trading market will develop for our common shares, or that the shares will trade in the public market at or above the initial public offering price.

Other than in the United States, no action has been taken by us or the underwriters that would permit a public offering of the securities offered by this prospectus in any jurisdiction where action for that purpose is required. The securities offered by this prospectus may not be offered or sold, directly or indirectly, nor may this prospectus or any other offering material or advertisements in connection with the offer and sale of any such securities be distributed or published in any jurisdiction, except under circumstances that will result in compliance with the applicable rules and regulations of that jurisdiction. Persons into whose possession this prospectus comes are advised to inform themselves about and to observe any restrictions relating to the offering and the distribution of this prospectus. This prospectus does not constitute an offer to sell or a solicitation of an offer to buy any securities offered by this prospectus in any jurisdiction in which such an offer or a solicitation is unlawful.

Other relationships

Certain of the underwriters and their affiliates have provided in the past to us and our affiliates and may provide from time to time in the future certain commercial banking, financial advisory, investment banking and other services for us and such affiliates in the ordinary course of their business, for which they have received

and may continue to receive customary fees and commissions. In addition, from time to time, certain of the underwriters and their affiliates may effect transactions for their own account or the account of customers, and hold on behalf of themselves or their customers, long or short positions in our debt or equity securities or loans, and may do so in the future.

Selling restrictions

Other than in the United States, no action has been taken by us or the underwriters that would permit a public offering of the securities offered by this prospectus in any jurisdiction where action for that purpose is required. The securities offered by this prospectus may not be offered or sold, directly or indirectly, nor may this prospectus or any other offering material or advertisements in connection with the offer and sale of any such securities be distributed or published in any jurisdiction, except under circumstances that will result in compliance with the applicable rules and regulations of that jurisdiction. Persons into whose possession this prospectus comes are advised to inform themselves about and to observe any restrictions relating to the offering and the distribution of this prospectus. This prospectus does not constitute an offer to sell or a solicitation of an offer to buy any securities offered by this prospectus in any jurisdiction in which such an offer or a solicitation is unlawful.

Notice to prospective investors in Canada

The shares may be sold only to purchasers purchasing, or deemed to be purchasing, as principal that are accredited investors, as defined in National Instrument 45-106 Prospectus Exemptions or subsection 73.3(1) of the Securities Act (Ontario), and are permitted clients, as defined in National Instrument 31-103 Registration Requirements, Exemptions and Ongoing Registrant Obligations. Any resale of the shares must be made in accordance with an exemption from, or in a transaction not subject to, the prospectus requirements of applicable securities laws.

Securities legislation in certain provinces or territories of Canada may provide a purchaser with remedies for rescission or damages if this prospectus (including any amendment thereto) contains a misrepresentation, provided that the remedies for rescission or damages are exercised by the purchaser within the time limit prescribed by the securities legislation of the purchaser's province or territory. The purchaser should refer to any applicable provisions of the securities legislation of the purchaser's province or territory for particulars of these rights or consult with a legal advisor.

Pursuant to section 3A.3 of National Instrument 33-105 Underwriting Conflicts (NI 33-105), the underwriters are not required to comply with the disclosure requirements of NI 33-105 regarding underwriter conflicts of interest in connection with this offering.

Notice to prospective investors in the European Economic Area

In relation to each Member State of the European Economic Area (each a Relevant State), no shares have been offered or will be offered pursuant to the offering to the public in that Relevant State prior to the publication of a prospectus in relation to the shares which has been approved by the competent authority in that Relevant State or, where appropriate, approved in another Relevant State and notified to the competent authority in that Relevant State, all in accordance with the Prospectus Regulation, except that the shares may be offered to the public in that Relevant State at any time:

(a) to any legal entity which is a qualified investor as defined under Article 2 of the Prospectus Regulation;

(b) to fewer than 150 natural or legal persons (other than qualified investors as defined under Article 2 of the Prospectus Regulation), subject to obtaining the prior consent of representatives for any such offer; or

(c) in any other circumstances falling within Article 1(4) of the Prospectus Regulation,

provided that no such offer of the shares shall require us or any underwriter to publish a prospectus pursuant to Article 3 of the Prospectus Regulation or supplement a prospectus pursuant to Article 23 of the Prospectus Regulation.

For the purposes of this provision, the expression an “offer to the public” in relation to the shares in any Relevant State means the communication in any form and by any means of sufficient information on the terms of the offer and any shares to be offered so as to enable an investor to decide to purchase or subscribe for any shares, and the expression “Prospectus Regulation” means Regulation (EU) 2017/1129.

Notice to prospective investors in the United Kingdom

No shares have been offered or will be offered pursuant to the offering to the public in the United Kingdom prior to the publication of a prospectus in relation to the Shares which has been approved by the Financial Conduct Authority, except that the shares may be offered to the public in the United Kingdom at any time:

(a) to any legal entity which is a qualified investor as defined under Article 2 of the UK Prospectus Regulation;

(b) to fewer than 150 natural or legal persons (other than qualified investors as defined under Article 2 of the UK Prospectus Regulation), subject to obtaining the prior consent of the representatives for any such offer; or

(c) in any other circumstances falling within Section 86 of the FSMA.

provided that no such offer of the shares shall require us or any underwriter to publish a prospectus pursuant to Section 85 of the FSMA or supplement a prospectus pursuant to Article 23 of the UK Prospectus Regulation. For the purposes of this provision, the expression an “offer to the public” in relation to the shares in the United Kingdom means the communication in any form and by any means of sufficient information on the terms of the offer and any shares to be offered so as to enable an investor to decide to purchase or subscribe for any shares and the expression “UK Prospectus Regulation” means Regulation (EU) 2017/1129 as it forms part of domestic law by virtue of the European Union (Withdrawal) Act 2018.

Notice to prospective investors in Switzerland

The shares may not be publicly offered in Switzerland and will not be listed on the SIX Swiss Exchange, or SIX or on any other stock exchange or regulated trading facility in Switzerland. This document does not constitute a prospectus within the meaning of, and has been prepared without regard to the disclosure standards for issuance prospectuses under art. 652a or art. 1156 of the Swiss Code of Obligations or the disclosure standards for listing prospectuses under art. 27 ff. of the SIX Listing Rules or the listing rules of any other stock exchange or regulated trading facility in Switzerland. Neither this document nor any other offering or marketing material relating to the shares or the offering may be publicly distributed or otherwise made publicly available in Switzerland.

Neither this document nor any other offering or marketing material relating to the offering, the Company or the shares have been or will be filed with or approved by any Swiss regulatory authority. In particular, this document will not be filed with, and the offer of shares will not be supervised by, the Swiss Financial Market

Supervisory Authority FINMA, and the offer of shares has not been and will not be authorized under the Swiss Federal Act on Collective Investment Schemes, or CISA. The investor protection afforded to acquirers of interests in collective investment schemes under the CISA does not extend to acquirers of shares.

Notice to prospective investors in the Dubai International Financial Centre

This document relates to an Exempt Offer in accordance with the Markets Rules 2012 of the Dubai Financial Services Authority, or DFSA. This document is intended for distribution only to persons of a type specified in the Markets Rules 2012 of the DFSA. It must not be delivered to, or relied on by, any other person. The DFSA has no responsibility for reviewing or verifying any documents in connection with Exempt Offers. The DFSA has not approved this prospectus supplement nor taken steps to verify the information set forth herein and has no responsibility for this document. The securities to which this document relates may be illiquid and/or subject to restrictions on their resale. Prospective purchasers of the securities offered should conduct their own due diligence on the securities. If you do not understand the contents of this document you should consult an authorized financial advisor.

In relation to its use in the Dubai International Financial Centre, or DIFC, this document is strictly private and confidential and is being distributed to a limited number of investors and must not be provided to any person other than the original recipient, and may not be reproduced or used for any other purpose. The interests in the securities may not be offered or sold directly or indirectly to the public in the DIFC.

Notice to prospective investors in the United Arab Emirates

The shares have not been, and are not being, publicly offered, sold, promoted or advertised in the United Arab Emirates (including the DIFC) other than in compliance with the laws of the United Arab Emirates (and the DIFC) governing the issue, offering and sale of securities. Further, this prospectus does not constitute a public offer of securities in the United Arab Emirates (including the DIFC) and is not intended to be a public offer. This prospectus has not been approved by or filed with the Central Bank of the United Arab Emirates, the Securities and Commodities Authority or the DFSA.

Notice to prospective investors in Australia

This prospectus:

- does not constitute a disclosure document or a prospectus under Chapter 6D.2 of the Corporations Act 2001, or the Corporations Act;
- has not been, and will not be, lodged with the Australian Securities and Investments Commission, or ASIC, as a disclosure document for the purposes of the Corporations Act and does not purport to include the information required of a disclosure document for the purposes of the Corporations Act; and
- may only be provided in Australia to select investors who are able to demonstrate that they fall within one or more of the categories of investors, available under section 708 of the Corporations Act, or Exempt Investors.

The shares may not be directly or indirectly offered for subscription or purchased or sold, and no invitations to subscribe for or buy the shares may be issued, and no draft or definitive offering memorandum, advertisement or other offering material relating to any shares may be distributed in Australia, except where disclosure to investors is not required under Chapter 6D of the Corporations Act or is otherwise in compliance with all applicable Australian laws and regulations. By submitting an application for the shares, you represent and warrant to us that you are an Exempt Investor.

As any offer of shares under this document will be made without disclosure in Australia under Chapter 6D.2 of the Corporations Act, the offer of those securities for resale in Australia within 12 months may, under section 707 of the Corporations Act, require disclosure to investors under Chapter 6D.2 if none of the exemptions in section 708 applies to that resale. By applying for the shares you undertake to us that you will not, for a period of 12 months from the date of issue of the shares, offer, transfer, assign or otherwise alienate those shares to investors in Australia except in circumstances where disclosure to investors is not required under Chapter 6D.2 of the Corporations Act or where a compliant disclosure document is prepared and lodged with ASIC.

Notice to prospective investors in Japan

The shares have not been and will not be registered pursuant to Article 4, Paragraph 1 of the Financial Instruments and Exchange Act. Accordingly, none of the shares nor any interest therein may be offered or sold, directly or indirectly, in Japan or to, or for the benefit of, any "resident" of Japan (which term as used herein means any person resident in Japan, including any corporation or other entity organized under the laws of Japan), or to others for re-offering or resale, directly or indirectly, in Japan or to or for the benefit of a resident of Japan, except pursuant to an exemption from the registration requirements of, and otherwise in compliance with, the Financial Instruments and Exchange Act and any other applicable laws, regulations and ministerial guidelines of Japan in effect at the relevant time.

Notice to prospective investors in Hong Kong

The shares have not been offered or sold and will not be offered or sold in Hong Kong, by means of any document, other than (a) to "professional investors" as defined in the Securities and Futures Ordinance (Cap. 571 of the Laws of Hong Kong), or the SFO, of Hong Kong and any rules made thereunder; or (b) in other circumstances which do not result in the document being a "prospectus" as defined in the Companies (Winding Up and Miscellaneous Provisions) Ordinance (Cap. 32) of Hong Kong, or the CO or which do not constitute an offer to the public within the meaning of the CO. No advertisement, invitation or document relating to the shares has been or may be issued or has been or may be in the possession of any person for the purposes of issue, whether in Hong Kong or elsewhere, which is directed at, or the contents of which are likely to be accessed or read by, the public of Hong Kong (except if permitted to do so under the securities laws of Hong Kong) other than with respect to shares which are or are intended to be disposed of only to persons outside Hong Kong or only to "professional investors" as defined in the SFO and any rules made thereunder.

Notice to prospective investors in Singapore

Each joint book-running manager has acknowledged that this prospectus has not been registered as a prospectus with the Monetary Authority of Singapore. Accordingly, each joint book-running manager has represented and agreed that it has not offered or sold any shares or caused the shares to be made the subject of an invitation for subscription or purchase and will not offer or sell any shares or cause the shares to be made the subject of an invitation for subscription or purchase, and has not circulated or distributed, nor will it circulate or distribute, this prospectus or any other document or material in connection with the offer or sale, or invitation for subscription or purchase, of the shares, whether directly or indirectly, to any person in Singapore other than:

(a) to an institutional investor (as defined in Section 4A of the Securities and Futures Act (Chapter 289) of Singapore, as modified or amended from time to time, or the SFA) pursuant to Section 274 of the SFA;

(b) to a relevant person (as defined in Section 275(2) of the SFA) pursuant to Section 275(1) of the SFA, or any person pursuant to Section 275(1A) of the SFA, and in accordance with the conditions specified in Section 275 of the SFA; or

(c) otherwise pursuant to, and in accordance with the conditions of, any other applicable provision of the SFA.

Where the shares are subscribed or purchased under Section 275 of the SFA by a relevant person which is:

(a) a corporation (which is not an accredited investor (as defined in Section 4A of the SFA)) the sole business of which is to hold investments and the entire share capital of which is owned by one or more individuals, each of whom is an accredited investor; or

(b) a trust (where the trustee is not an accredited investor) whose sole purpose is to hold investments and each beneficiary of the trust is an individual who is an accredited investor,

securities or securities-based derivatives contracts (each term as defined in Section 2(1) of the SFA) of that corporation or the beneficiaries' rights and interest (howsoever described) in that trust shall not be transferred within six months after that corporation or that trust has acquired the shares pursuant to an offer made under Section 275 of the SFA except:

(i) to an institutional investor or to a relevant person, or to any person arising from an offer referred to in Section 275(1A) or Section 276(4)(i)(B) of the SFA;

(ii) where no consideration is or will be given for the transfer;

(iii) where the transfer is by operation of law;

(iv) as specified in Section 276(7) of the SFA; or

(v) as specified in Regulation 37A of the Securities and Futures (Offers of Investments) (Securities and Securities-based Derivatives Contracts) Regulations 2018.

Singapore SFA Product Classification—In connection with Section 309B of the SFA and the CMP Regulations 2018, unless otherwise specified before an offer of Notes, we have determined, and hereby notify all relevant persons (as defined in Section 309A(1) of the SFA), that the shares are "prescribed capital markets products" (as defined in the CMP Regulations 2018) and Excluded Investment Products (as defined in MAS Notice SFA 04-N12: Notice on the Sale of Investment Products and MAS Notice FAA-N16: Notice on Recommendations on Investment Products).

Notice to prospective investors in Bermuda

Shares may be offered or sold in Bermuda only in compliance with the provisions of the Investment Business Act of 2003 of Bermuda which regulates the sale of securities in Bermuda. Additionally, non-Bermudian persons (including companies) may not carry on or engage in any trade or business in Bermuda unless such persons are permitted to do so under applicable Bermuda legislation.

Notice to prospective investors in Saudi Arabia

This document may not be distributed in the Kingdom of Saudi Arabia except to such persons as are permitted under the Offers of Securities Regulations as issued by the board of the Saudi Arabian Capital Market Authority, or CMA pursuant to resolution number 2-11-2004 dated 4 October 2004 as amended by resolution number 1-28-2008, as amended. The CMA does not make any representation as to the accuracy or completeness of this document and expressly disclaims any liability whatsoever for any loss arising from, or incurred in reliance upon, any part of this document. Prospective purchasers of the securities offered hereby should conduct their own due diligence on the accuracy of the information relating to the securities. If you do not understand the contents of this document, you should consult an authorized financial adviser.

Notice to prospective investors in the British Virgin Islands

The shares are not being, and may not be offered to the public or to any person in the British Virgin Islands for purchase or subscription by or on our behalf. The shares may be offered to companies incorporated under the BVI Business Companies Act, 2004 (British Virgin Islands), or BVI Companies, but only where the offer will be made to, and received by, the relevant BVI Company entirely outside of the British Virgin Islands.

Notice to prospective investors in China

This prospectus will not be circulated or distributed in the PRC and the shares will not be offered or sold, and will not be offered or sold to any person for re-offering or resale directly or indirectly to any residents of the PRC except pursuant to any applicable laws and regulations of the PRC. Neither this prospectus nor any advertisement or other offering material may be distributed or published in the PRC, except under circumstances that will result in compliance with applicable laws and regulations.

Notice to prospective investors in Korea

The shares have not been and will not be registered under the Financial Investments Services and Capital Markets Act of Korea and the decrees and regulations thereunder, or the FSCMA, and the shares have been and will be offered in Korea as a private placement under the FSCMA. None of the shares may be offered, sold or delivered directly or indirectly, or offered or sold to any person for re-offering or resale, directly or indirectly, in Korea or to any resident of Korea except pursuant to the applicable laws and regulations of Korea, including the FSCMA and the Foreign Exchange Transaction Law of Korea and the decrees and regulations thereunder, or the FETL. The shares have not been listed on any of securities exchanges in the world including, without limitation, the Korea Exchange in Korea. Furthermore, the purchaser of the shares shall comply with all applicable regulatory requirements (including but not limited to requirements under the FETL) in connection with the purchase of the shares. By the purchase of the shares, the relevant holder thereof will be deemed to represent and warrant that if it is in Korea or is a resident of Korea, it purchased the shares pursuant to the applicable laws and regulations of Korea.

Notice to prospective investors in Malaysia

No prospectus or other offering material or document in connection with the offer and sale of the shares has been or will be registered with the Securities Commission of Malaysia, or Commission, for the Commission's approval pursuant to the Capital Markets and Services Act 2007. Accordingly, this prospectus and any other document or material in connection with the offer or sale, or invitation for subscription or purchase, of the shares may not be circulated or distributed, nor may the shares be offered or sold, or be made the subject of an invitation for subscription or purchase, whether directly or indirectly, to persons in Malaysia other than (i) a closed end fund approved by the Commission; (ii) a holder of a Capital Markets Services Licence; (iii) a person who acquires the shares, as principal, if the offer is on terms that the shares may only be acquired at a consideration of not less than RM250,000 (or its equivalent in foreign currencies) for each transaction; (iv) an individual whose total net personal assets or total net joint assets with his or her spouse exceeds RM3 million (or its equivalent in foreign currencies), excluding the value of the primary residence of the individual; (v) an individual who has a gross annual income exceeding RM300,000 (or its equivalent in foreign currencies) per annum in the preceding twelve months; (vi) an individual who, jointly with his or her spouse, has a gross annual income of RM400,000 (or its equivalent in foreign currencies), per annum in the preceding twelve months; (vii) a corporation with total net assets exceeding RM10 million (or its equivalent in a foreign currencies) based on the last audited accounts; (viii) a partnership with total net assets exceeding RM10 million (or its equivalent in foreign currencies); (ix) a bank licensee or insurance licensee as defined in the Labuan Financial Services and Securities Act 2010; (x) an Islamic bank licensee or takaful licensee as defined in the Labuan Financial Services and Securities Act 2010; and (xi) any other person as may be specified by the Commission; provided that, in the

each of the preceding categories (i) to (xi), the distribution of the shares is made by a holder of a Capital Markets Services Licence who carries on the business of dealing in securities. The distribution in Malaysia of this prospectus is subject to Malaysian laws. This prospectus does not constitute and may not be used for the purpose of public offering or an issue, offer for subscription or purchase, invitation to subscribe for or purchase any securities requiring the registration of a prospectus with the Commission under the Capital Markets and Services Act 2007.

Notice to prospective investors in Taiwan

The shares have not been and will not be registered with the Financial Supervisory Commission of Taiwan pursuant to relevant securities laws and regulations and may not be sold, issued or offered within Taiwan through a public offering or in circumstances which constitutes an offer within the meaning of the Securities and Exchange Act of Taiwan that requires a registration or approval of the Financial Supervisory Commission of Taiwan. No person or entity in Taiwan has been authorized to offer, sell, give advice regarding or otherwise intermediate the offering and sale of the shares in Taiwan.

Notice to prospective investors in South Africa

Due to restrictions under the securities laws of South Africa, no “offer to the public” (as such term is defined in the South African Companies Act, No. 71 of 2008 (as amended or re-enacted), or the South African Companies Act) is being made in connection with the issue of the shares in South Africa. Accordingly, this document does not, nor is it intended to, constitute a “registered prospectus” (as that term is defined in the South African Companies Act) prepared and registered under the South African Companies Act and has not been approved by, and/or filed with, the South African Companies and Intellectual Property Commission or any other regulatory authority in South Africa. The shares are not offered, and the offer shall not be transferred, sold, renounced or delivered, in South Africa or to a person with an address in South Africa, unless one or other of the following exemptions stipulated in section 96 (1) applies:

Section 96 (1) (a)	the offer, transfer, sale, renunciation or delivery is to: (i) persons whose ordinary business, or part of whose ordinary business, is to deal in securities, as principal or agent; (ii) the South African Public Investment Corporation; (iii) persons or entities regulated by the Reserve Bank of South Africa; (iv) authorised financial service providers under South African law; (v) financial institutions recognised as such under South African law; (vi) a wholly owned subsidiary of any person or entity contemplated in (c), (d) or (e), acting as agent in the capacity of an authorised portfolio manager for a pension fund, or as manager for a collective investment scheme (in each case duly registered as such under South African law); or (vii) any combination of the person in (i) to (vi); or
Section 96 (1) (b)	the total contemplated acquisition cost of the securities, for any single addressee acting as principal is equal to or greater than ZAR1,000,000 or such higher amount as may be promulgated by notice in the Government Gazette of South Africa pursuant to section 96(2)(a) of the South African Companies Act.

Information made available in this prospectus should not be considered as "*advice*" as defined in the South African Financial Advisory and Intermediary Services Act, 2002.

Notice to prospective investors in Israel

This document does not constitute a prospectus under the Israeli Securities Law, 5728-1968, or the Securities Law, and has not been filed with or approved by the Israel Securities Authority. In Israel, this prospectus is being distributed only to, and is directed only at, and any offer of the shares is directed only at, (i) a limited number of persons in accordance with the Israeli Securities Law and (ii) investors listed in the first addendum, or the Addendum, to the Israeli Securities Law, consisting primarily of joint investment in trust funds, provident funds, insurance companies, banks, portfolio managers, investment advisors, members of the Tel Aviv Stock Exchange, underwriters, venture capital funds, entities with equity in excess of NIS 50 million and "qualified individuals," each as defined in the Addendum (as it may be amended from time to time), collectively referred to as qualified investors (in each case, purchasing for their own account or, where permitted under the Addendum, for the accounts of their clients who are investors listed in the Addendum). Qualified investors are required to submit written confirmation that they fall within the scope of the Addendum, are aware of the meaning of same and agree to it.

Legal matters

The validity of the shares of common stock offered hereby is being passed upon for us by Wilmer Cutler Pickering Hale and Dorr LLP, Boston, Massachusetts. Cooley LLP, Washington, DC, is acting as counsel for the underwriters in connection with this offering.

Experts

The consolidated financial statements of Verve Therapeutics, Inc. at December 31, 2020 and 2019, and for each of the two years in the period ended December 31, 2020, appearing in this Prospectus and Registration Statement have been audited by Ernst & Young LLP, independent registered public accounting firm, as set forth in their report thereon appearing elsewhere herein, and are included in reliance upon such report given on the authority of such firm as experts in accounting and auditing.

Where you can find more information

We have filed with the SEC a registration statement on Form S-1 under the Securities Act with respect to the shares of common stock we are offering to sell. This prospectus, which constitutes part of the registration statement, does not include all of the information contained in the registration statement and the exhibits, schedules and amendments to the registration statement. For further information with respect to us and our common stock, we refer you to the registration statement and to the exhibits and schedules to the registration statement. Statements contained in this prospectus about the contents of any contract, agreement or other document are not necessarily complete, and, in each instance, we refer you to the copy of the contract, agreement or other document filed as an exhibit to the registration statement. Each of these statements is qualified in all respects by this reference to such contract, agreement or document.

The SEC maintains a website, which is located at http://www.sec.gov, that contains reports, proxy and information statements and other information regarding issuers that file electronically with the SEC. You may access the registration statement of which this prospectus is a part at the SEC's website. Upon completion of this offering, we will be subject to the information reporting requirements of the Securities Exchange Act of 1934, as amended, and we will file reports, proxy statements and other information with the SEC. We plan to fulfill our obligations with respect to such requirements by filing periodic reports and other information with the SEC. We intend to furnish our stockholders with annual reports containing financial statements certified by an independent registered public accounting firm. Our website address is www.vervetx.com. The information contained on, or that can be accessed through, our website is not a part of this prospectus. We have included our website address in this prospectus solely as an inactive textual reference.

Index to consolidated financial statements

Report of independent registered public accounting firm

To the Stockholders and the Board of Directors of Verve Therapeutics, Inc.

Opinion on the financial statements

We have audited the accompanying consolidated balance sheets of Verve Therapeutics, Inc. (the Company) as of December 31, 2020 and 2019, the related consolidated statements of operations and comprehensive loss, convertible preferred stock and stockholders' deficit and cash flows for each of the two years in the period ended December 31, 2020, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company at December 31, 2020 and 2019, and the results of its operations and its cash flows for each of the two years in the period ended December 31, 2020, in conformity with U.S. generally accepted accounting principles.

Basis for opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB and in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2020.
Boston, Massachusetts
April 16, 2021

Verve Therapeutics, Inc.
Consolidated balance sheets

(in thousands, except share and per share amounts)	December 31, 2020	December 31, 2019
Assets		
Current assets:		
Cash and cash equivalents	$ 8,993	$ 2,986
Marketable securities	63,119	15,796
Prepaid expenses and other current assets	1,854	272
Total current assets	73,966	19,054
Property and equipment, net	3,984	2,358
Restricted cash	463	235
Total assets	$ 78,413	$ 21,647
Liabilities, convertible preferred stock, and stockholders' deficit		
Current liabilities:		
Accounts payable	$ 36	$ 2,411
Accrued expenses	7,189	1,111
Deferred rent, current portion	90	31
Total current liabilities	7,315	3,553
Deferred rent, net of current portion	125	132
Preferred stock tranche liability	—	9,571
Success payment liability (See Note 8 and Note 15)	2,806	419
Antidilution rights liability (See Note 8 and Note 15)	6,916	2,044
Other liabilities	—	1
Total liabilities	17,162	15,720
Commitments and contingencies (See Note 7 and Note 8)		
Convertible preferred stock (See Note 10)	125,160	25,480
Stockholders' deficit:		
Common stock, $0.001 par value; 255,000,000 and 164,016,724 shares authorized, 28,921,345 and 27,127,622 shares issued at December 31, 2020 and 2019, respectively; 23,943,120 and 17,171,171 shares outstanding at December 31, 2020 and 2019, respectively	24	17
Additional paid-in capital	2,595	1,253
Accumulated other comprehensive income	8	9
Accumulated deficit	(66,536)	(20,832)
Total stockholders' deficit	(63,909)	(19,553)
Total liabilities, convertible preferred stock, and stockholders' deficit	$ 78,413	$ 21,647

The accompanying notes are an integral part of these consolidated financial statements.

Verve Therapeutics, Inc.
Consolidated statements of operations and comprehensive loss

(in thousands, except share and per share amounts)	Year ended December 31, 2020	2019
Operating expenses:		
Research and development	$ 35,371	$ 11,144
General and administrative	5,256	2,498
Total operating expenses	40,627	13,642
Loss from operations	(40,627)	(13,642)
Other income (expense):		
Change in fair value of preferred stock tranche liability	2,507	(4,883)
Change in fair value of antidilution rights liability	(5,359)	(982)
Change in fair value of success payment liability	(2,387)	(68)
Interest income and other income (expense), net	162	278
Total other (expense) income, net	(5,077)	(5,655)
Net loss	$ (45,704)	$ (19,297)
Net loss per common share attributable to common stockholders, basic and diluted	$ (2.19)	$ (1.63)
Weighted-average common shares used in net loss per share attributable to common stockholders, basic and diluted	20,834,742	11,825,835
Comprehensive Loss:		
Net loss	$ (45,704)	$ (19,297)
Other comprehensive (loss) income:		
Unrealized (loss) gain on marketable securities	(1)	9
Comprehensive loss	$ (45,705)	$ (19,288)

The accompanying notes are an integral part of these consolidated financial statements.

Verve Therapeutics, Inc.
Consolidated statements of convertible preferred stock and stockholders' deficit

(in thousands, except share amounts)	Convertible preferred stock		Common stock		Additional paid-in capital	Accumulated other comprehensive income	Accumulated deficit	Total stockholders' deficit
	Shares	Amount	Shares	Amount				
Balance at December 31, 2018	19,565,217	$ 6,905	4,978,226	$ 5	$ 46	$ —	$ (1,535)	$ (1,484)
Issuance of Series A convertible preferred stock, net of issuance costs of $10 and tranche right liability of $84	30,183,947	17,956	—	—	—	—	—	—
Issuance of Series A Preferred Stock in payment of licensing fee	1,672,240	619	—	—	—	—	—	—
Issuance of common stock to licensor institutions	—	—	6,236,853	6	742	—	—	748
Vesting of restricted common stock	—	—	5,956,092	6	(5)	—	—	1
Repayment of shareholder loan	—	—	—	—	24	—	—	24
Unrealized gain on available-for-sale securities	—	—	—	—	—	9	—	9
Stock-based compensation	—	—	—	—	446	—	—	446
Net loss	—	—	—	—	—	—	(19,297)	(19,297)
Balance at December 31, 2019	51,421,404	25,480	17,171,171	17	1,253	9	(20,832)	(19,553)
Issuance of Series A convertible preferred stock and settlement of tranche right liability of $7.0 million, net of issuance costs of $22	49,749,167	36,792	—	—	—	—	—	—
Issuance of Series A-2 convertible preferred stock, net of issuance costs of $112	78,348,461	62,888	—	—	—	—	—	—
Additional issuances of common stock to licensor institutions	—	—	1,739,557	2	485	—	—	487
Vesting of restricted common stock	—	—	4,978,226	5	(4)	—	—	1
Unrealized loss on available-for-sale securities	—	—	—	—	—	(1)	—	(1)
Stock-based compensation	—	—	—	—	850	—	—	850
Exercise of common stock options	—	—	54,166	—	11	—	—	11
Net loss	—	—	—	—	—	—	(45,704)	(45,704)
Balance at December 31, 2020	179,519,032	$125,160	23,943,120	$ 24	$ 2,595	$ 8	$ (66,536)	$ (63,909)

The accompanying notes are an integral part of these consolidated financial statements.

Verve Therapeutics, Inc.
Consolidated statements of cash flows

(in thousands)	Year ended December 31, 2020	2019
Cash flows from operating activities:		
Net loss	$(45,704)	$(19,297)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation	1,328	106
Non-cash research and development license expense	—	2,781
Amortization (accretion) of premium (discount) on marketable securities	380	(72)
Stock-based compensation	850	446
Change in fair value of preferred stock tranche liabilities	(2,507)	4,883
Change in fair value of antidilution rights	5,359	982
Change in fair value of success payments liabilities	2,387	68
Changes in operating assets and liabilities:		
Prepaid expenses and other current assets	(1,582)	(182)
Accounts payable	(1,898)	1,735
Accrued expenses and other liabilities	6,071	945
Deferred rent liability	51	163
Net cash used in operating activities	(35,265)	(7,442)
Cash flows from investing activities:		
Purchases of property and equipment	(3,424)	(1,857)
Purchases of marketable securities	(98,484)	(22,001)
Maturities of marketable securities	50,781	11,100
Net cash used in investing activities	(51,127)	(12,758)
Cash flows from financing activities		
Proceeds from issuance of Series A Preferred Stock, net	29,728	18,040
Proceeds from issuance of Series A-2 Preferred Stock, net	62,888	—
Shareholder loan given	—	(110)
Proceeds from exercise of stock options	11	—
Payments received on shareholder loan	—	24
Net cash provided by financing activities	92,627	17,954
Increase (decrease) in cash, cash equivalents and restricted cash	6,235	(2,246)
Cash, cash equivalents and restricted cash—beginning of period	3,221	5,467
Cash, cash equivalents and restricted cash—end of period	$ 9,456	$ 3,221
Supplemental disclosure of noncash investing activities:		
Property and equipment additions included in accounts payable and accrued expenses	$ 86	$ 556
Supplemental disclosures of noncash financing activities:		
Issuance of preferred stock tranche liability	$ —	$ 84
Settlement of tranche right liability	$ 7,064	$ —
Partial settlement of derivative liability by issuing common stock	$ 486	$ 135

The accompanying notes are an integral part of these consolidated financial statements.

Verve Therapeutics, Inc.
Notes to consolidated financial statements

1. Nature of the business and basis of presentation

Organization

Verve Therapeutics, Inc. (the “Company” or “Verve”) is a genetic medicines company pioneering a new approach to the care of cardiovascular disease, transforming treatment from chronic management to single-course gene editing medicines. The Company was incorporated on March 9, 2018 as Endcadia, Inc., a Delaware corporation, and began operations shortly thereafter. In January 2019, the Company amended its certificate of incorporation to change its name to Verve Therapeutics, Inc. The Company’s principal offices are located in Cambridge, Massachusetts.

Since its inception, the Company has devoted its efforts principally to research and development and raising capital. The Company is subject to risks and uncertainties common to early-stage companies in the biotechnology industry including, but not limited to, technical risks associated with the successful research, development and manufacturing of product candidates, development by competitors of new technological innovations, dependence on key personnel, protection of proprietary technology, compliance with government regulations and the ability to secure additional capital to fund operations. Current and future programs will require significant research and development efforts, including extensive preclinical and clinical testing and regulatory approval prior to commercialization. These efforts require significant amounts of additional capital, adequate personnel and infrastructure and extensive compliance-reporting capabilities. Even if the Company’s development efforts are successful, it is uncertain when, if ever, the Company will realize significant revenue from product sales.

Basis of presentation and liquidity

The accompanying consolidated financial statements have been prepared in accordance with United States generally accepted accounting principles (“GAAP”). Any reference in these notes to applicable guidance is meant to refer to the authoritative GAAP as found in the Accounting Standards Codification (“ASC”) and Accounting Standards Update (“ASU”) of the Financial Accounting Standards Board (“FASB”). The accompanying consolidated financial statements have been prepared on a going concern basis, which contemplates the realization of assets and the satisfaction of liabilities and commitments in the ordinary course of business. The Company has incurred losses since its inception, including losses of $45.7 million and $19.3 million for the years ended December 31, 2020 and 2019, respectively. As of December 31, 2020, the Company had an accumulated deficit of $66.5 million. To date, the Company has funded its operations primarily with proceeds from the sale of preferred stock. The Company expects to generate operating losses and negative operating cash flows for the foreseeable future.

The Company expects that its cash, cash equivalents and marketable securities as of December 31, 2020, along with $94.0 million in gross proceeds from its convertible Series B Preferred Stock (“Series B Preferred”) financing in January 2021, will be sufficient to fund its operations for at least the next twelve months from the date of issuance of these financial statements. The Company will need additional financing to support its continuing operations and pursue its growth strategy. Until such time as the Company can generate significant revenue from product sales, if ever, it expects to finance its operations through a combination of equity offerings, debt financings, collaborations, strategic alliances and licensing arrangements. The Company may be unable to raise additional funds or enter into such other agreements when needed on favorable terms or at all.

The inability to raise capital as and when needed could have a negative impact on the Company's financial condition and its ability to pursue its business strategy. The Company will need to generate significant revenue to achieve profitability, and it may never do so.

The Company is seeking to complete an initial public offering ("IPO") of its common stock. Upon the completion of a qualified public offering on specified terms, the Company's outstanding convertible preferred stock will automatically convert into shares of common stock (see Note 11, Common Stock).

2. Summary of significant accounting policies

Principles of consolidation

The accompanying consolidated financial statements include the accounts of Verve and its wholly owned subsidiary, Verve Securities Corporation. All intercompany transactions and balances have been eliminated in consolidation.

Use of estimates

The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities and expenses, and the disclosure of contingent assets and liabilities as of and during the reporting period. The Company bases its estimates and assumptions on historical experience when available and on various factors that it believes to be reasonable under the circumstances. Significant estimates and assumptions reflected in these consolidated financial statements include, but are not limited to, the fair values of common stock, convertible preferred stock, preferred stock tranche liability, stock-based compensation, and the liabilities for antidilution rights and success payments. Actual results could differ from these estimates.

Cash and cash equivalents

Cash and cash equivalents consist of standard checking accounts and money market account funds that invest primarily in U.S. government-backed securities and treasuries. The Company considers all highly liquid investments with an original maturity of three months or less at the date of purchase to be cash equivalents. Cash equivalents are stated at cost, which is substantially equivalent to fair value.

Restricted cash

Restricted cash represents collateral provided for a letter of credit issued as a security deposit in connection with the Company's lease of its corporate facilities. A reconciliation of the cash, cash equivalents, and restricted cash reported within the balance sheet that sum to the total of the same amounts shown in the statement of cash flows is as follows:

	December 31,	
(in thousands)	**2020**	**2019**
Cash and cash equivalents	$8,993	$2,986
Restricted cash	463	235
Total cash, cash equivalents and restricted cash	$9,456	$3,221

Marketable securities

The Company classifies marketable securities with a remaining maturity when purchased of greater than three months as available-for-sale. Available-for-sale securities are maintained by the Company's investment managers and consist of U.S. treasury bills and U.S agency securities. Available-for-sale securities are carried at fair value with the unrealized gains and losses included in accumulated other comprehensive income as a component of stockholders' equity until realized. Any premium or discount arising at purchase is amortized and/or accreted to interest income and/or expense over the life of the instrument. Realized gains and losses are determined using the specific identification method and are included in other income (expense).

Concentrations of credit risk

Financial instruments that potentially subject the Company to significant concentration of credit risk consist primarily of cash, cash equivalents and restricted cash. Periodically, the Company may maintain deposits in financial institutions in excess of government insured limits. Management believes that the Company is not exposed to significant credit risk as the Company's deposits are held at financial institutions that management believes to be of high credit quality, and the Company has not experienced any losses on these deposits.

Deferred offering costs

The Company capitalizes incremental legal, professional accounting and other third-party fees that are directly associated with the planned IPO as other non-current assets until the IPO is consummated. After consummation of the IPO, these costs will be recorded in stockholders' deficit as a reduction of additional paid-in-capital generated as a result of the offering. If the Company terminates its plan for an IPO, any costs deferred will be expensed immediately. As of December 31, 2020, there were no deferred offering costs.

Indemnification agreements

In the ordinary course of business, the Company may provide indemnification of varying scope and terms to vendors, lessors, contract research organizations, business partners and other parties with respect to certain matters including, but not limited to, losses arising out of breach of such agreements or from intellectual property infringement claims made by third parties. In addition, the Company has entered into indemnification agreements with members of its board of directors and its executive officers that will require the Company, among other things, to indemnify them against certain liabilities that may arise by reason of their status or service as directors or officers. The maximum potential amount of future payments the Company could be required to make under these indemnification agreements is, in many cases, unlimited. The Company has not incurred any material costs as a result of such indemnifications and is not currently aware of any indemnification claims.

Fair value of financial instruments

ASC Topic 820, *Fair Value Measurement* ("ASC 820"), establishes a fair value hierarchy for instruments measured at fair value that distinguishes between assumptions based on market data (observable inputs) and the Company's own assumptions (unobservable inputs). Observable inputs are inputs that market participants would use in pricing the asset or liability based on market data obtained from sources independent of the Company. Unobservable inputs are inputs that reflect the Company's assumptions about the inputs that market participants would use in pricing the assets or liability and are developed based on the best information available in the circumstances. ASC 820 identifies fair value as the price that would be received to sell an asset or paid to transfer a liability, in an orderly transaction between market participants at the measurement date.

As a basis for considering market participant assumptions in fair value measurements, ASC 820 establishes a three-tiered value hierarchy that distinguishes between the following:

Level 1—Quoted market prices in active markets for identical assets or liabilities.

Level 2—Inputs other than Level 1 inputs that are either directly or indirectly observable, such as quoted market prices, interest rates and yield curves.

Level 3—Unobservable inputs for the asset or liability (i.e. supported by little or no market activity). Level 3 inputs include management's own assumptions about the assumptions that market participants would use in pricing the asset or liability (including assumptions about risk).

To the extent the valuation is based on models or inputs that are less observable or unobservable in the market, the determination of fair values requires more judgement. Accordingly, the degree of judgement exercised by the Company in determining fair value is greatest for instruments categorized as Level 3. A financial instrument's level within the fair value hierarchy is based on the lowest level of any input that is significant to the fair value measurement.

There have been no changes to the valuation methods utilized by the Company during the years ended December 31, 2020 and 2019. The Company evaluates transfers between levels at the end of each reporting period. There were no transfers of financial instruments between levels during the years ended December 31, 2020 and 2019.

Property and equipment, net

Property and equipment are stated at cost less accumulated depreciation. Depreciation expense is recognized using the straight-line method over the estimated useful life of each asset as follows:

Asset category	Estimated useful life
Computer equipment and software	3 years
Office furniture	4 years
Laboratory equipment	5 years
Leasehold improvements	Shorter of useful life or remaining lease term

Upon retirement or sale, the cost of assets disposed of and the related accumulated depreciation are removed from the accounts and any resulting gain or loss is included in loss from operations. Expenditures for repairs and maintenance are charged to expense as incurred.

Impairment of long-lived assets

The Company evaluates its long-lived assets, which consist primarily of property and equipment, for impairment whenever events or changes in circumstances indicate that the carrying amount of such assets may not be recoverable. Recoverability of assets to be held and used is measured by a comparison of the carrying amount of an asset to the future undiscounted net cash flows expected to be generated by the asset. If such assets are considered to be impaired, the impairment to be recognized is measured by the amount by which the carrying amount of the asset exceeds the fair value of the asset. There were no impairment losses recognized during the years ended December 31, 2020 and 2019.

Freestanding financial instruments and derivatives

The Company has identified the following financial instruments, which are recorded as liabilities in the balance sheet and separately accounted for at fair value.

Preferred Stock Tranche Liabilities—The Company has determined that its obligation to issue, and the Company's investors' right to purchase, additional shares of convertible Series A Preferred Stock ("Series A Preferred") pursuant to subsequent closings represent a freestanding financial instrument. The freestanding preferred stock tranche liability (the "tranche liability") was initially recorded at fair value, with gains and losses arising from changes in fair value recognized in other income (expense) in the statement of operations and comprehensive loss. The tranche liabilities were remeasured at each reporting period and upon the exercise or expiration of the obligation. As of December 31, 2020, all Series A Preferred closings occurred, and all preferred stock tranche liabilities have been settled. Refer to Note 9, Preferred Stock tranche liability, for additional discussion.

Pursuant to license agreements with (i) the President and Fellows of Harvard College ("Harvard") and The Broad Institute, Inc. ("Broad") ("Harvard/Broad License Agreement") and (ii) Broad ("Broad License Agreement") (see Note 8, License agreements), the following financial instruments were issued by the Company.

Antidilution Rights—The antidilution rights represent the obligation to issue additional shares of common stock to Harvard and Broad following the completion of additional financings, including the Company's initial public offering. These antidilution rights were accounted for under ASC 815 and were initially recorded at fair value with a corresponding charge to research and development expense. The liability is remeasured at each reporting period, with changes in fair value recognized in other income (expense) in the statement of operations and comprehensive loss while this instrument is outstanding. Refer to Note 5, Fair value of financial instruments, for additional discussion.

Success Payments—The Company is obligated to pay to Harvard and Broad tiered success payments in the event the Company's average market capitalization exceeds specified thresholds ascending from a high nine digit dollar amount to $10.0 billion, or sale of the company for consideration in excess of those thresholds. In the event of a change of control of the Company or a sale of the Company, the Company is required to pay in cash within a specified period following such event. Otherwise, the payments may be settled at the Company's option in either cash or shares of the Company's common stock. The success payments are accounted for under ASC 815 and are initially recorded at fair value with a corresponding charge to research and development expense. The liability is remeasured at each reporting period with all changes in value recognized in other income (expense) in the statement of operations and other comprehensive loss. The Company will continue to adjust the liability for changes in fair value until the earlier of the achievement or expiration of the success payment obligation. Refer to Note 5, Fair value of financial instruments, for additional discussion.

Convertible preferred stock

The Company has classified convertible preferred stock as temporary equity in the accompanying consolidated balance sheets because it could become redeemable due to certain change in control clauses that are outside of the Company's control. The convertible preferred stock is not redeemable, except in the event of a deemed liquidation (see Note 10, Convertible Preferred Stock). Because the occurrence of a deemed liquidation event is not currently probable, the carrying values of the convertible preferred stock are not being accreted to their redemption values. Subsequent adjustments to the carrying values of the convertible preferred stock would be made only when a deemed liquidation event becomes probable.

Research and development costs

Research and development costs are charged to expense as incurred. Research and development costs consist of costs incurred in performing research and development activities, including salaries and bonuses, stock-based compensation, employee benefits, facilities costs, third-party license fees related to technology with no

alternative future use, laboratory supplies, depreciation, manufacturing expenses, preclinical expenses, consulting and other contracted services. Costs for certain research and development activities are recognized based on the terms of the individual arrangements, which may differ from the pattern of costs incurred, and are reflected in the financial statements as prepaid or accrued research and development.

Stock-based compensation

The Company's stock-based compensation program allows for grants of stock options and restricted stock awards. Grants are awarded to employees and non-employees, including directors.

The Company accounts for its stock-based compensation in accordance with ASC Topic 718, *Compensation-Stock Compensation* ("ASC 718"). ASC 718 requires all stock-based payments to employees, non-employees and directors, to be recognized as expense in the consolidated statements of operations and comprehensive loss based on their grant date fair values. The Company estimates the fair value of options granted using the Black-Scholes option pricing model ("Black-Scholes") for stock option grants to both employees and non-employees. The fair value of the Company's common stock is used to determine the fair value of restricted stock awards.

The Company's stock-based compensation awards are subject to either service or performance-based vesting conditions. Compensation expense related to awards to employees, directors and non-employees with service-based vesting conditions is recognized on a straight-line basis based on the grant date fair value over the associated service period of the award, which is generally the vesting term. Compensation expense related to awards to employees with performance-based vesting conditions is recognized over the implied service period when achievement of the performance-based milestones is deemed probable. The Company uses judgement to determine whether and, if so, how many awards are deemed probable of vesting at each reporting period.

Black-Scholes requires inputs based on certain subjective assumptions, including (i) the expected stock price volatility, (ii) the expected term of the award, (iii) the risk-free interest rate and (iv) expected dividends. Due to the lack of a public market for the Company's common stock and lack of company-specific historical and implied volatility data, the Company has based its computation of expected volatility on the historical volatility of a representative group of public companies with similar characteristics to the Company, including stage of product development and life science industry focus. The historical volatility is calculated based on a period of time commensurate with expected term assumption. The Company uses the simplified method as prescribed by the SEC Staff Accounting Bulletin No. 107, *Share-Based Payment*, to calculate the expected term for options granted to employees and non-employees whereby, the expected term equals the arithmetic average of the vesting term and the original contractual term of the options due to its lack of sufficient historical data. The risk-free interest rate is based on U.S. Treasury securities with a maturity date commensurate with the expected term of the associated award. The expected dividend yield is assumed to be zero as the Company has never paid dividends and has no current plans to pay any dividends on its common stock. The Company recognizes forfeitures as they occur.

Due to the absence of an active market for the Company's common stock, the Company utilized methodologies in accordance with the framework of the American Institute of Certified Public Accountants Accounting and Valuation Guide, *Valuation of Privately-Held Company Equity Securities Issued as Compensation* ("AICPA Valuation Guide"), to estimate the fair value of its common stock. The estimated fair value of the common stock has been determined at each grant date based upon a variety of factors, including the illiquid nature of the common stock, arm's-length sales of the Company's capital stock (including convertible preferred stock), the effect of the rights and preferences of the preferred stockholders, and the prospects of a liquidity event. Among other factors are the Company's financial position and historical financial performance, the status of technological developments within the Company's research, the composition and ability of the current research and management team, an evaluation or benchmark of the Company's competition, and the current business

climate in the marketplace. Significant changes to the key assumptions underlying the factors used could result in different fair values of common stock at each valuation date.

Rent expense

The Company's real estate operating lease provides for scheduled annual rent increases throughout the lease term. The Company recognizes the effects of the scheduled rent increases on a straight-line basis over the full term of the lease. Tenant improvement allowances, if any, provided by the landlord are recorded as deferred rent and amortized as reduction to rent expense over the lease term.

Income taxes

The Company recognizes deferred tax assets and liabilities for the expected future tax consequences of events that have been included in the Company's financial statements and tax returns. Deferred tax assets and liabilities are determined based upon the differences between the financial statement carrying amounts and the tax bases of existing assets and liabilities and for loss and credit carryforwards, using enacted tax rates expected to be in effect in the year in which the differences are expected to reverse. Deferred tax assets are reduced by a valuation allowance if it is more likely than not that these assets may not be realized. The Company determines whether it is more likely than not that a tax position will be sustained upon examination. If it is not more likely than not that a position will be sustained, none of the benefit attributable to the position is recognized. The tax benefit to be recognized for any tax position that meets the more-likely-than-not recognition threshold is calculated as the largest amount that is more than 50% likely of being realized upon resolution of the contingency. The Company accounts for interest and penalties related to uncertain tax positions as part of its provision for income taxes.

Comprehensive loss

Comprehensive loss includes net loss as well as other changes in stockholders' equity that result from transactions and economic events other than those with stockholders. For the years ended December 31, 2020 and 2019, the Company's only element of other comprehensive income was unrealized gains on marketable securities.

Net loss per share

The Company follows the two-class method when computing net loss per share, as the Company has issued shares that meet the definition of participating securities. The two-class method determines net loss per share for each class of common and participating securities according to dividends declared or accumulated and participation rights in undistributed earnings. The two-class method requires income available to common stockholders for the period to be allocated between common and participating securities based upon their respective rights to receive dividends as if all income for the period had been distributed.

Basic net loss per share attributable to common stockholders is computed by dividing the net loss attributable to common stockholders by the weighted average number of common shares outstanding for the period. Diluted net loss attributable to common stockholders is computed by adjusting net loss attributable to common stockholders to reallocate undistributed earnings based on the potential impact of dilutive securities. Diluted net loss per share attributable to common stockholders is computed by dividing the diluted net loss attributable to common stockholders by the weighted average number of common shares outstanding for the period, including potential dilutive common shares assuming the dilutive effect of common stock equivalents.

The Company's convertible preferred stock contractually entitles the holders of such shares to participate in dividends but does not contractually require the holders of such shares to participate in losses of the Company. Accordingly, in periods in which the Company reports a net loss, such losses are not allocated to such participating securities. In periods in which the Company reports a net loss attributable to common stockholders, diluted net loss per share attributable to common stockholders is the same as basic net loss per share attributable to common stockholders, since dilutive common shares are not assumed to have been issued if their effect is anti-dilutive. The Company reported a net loss attributable to common stockholders for the years ended December 31, 2020 and 2019.

Segment and geographic information

Operating segments are defined as components of an entity about which separate discrete information is available for evaluation by the chief operating decision maker ("CODM"), or decision-making group, in deciding how to allocate resources and in assessing performance. The CODM is the Company's Chief Executive Officer. The Company views its operations as and manages its business in one operating segment operating exclusively in the United States.

Subsequent events

The Company performs an evaluation of all subsequent events after the balance sheet date through the date of issuance of the consolidated financial statements to ensure appropriate disclosure of events both recognized in the consolidated financial statements and events which occurred subsequently but were not recognized in the consolidated financial statements.

Recently issued accounting pronouncements

The Jumpstart Our Business Startups Act of 2012 permits an emerging growth company to take advantage of an extended transition period to comply with new or revised accounting standards applicable to public companies until those standards would otherwise apply to private companies. As an emerging growth company ("EGC"), the Company has elected to take advantage of this extended transition period for certain new accounting standards.

In February 2016, the FASB issued ASU No. 2016-02, *Leases* ("ASU 2016-02"). ASU 2016-02 will require lessees to recognize most leases on their balance sheet as a right-of-use asset and a lease liability. Leases will be classified as either operating or finance leases, and classification will be based on criteria similar to current lease accounting, but without explicit bright lines. For EGCs, such as the Company, ASU 2016-02, as amended, will be effective for annual reporting periods beginning after December 15, 2021 and interim periods within those fiscal years, with early adoption permitted. The Company is currently evaluating the full impact that the adoption of ASU 2016-02 is expected to have on its financial statements; however, the adoption of ASU 2016-02 will require the recognition at the adoption date of both a lease liability, based on the present value of future lease payments, and a corresponding right-to-use asset, which amounts the Company expects to be material. The future lease payment obligations as of December 31, 2020 are disclosed in Note 7, Commitments.

In June 2016, the FASB issued ASU No. 2016-13, *Financial Instruments—Credit Losses* (Topic 326): Measurement of Credit Losses on Financial Instruments ("ASU 2016-13"). The standard requires that credit losses be reported using an expected losses model rather than the incurred losses model that is currently used, and establishes additional disclosures related to credit risks. For available-for-sale debt securities with unrealized losses, this standard requires allowances to be recorded instead of reducing the amortized cost of the investment. The new

standard will be effective for the Company on January 1, 2023. The Company is currently evaluating the potential impact that this standard may have on its consolidated financial position and results of operations.

3. Marketable securities

Marketable securities by security type consisted of the following:

	December 31, 2020			
(in thousands)	Amortized cost	Gross unrealized gains	Gross unrealized losses	Fair value
U.S. treasury bills and notes	$ 32,221	$ 3	$ —	$32,224
U.S. agency securities	30,890	5	—	30,895
Total	$ 63,111	$ 8	$ —	$63,119

	December 31, 2019			
(in thousands)	Amortized cost	Gross unrealized gains	Gross unrealized losses	Fair value
U.S. treasury bills and notes	$ 10,502	$ 6	$ —	$10,508
U.S. agency securities	5,285	3	—	5,288
Total	$ 15,787	$ 9	$ —	$15,796

The remaining contractual maturities of all marketable securities were less than one year as of December 31, 2020 and 2019.

4. Property and equipment, net

Property and equipment, net, consist of the following:

	December 31,	
(in thousands)	2020	2019
Lab equipment	$3,937	$1,670
Leasehold improvements	259	648
Furniture and fixtures	481	118
Computer equipment	105	31
Total property and equipment	4,782	2,467
Less accumulated depreciation	(798)	(109)
Property and equipment, net	$3,984	$2,358

Depreciation expense for the years ended December 31, 2020 and 2019 was $1.3 million and $0.1 million, respectively.

5. Fair value of financial instruments

The Company's financial instruments consist of money market funds, marketable securities, the preferred stock tranche liability as well as an antidilution right liability, and success payment liability pursuant to the Harvard/ Broad License Agreement and the Broad License Agreement. The preferred stock tranche liability is considered a freestanding financial instrument that imposes an obligation on the Company to issue shares that are

potentially redeemable, resulting in liability classification under ASC 480, *Distinguishing Liabilities from Equity* ("ASC 840"). The antidilution rights and success payments liabilities meet the definition of a derivative under ASC 815. The liabilities are carried at fair value. The following tables set forth the fair value of the Company's financial instruments by level within the fair value hierarchy:

	As of December 31, 2020			
(in thousands)	**Fair value**	**Level 1**	**Level 2**	**Level 3**
Assets				
Money market funds	$ 2,278	$ 2,278	$ —	$ —
Marketable securities:				
U.S. treasury bills and notes	32,224	—	32,224	—
U.S. agency securities	30,895	—	30,895	—
Total assets	$65,397	$ 2,278	$63,119	$ —
Liabilities				
Success payment liability	$ 2,806	$ —	$ —	$ 2,806
Antidilution rights liability	6,916	—	—	6,916
Total liabilities	$ 9,722	$ —	$ —	$ 9,722

	As of December 31, 2019			
(in thousands)	**Fair value**	**Level 1**	**Level 2**	**Level 3**
Assets				
Money market funds	$ 1,675	$ 1,675	$ —	$ —
Marketable securities:				
U.S. treasury bills and notes	10,508	—	10,508	—
U.S. agency securities	5,288	—	5,288	—
Total assets	$17,471	$ 1,675	$15,796	$ —
Liabilities				
Preferred stock tranche liability	$ 9,571	$ —	$ —	$ 9,571
Success payment liability	419	—	—	419
Antidilution rights liability	2,044	—	—	2,044
Total liabilities	$12,034	$ —	$ —	$12,034

Cash Equivalents—Cash equivalents of $2.2 million and $1.7 million as of December 31, 2020 and December 31, 2019, respectively, consisted of money market funds and are classified within Level 1 of the fair value hierarchy because they are valued using quoted market prices in active markets.

Preferred Stock Tranche Liability—The preferred stock tranche liability is stated at fair value and is considered Level 3 within the fair value hierarchy because its fair value measurement is based, in part, on significant inputs not observed in the market. The tranche liability was valued using a probability-adjusted scenario-based method that considered the probability of triggering the tranche rights through achievement of certain non-scientific and scientific milestones as well as the purchase price of Series A preferred stock. Subsequent Series A Preferred closings occurred in both 2019 and 2020 and the tranche liability has been fully settled as of December 31, 2020 (refer to Note 9, Preferred Stock tranche liability).

Antidilution Rights Liability—The antidilution rights liability represents the obligation to issue additional shares of common stock to Harvard and Broad following the completion of (1) a defined aggregate level of preferred stock financing and (2) either a sale of the Company's preferred stock, an initial public offering, or a company sale meeting a certain value threshold. The antidilution rights liability is stated at fair value and is considered Level 3 in the fair value hierarchy because its fair value measurement is based, in part, on significant inputs not observed in the market. The antidilution rights liability related to meeting a defined aggregate level of preferred stock financing was valued using a probability-weighted present value model that considered the probability of meeting the defined aggregate level of preferred stock financing, as well as the fair value of the Company's common stock. The antidilution rights liability related to the achievement of a specified valuation through either a sale of the Company's preferred stock, an initial public offering, or a company sale was valued using a Monte Carlo simulation model, which models the value of the liability based on several key variables, including probability of event occurrence, timing of event occurrence, as well as the fair value of the Company's common stock.

At issuance in 2019, the estimated fair value of the antidilution rights liability was $1.2 million, which was recorded as research and development expense. The Company remeasured the liability at fair value with the corresponding charges of $5.4 million and $1.0 million recorded to other expense for the years ended December 31, 2020 and 2019, respectively. In addition, the antidilution rights associated with the Company achieving a defined aggregate level of preferred stock financing were partially satisfied in 2019 and fully satisfied in 2020, which settlement amounts totaled $0.1 million and $0.5 million, respectively, and which amounts were settled through issuances of 1,124,209 and 1,739,557 shares of the Company's common stock, respectively. The Company will continue to adjust the remaining antidilution rights liability for changes in fair value until the obligation is satisfied in full upon completion of its initial public offering.

The primary inputs used in valuing the antidilution rights liability associated with the Company achieving a defined aggregate level of preferred stock financing upon remeasurement at December 31, 2019 and at inception in 2019, were as follows:

	At December 31, 2019	At Inception in 2019
Fair value of common stock (per share)	$ 0.28	$ 0.12
Expected amount to be raised subject to antidilution rights	28,750	46,800
Probability range of preferred stock financing amount being achieved	50%	25—50%
Expected term (in years)	0.25	1.05

The primary inputs used in valuing the antidilution rights liability associated with the Company's realization of a certain valuation threshold through either a sale of the Company's preferred stock, an initial public offering, or a company sale upon remeasurement at December 31, 2020 and 2019 and at inception in 2019 are included together with the "Success Payment Liability" table below.

Success Payment Liability—The Company is obligated to pay to Harvard and Broad tiered success payments in the event its average market capitalization exceeds specified thresholds ascending from a high nine digit dollar amount to $10.0 billion, or sale of the Company for consideration in excess of those thresholds. In the event of a change of control or a sale of the Company, the Company is required to pay in cash within a specified period following such event. Otherwise, the payments may be settled at the Company's option in either cash or shares of its common stock, or a combination of cash and shares of its common stock. The maximum aggregate success payments that could be payable by the Company is $31.3 million (after termination of the Broad agreement). At inception of the agreements, the success payment liability was recorded at fair value with the

cost recorded as research and development expense and will be remeasured at each reporting period with charges recorded in other income (expense) while the instrument is outstanding.

The success payments liability is stated at fair value and is considered Level 3 because its fair value measurement is based, in part, on significant inputs not observed in the market. The Company used a Monte Carlo simulation model, which models the value of the liability based on several key variables, including probability of event occurrence, timing of event occurrence, as well as the value of the Company's common stock. The Company also estimated the likelihood that it would maintain both the Harvard/Broad License Agreement and the Broad License Agreement based on its on-going research efforts.

At issuance in 2019, the estimated fair value of the success payment liability was $0.4 million, which was recorded as research and development expense. The Company remeasured the liability at fair value with the corresponding charges of $2.4 million and less than $0.1 million recorded to other expense for the years ended December 31, 2020 and 2019, respectively. No settlements of the success payment liability occurred during 2020 and 2019. The Company will continue to adjust the success payment liability for changes in fair value until the earlier of the achievement or expiration of the obligation.

The primary inputs used in valuing (i) the success payments liability and (ii) the antidilution rights liability associated with the Company's realization of a certain valuation threshold through either a sale of the Company's preferred stock, an initial public offering, or a company sale upon remeasurement at December 31, 2020 and 2019 and at inception in 2019, were as follows:

	At December 31, 2020	At December 31, 2019	At Inception in 2019
Fair value of common stock (per share)	$ 0.89	$ 0.28	$ 0.12
Equity volatility	105%	100%	90%
Cumulative probability of triggering event	70%	11%	10%
Expected term (in years)	0.50	2.89	2.46

The fair value of the common stock was determined by management with the assistance of an independent third-party valuation specialist using methods consistent with the AICPA Valuation Guide. The computation of equity volatility was estimated using available information about the historical volatility of stocks of similar publicly traded companies for a period matching the expected term assumption. In addition, the Company incorporated the timing and probability of future events in the calculation of liabilities. The Company also estimated the likelihood that it would maintain both the Harvard/Broad License Agreement and the Broad License Agreement based on its on-going research efforts. The Company applied a 90% probability of termination of the Broad License Agreement at December 31, 2020.

In February 2021, the Company provided written notice to Broad of its election to terminate the Broad License Agreement, which termination would be effective in June 2021. See Note 17, Subsequent events.

The reconciliation of changes in the fair value of financial instruments based on Level 3 inputs for the years ended December 31, 2020 and 2019 is as follows:

(in thousands)	Preferred stock tranche liability	Antidilution rights liability	Success payment liability	Total
Balance at December 31, 2018	$ 4,604	$ —	$ —	$ 4,604
Issuance of fair value instrument	84	1,197	351	1,632
Issuance of common stock	—	(135)	—	(135)
Changes in fair value	4,883	982	68	5,933
Balance at December 31, 2019	9,571	2,044	419	12,034
Issuance of Series A Preferred	(7,064)	—	—	(7,064)
Issuance of common stock	—	(487)	—	(487)
Change in fair value	(2,507)	5,359	2,387	5,239
Balance at December 31, 2020	$ —	$ 6,916	$ 2,806	$ 9,722

6. Accrued expenses

Accrued expenses consist of the following:

	December 31,	
(in thousands)	2020	2019
Employee compensation and related benefits	$1,636	$ 624
Accrued external research and development expenses	4,827	67
License agreements	83	255
Professional fees	303	36
Other	340	129
Total	$7,189	$1,111

7. Commitments

Operating leases

In January 2019, the Company entered into an operating lease for office and laboratory space in Cambridge, Massachusetts that expired in December 2019.

In August 2019, the Company entered into an operating lease for 7,484 square feet of office and laboratory space with an end date of January 31, 2023 in Cambridge, Massachusetts. The landlord agreed to fund up to $0.1 million in tenant improvements. The Company subsequently notified the landlord in June 2020 of its desire to terminate the operating lease in August 2020 and was required to pay a termination penalty less than $0.1 million.

In April 2020, the Company signed an operating lease for 16,843 square feet of office and laboratory space in Cambridge, Massachusetts. Lease payments commenced in August 2020. The lease is subject to fixed rate escalation increases. The Company recognizes rent expense on a straight-line basis over the expected lease term, which is 2.2 years. The Company began to record rent expense in June 2020 upon gaining access to and control of the space. Deferred rent is amortized as a reduction in rent expense over the term of the lease. In addition, upon execution of the lease, the Company provided a letter of credit issued as a security deposit of

approximately $0.4 million. The Company has recorded cash held to secure this letter of credit as restricted cash in the accompanying consolidated balance sheet as of December 31, 2020.

Future minimum lease payments for the Company's facility are as follows:

Years ending December 31,	Amount (in thousands)
2021	$ 1,671
2022	992
Thereafter	—
Total future minimum lease payments	$ 2,663

Rent expense for the years ended December 31, 2020 and 2019, was $1.3 million and $0.2 million, respectively.

8. License agreements

Harvard/ broad license agreement and broad license agreement

In March 2019, the Company simultaneously entered into the Harvard/Broad License Agreement and Broad License Agreement (the "license agreements") for certain base editing technologies pursuant to which the Company received exclusive, worldwide, sublicensable, royalty-bearing licenses under specified patent rights to develop and commercialize licensed products and nonexclusive, worldwide, sublicensable, royalty-bearing licenses under certain patent rights to research and develop licensed products. The Company agreed to use commercially reasonable efforts to develop licensed products in accordance with the development plans, to introduce any licensed products that gain regulatory approval into the commercial market, to market licensed products that have gained regulatory approval following such introduction into the market, and to make licensed products that have gained regulatory approval reasonably available to the public. The term of the agreements will continue until the expiration of the last to expire valid claim. The Company may terminate either of the license agreements without cause upon four months' prior written notice to Harvard and Broad, unless terminated earlier. In February 2021, the Company provided written notice to Broad of its intent to terminate the Broad License Agreement, which termination would be effective in June 2021. See Note 17, Subsequent events.

As partial consideration for the rights granted under the Harvard/ Broad License Agreement and Broad License Agreement, the Company paid $0.3 million in non-refundable upfront license fees and also issued 2,556,322 shares of its common stock with a fair value of $0.3 million. Additional consideration under the license agreements is as follows:

Antidilution Rights—The initial shares of common stock issued to Harvard and Broad are subject to antidilution provisions as further described in Note 5, Fair value of financial instruments. The antidilution rights associated with the Company achieving a defined aggregate level of preferred stock financing were partially satisfied in 2019 and fully satisfied in 2020, which settlement amounts totaled $0.1 million and $0.5 million, respectively, and which amounts were settled through issuances of 1,124,209 and 1,739,557 shares of common stock, respectively. The remaining antidilution rights liability will be satisfied upon meeting a defined value threshold, which could occur upon the closing of the Company's initial public offering.

Success Payments—The Company is required to make success payments under the license agreements as further described in Note 5, Fair value of financial instruments. As of and for the years ended December 31, 2020 and 2019, no success payments were paid or due.

Other Payments—The Company agreed to pay an annual license maintenance fee ranging from low-to-mid five figures to low six figures, depending on the particular calendar year, for each of the license agreements. The

Company is responsible for the payment of certain patent prosecution and maintenance costs incurred by Harvard and Broad related to licensed patents. To the extent achieved, the Company is obligated to pay up to an aggregate of $46.2 million and $108 million in development and sales-based milestones, respectively. If the Company undergoes a change of control during the term of the license agreements, then certain of the milestone payments would be increased by a mid-double-digit percentage. To the extent there are sales of a licensed product, the Company is required to pay low single digit royalties on net sales, for each of the license agreements. The Company is entitled to certain reductions and offsets on these royalties with respect to a licensed product in a given country.

The Company concluded that the assets acquired from Harvard and Broad did not meet the accounting definition of a business as inputs, but no processes or outputs were acquired with the licenses. As the inputs that were acquired along with the licenses do not constitute a “business,” the transaction has been accounted for as an asset acquisition. As of the date of the license agreements, the assets acquired had no alternative future use and the assets had not reached a stage of technological feasibility. As a result, all share-based and cash payment obligations have been recorded as research and development expense in the statement of operations and comprehensive loss.

At the inception of the license agreements in March 2019, the Company recognized $2.1 million as research and development expense, which includes the non-refundable upfront license fees payable in cash and the fair value of the common stock issued, along with the initial fair values of the antidilution rights liability and success payment liability. As further disclosed in Note 5, the antidilution rights liability and success payment liability are remeasured at fair value each reporting period with subsequent changes recognized in other income (expense).

Verily agreement

In March 2019, the Company and Verily Life Sciences LLC (“Verily”) entered into a collaboration agreement. Pursuant to the agreement, the Company and Verily intend to collaborate to utilize Verily’s nanoparticle platform to screen, develop and characterize improved nanoparticles for the delivery of the Company’s gene editing tools to enable development and commercialization of nanoparticle-based drug products. As part of the agreement, Verily granted the Company an exclusive, perpetual, worldwide, sublicensable, fully paid right and license to Verily’s solely owned and developed intellectual property to research, develop, make, offer for sale, sell and import products targeting the Company’s gene targets for the treatment or prevention of atherosclerotic cardiovascular disease. The term of the agreement continues until the earlier of (i) completion of all activities related to the collaboration or (ii) the three-year anniversary of the agreement date, unless terminated earlier. At any time during the term, the Company has the right to terminate the agreement in its entirety for any reason by delivering a 90-day termination notice to Verily.

As partial consideration for the license rights granted by Verily, at inception of the arrangement, the Company paid a one-time, nonrefundable fee through the issuance of 1,672,240 shares of Series A Preferred with a fair value of $0.6 million. To the extent achieved, the Company was obligated to make one-time payments to Verily of up to $5.5 million in development-based milestones. The Company paid a milestone payment of $1.0 million in 2020 related to a study in wild type mice that demonstrated a certain gene editing percentage level. In addition, as consideration for Verily’s activities under the agreement, the Company was obligated to pay a $0.3 million quarterly development payment for a period of ten quarters.

The Company concluded the assets acquired from Verily did not meet the accounting definition of a business as inputs, but no processes or outputs were acquired with the licenses. As the inputs that were acquired along with the licenses do not constitute a “business,” the transaction has been accounted for as an asset acquisition. As of the date of the collaboration agreement, the assets acquired had no alternative future use and the assets had

not reached a stage of technological feasibility. As a result, at the inception of the agreement in 2019, the Company recognized $0.6 million as research and development expense, which includes the one-time, nonrefundable license fee settled through issuing 1,672,240 shares of Series A Preferred. In addition, the Company recognized $0.8 million in quarterly development payments to Verily as research and development expense in 2019. In 2020, the Company recognized the milestone payment of $1.0 million described above as research and development expense upon achievement of the related development-based milestone. Further, the Company recognized $0.5 million in quarterly development payments to Verily as research and development expense in 2020.

The Company elected to terminate the agreement with Verily effective June 26, 2020 and has no outstanding amounts due or payable to Verily as of December 31, 2020.

Beam license agreement

In April 2019, the Company and Beam Therapeutics, Inc. (“Beam”) entered into a collaboration and license agreement. Pursuant to the agreement, the Company received an exclusive, worldwide, sublicensable license under certain of Beam’s base editing technology, gene editing, and delivery technologies to develop, make, use, offer for sale, sell and import base editing products and nuclease products using Beam’s CRISPR associated protein 12b, or Cas12b technology, in each case, directed to any of four gene targets, including the PCSK9 and ANGPTL3 genes, that are associated with an increased risk of coronary diseases. In addition, the Company granted Beam an exclusive, worldwide, sublicensable license under certain of its delivery technology to develop, manufacture, sell and import product candidates and products, except for base editor products.

Both parties may conduct certain activities in accordance with an agreed-upon research and/or development plan. Following the final dosing of a patient in a Phase 1 clinical trial of a given licensed product, Beam has the right to opt in to share worldwide expenses of the development of such licensed product, as well as jointly commercialize and share profits and expenses of commercializing such licensed product in the United States on a 50/50 basis. If Beam exercises its opt-in right for a given licensed product, which we refer to following such opt-in as a collaboration product, it will be obligated to pay for a specified percentage of the development and commercialization costs of such collaboration product and will have the right to receive a specified percentage of the profits from any sales of such collaboration product. The term of the agreement continues until the last to expire of any royalty term for any product. The Company has the right to terminate the agreement as to any licensed product, but not for any collaboration product, by delivering a 90-day termination notice to Beam, provided that Beam has elected not to exercise its opt-in right or the period to exercise such opt-in right has expired.

The Company is responsible for all costs and expenses incurred in the conduct of activities under the research plan, any development plan and any costs and expenses for the development of a licensed product for which Beam has not elected to opt-in.

As partial consideration for the license rights granted by Beam, the Company paid a one-time, nonrefundable fee through issuing 2,556,322 shares of its common stock with a fair value of $0.3 million. To the extent achieved, for each licensed product, the Company is also obligated to pay up to $11.3 million in development and regulatory-based milestones and $15.0 million in sales-based milestones. To the extent there are sales of a licensed product, the Company is required to pay low-to-mid single digit royalties on net sales. To the extent achieved, for each collaboration product outside of the United States, the Company is obligated to pay up to $5.6 million in development and regulatory-based milestones and $7.5 million in sales-based milestones. To the extent there are ex-U.S. sales of a collaboration product, the Company is required to pay low-to-mid single digit royalties on net sales.

The parties have also promised that in further consideration for the licenses granted under the parties' respective delivery technologies, each party will pay to the other party development-based milestone payments up to $6.0 million for each delivery technology product of such paying party to achieve the corresponding milestone event. The triggering of these milestone payments was not considered probable as of the transaction date, and no expense has been recorded for these milestones as of December 31, 2020. To the extent there are sales of a delivery technology product, each party will pay the other party low-to-mid single digit royalties based on the annual aggregate worldwide net sales resulting from the sale of each delivery technology product of such paying party; provided, however, that such royalty payments will not apply to net sales of the collaboration products or licensed products. The Company concluded the receipt of any milestone or royalty payments under the agreement was not probable as of December 31, 2020.

The Company further concluded the assets acquired from Beam did not meet the accounting definition of a business as inputs, but no processes or outputs were acquired with the licenses. As the inputs that were acquired along with the licenses do not constitute a "business," the transaction has been accounted for as an asset acquisition. As of the date of the license agreement, the assets acquired had no alternative future use and the assets had not reached a stage of technological feasibility. As a result, at the inception of the agreement in 2019, the Company recognized $0.3 million as research and development expense, which includes the one-time, nonrefundable license fee settled through the issuance of 2,556,322 shares of common stock.

Acuitas agreements

Development and option agreement

In December 2019, the Company and Acuitas Therapeutics, Inc. ("Acuitas") entered into a development and option agreement, which agreement was amended and restated in October 2020. Pursuant to the agreement, Acuitas granted the Company a non-exclusive, worldwide, royalty-free license under its LNP technology. The Acuitas development and option agreement provides the Company the option to enter into separate non-exclusive license agreements for a specified number of gene targets under which it can pursue further development and commercialization of licensed products that include the Acuitas LNP technology.

The Company and Acuitas will jointly conduct activities using the Acuitas LNP technologies and the Company's genome editing technology for development of licensed products. Unless sooner terminated, the development and option agreement will terminate on the third anniversary of the agreement, provided that the Company has the option to extend the term for an additional two years upon six months' prior written notice to Acuitas. The Company can terminate the development and option agreement without cause upon prior written notice to Acuitas.

As consideration for entering into the agreement and the access rights granted by Acuitas, the Company paid a one-time, nonrefundable technology access fee of $0.5 million. The Company is also obligated to pay to Acuitas an annual target reservation fee of $0.1 million. In addition, the Company will pay an annual technology maintenance fee of $0.3 million for each of the options that have not been exercised. Upon exercising the option to enter into a non-exclusive license agreement for any gene target, the Company will be required to pay Acuitas $2.0 million less any amounts from the target reservation and maintenance fees that are creditable against the option exercise fee. The option exercise fees under the agreement will be recorded as research and development expense, if and when the Company exercises such options.

In 2019, the Company recognized $0.5 million as research and development expense which includes the non-refundable upfront technology access fee and the human genome target reservation fees. In addition, the Company agreed to reimburse Acuitas on a quarterly basis for its services performed related to the program activities based on an agreed upon number of fulltime employees committed to work on the program at an

annual rate per employee, including reimbursement of reasonable external costs. These services commenced during 2020 and the Company recognized research and development expense of $2.0 million for the year ended December 31, 2020 related to the reimbursement of research and development services provided by Acuitas and technology maintenance fees. In 2020 upon the one-year anniversary of the agreement the Company had exercised one of its options to enter into a non-exclusive license agreement, as further described below.

License agreement

In October 2020, the Company exercised an option with respect to a licensed product and a licensed genome target and entered into a non-exclusive, worldwide license with Acuitas, with a right to sub-license through multiple tiers, under the licensed LNP technology to research, develop and commercialize the licensed products using the LNP technology in connection with the PCSK9 gene target for all human therapeutic or prophylactic uses. The Company has the right to terminate the license agreement without cause upon prior written notice to Acuitas. Unless earlier terminated, the license agreement will terminate on a licensed product-by-licensed product and country-by-country basis until the later of (i) the expiration of the last to expire valid claim in the licensed technology that covers the licensed product in such country, (ii) the expiration of the regulatory exclusivity period and (iii) ten years from the first commercial sale of the licensed product in such country.

In addition to an upfront, nonrefundable license fee of $2.0 million (less previously paid target reservation fees), the Company is required to pay an annual license maintenance fee of $0.8 million until the achievement of a certain development-based milestone. To the extent achieved, the Company is also obligated to pay up to an aggregate of $9.8 million in clinical and regulatory milestones and $9.5 million in sales-based milestones. The milestones have not been achieved and no expense has been recorded for these milestones as of December 31, 2020. To the extent there are sales of a licensed product, the Company is required to pay low single digit royalties on net sales.

The Company concluded that the assets acquired from Acuitas did not meet the accounting definition of a business as inputs, but no processes or outputs were acquired with the licenses. As the inputs that were acquired along with the licenses do not constitute a “business,” the transaction has been accounted for as an asset acquisition. As of the date of the license agreement, the assets acquired had no alternative future use and the assets had not reached a stage of technological feasibility. As a result, all cash payment obligations for the Acuitas license agreement have been recorded as research and development expense in the statement of operations and comprehensive loss.

At the inception of the license agreement in October 2020, the Company recognized $2.0 million as research and development expense which includes the non-refundable upfront license fees.

9. Preferred stock tranche liability

Included in the terms of the Series A purchase agreement (see Note 10) were certain tranche rights whereupon the Company is obligated to issue, and the Series A Preferred investors have the obligation to purchase, additional shares of Series A Preferred, as follows:

- 29,347,825 shares of Series A Preferred at $0.598 per share upon the Company achieving certain scientific and non-scientific milestones (“second tranche”); and
- 49,749,167 shares of Series A Preferred at $0.598 per share upon the Company achieving additional scientific and non-scientific milestones (“third tranche”).

The second tranche and third tranche represent freestanding financial instruments accounted for as liabilities under ASC 480 because these tranche rights (i) embody an obligation to repurchase the Company’s equity

shares and (ii) may require the Company to settle the obligation by transferring assets. As a result, upon issuance, the respective tranche rights were initially recorded at fair value and subsequently re-measured at fair value in each reporting period (and at settlement, as applicable). Changes in the fair value were recognized as a component of other income (expense) in the consolidated statements of operations and comprehensive loss. The second tranche and third tranche were settled in 2019 and 2020, respectively.

While outstanding, the estimated fair value of the tranche rights was determined using a probability-weighted present value model that considered the probability of triggering the tranche rights through achievement of the scientific and non-scientific milestones. The estimates were based, in part, on subjective assumptions. Changes to these assumptions could have had a significant impact on the reported fair value of the tranche rights. Significant assumptions for the third tranche as of December 31, 2019 include a 50% cumulative probability of achieving the remaining third tranche milestones and an estimated term of 0.4 years. Additional details for the second tranche and third tranche are included below.

Second tranche

During 2018, the estimated fair value of the second tranche was insignificant. In April 2019, the board of directors agreed to amend certain scientific milestones and subsequently determined the second tranche milestones, as modified, were achieved and the Company settled the second tranche by issuing 29,347,825 shares of Series A Preferred at a price of $0.598 per share for gross proceeds of $17.5 million.

Third tranche

During 2018, the estimated fair value of the third tranche approximated $4.6 million. The increase in fair value of the third preferred stock tranche liability of $4.8 million in 2019 is attributed to an increase in the cumulative probability of achieving the third tranche milestones from 2018 to 2019. In March 2020, the board of directors agreed to waive the final remaining milestones and determined the third tranche milestones, as modified, were achieved. In March 2020, the Company settled the third tranche by issuing 49,749,167 shares of Series A Preferred at a price of $0.598 per share for gross proceeds of $29.8 million.

A rollforward of the preferred stock tranche liability for the years ended December 31, 2020 and 2019 is included in Note 5, Fair value of financial instruments.

10. Convertible preferred stock

The Company has issued and sold Series A Preferred and Series A-2 Preferred, as follows:

During 2018, the Company issued and sold 19,565,217 shares of Series A Preferred at a price of $0.598 per share for gross proceeds of $11.7 million. The Company incurred issuance costs in connection with these transactions of $0.2 million. These issuances included the tranche rights for the second tranche and third tranche, as previously described in Note 9, Preferred Stock tranche liability.

In March 2019, the Company issued 1,672,240 shares of Series A Preferred in exchange for in-licensing certain technologies from Verily. See Note 8, License agreements.

In August 2019, the Company issued 29,347,825 shares of Series A Preferred at a price of $0.598 per share for gross proceeds of $17.5 million. This issuance represented the settlement of the second tranche. See Note 9, Preferred Stock tranche liability.

In October 2019, the Company issued 836,122 shares of Series A Preferred at a price of $0.598 per share for gross proceeds of $0.5 million. This issuance included tranche rights for the third tranche. See Note 9, Preferred Stock tranche liability.

In March 2020, the Company issued 49,749,167 shares of Series A Preferred at a price of $0.598 per share for gross proceeds of $29.8 million. This issuance represented the settlement of the third tranche. See Note 9, Preferred Stock tranche liability.

Between April and June 2020, the Company issued 78,348,461 shares of Series A-2 Preferred at a price of $0.8041 per share for gross proceeds of $63.0 million. The Company incurred issuance costs in connection with this transaction of $0.1 million.

Upon issuance of each of Series A Preferred and Series A-2 Preferred, the Company assessed the embedded conversion and liquidation features of the shares and determined that such features did not require the Company to separately account for these features. The Company also concluded that no beneficial conversion feature existed on the issuance date of each of Series A Preferred and Series A-2 Preferred.

As of December 31, 2020, the Series A Preferred and Series A-2 Preferred consisted of the following:

(in thousands, except for share data)	Preferred stock authorized	Preferred stock issued and outstanding	Carrying value	Liquidation preference	Common stock issuable upon conversion
Series A Preferred	101,170,571	101,170,571	$ 62,272	$ 60,500	101,170,571
Series A-2 Preferred	78,348,462	78,348,461	62,888	63,000	78,348,461
	179,519,033	179,519,032	$ 125,160	$ 123,500	179,519,032

As of December 31, 2019, there were 51,421,404 shares of Series A Preferred issued and outstanding having a carrying value and liquidation preference of $25.5 million and $30.8 million, respectively.

The following is a summary of the rights and preferences of the Series A Preferred and Series A-2 Preferred as of December 31, 2020:

Conversion—Each share of Series A Preferred and Series A-2 Preferred may be converted at any time, at the option of the holder, into shares of common stock, subject to the applicable conversion rate as determined by dividing the original issue price by the conversion price. The initial conversion price for each of the Series A Preferred and Series A-2 Preferred (each as may be adjusted for certain dilutive events) is $0.598 and $0.8041 per share, respectively. Each series of Series A Preferred and Series A-2 Preferred automatically converts into shares of common stock on a 1:1 conversion ratio (as may be adjusted for certain dilutive events) at the earlier of the closing of an initial public offering of the Company's common stock with gross proceeds to the Company of at least $50.0 million and a purchase price of $2.4123 per share, or at the election of the holders of at least two-thirds of the then-outstanding shares of Preferred Stock.

Dividends—Holders are entitled to non-cumulative dividends of $0.05 per share with respect to Series A Preferred and $0.06 per share with respect to the Series A-2 Preferred, when, as, and if declared by the board of directors. No dividends have been declared through December 31, 2020.

Voting Rights—Series A Preferred, Series A-2 Preferred and common stock generally vote together as one class on an as-converted basis; however, common stock voting rights on certain matters are subject to the powers, preferences, and rights of the Series A Preferred and Series A-2 Preferred. The holders of Series A Preferred and Series A-2 Preferred, voting together as a single class, are entitled to elect three directors to the Company's board of directors and the holders of common stock, voting as a single class, are entitled to elect two directors to the Company's board of directors. Certain actions, such as mergers, consolidation, sale of substantially all assets, liquidation, dissolution, wind up of business, or any other deemed liquidation events, must be approved by the holders of at least two-thirds of the then-outstanding shares of Series A Preferred and Series A-2 Preferred.

Liquidation Preference—Upon liquidation, dissolution, or winding up of business, the holders of the Series A Preferred and Series A-2 Preferred are entitled to receive a liquidation preference in priority over the holders of common stock, at an amount per share equal to the greater of i) the original Series A Preferred and Series A-2 Preferred issue price plus any declared but unpaid dividends, or ii) the amount per share payable had all shares of Series A Preferred and Series A-2 Preferred been converted to common stock immediately prior to such liquidation. If assets available for distribution are insufficient to satisfy the liquidation payment to holders in full, assets available for distribution will be allocated among holders based on their pro rata shareholdings. When holders are satisfied in full, any excess assets available for distribution will be allocated ratably among the holders of common stock based on their pro rata holdings. Upon a deemed liquidation event, as defined, holders have the option to redeem their outstanding shares at a price equal to the liquidation payment amounts summarized above.

Redemption—Aside from upon the occurrence of a deemed liquidation event, the Series A Preferred and Series A-2 preferred are not redeemable.

11. Common stock

The Company was authorized to issue up to 255,000,000 and 164,016,724 shares of common stock with a $0.001 par value per share as of December 31, 2020 and 2019, respectively. In January 2021, the Company increased the number of shares of authorized common stock issuable to 355,000,000.

The holders of common stock are entitled to one vote for each share of common stock. Subject to the payment in full of all preferential dividends to which the holders of the Preferred Stock are entitled, the holders of common stock shall be entitled to receive dividends out of funds legally available. In the event of any voluntary or involuntary liquidation, dissolution, or winding up of the Company, after the payment or provision for payment of all debts and liabilities of the Company and all preferential amounts to which the holders of Preferred Stock are entitled with respect to the distribution of assets in liquidation, the holders of common stock shall be entitled to share ratably in the remaining assets of the Company available for distribution.

As of December 31, 2020, the Company has reserved 179,519,032 shares of common stock for the potential conversion of Preferred Stock and 36,008,559 shares of common stock for the potential exercise of outstanding stock options under the 2018 Equity Incentive Plan (the “2018 Plan”).

12. Stock-based compensation

2018 equity incentive plan

In 2018, the board of directors adopted the 2018 Plan, which provided for the grant of qualified incentive stock options, non-statutory stock options, stock appreciation rights, restricted stock and restricted stock units to the Company’s employees, officers, directors, advisors, and outside consultants for the issuance or purchase of shares of the Company’s common stock. As of December 31, 2020, the 2018 Plan allowed for the issuance of up to 46,803,210 shares of the Company’s common stock for the issuance of stock options and restricted stock, of which 10,740,485 shares remained available for future grant under the 2018 Plan.

The 2018 Plan is administered by the board of directors. The exercise prices, vesting and other restrictions are determined at the discretion of the board of directors, except that the exercise price per share of stock options may not be less than 100% of the fair market value of the common stock on the date of grant. Stock options awarded under the 2018 Plan expire 10 years after the grant date unless the board of directors sets a shorter term. Vesting periods for awards under the 2018 Plan are determined at the discretion of the board of directors. Incentive stock options granted to employees and shares of restricted stock granted to officers,

founders and consultants of the Company typically vest over four years. Certain options provide for accelerated vesting if there is a change in control, as defined in the 2018 Plan. Non-statutory options granted to employees, officers, members of the board of directors and consultants of the Company typically vest over four years.

For the years ended December 31, 2020 and December 31, 2019, the Company recorded stock-based compensation expense of $0.9 million and $0.4 million, respectively. Stock compensation expense for 2020 included less than $0.1 million related to restricted stock and $0.8 million related to stock options. Stock compensation expense for the year ended December 31, 2019 included $0.1 million related to restricted stock and $0.3 million related to stock options.

Stock-based compensation expense recorded as research and development and general and administrative expenses in the consolidated statements of operations and comprehensive loss is as follows:

	Year ended December 31,	
(in thousands)	**2020**	**2019**
Research and development	$ 494	$ 336
General and administrative	356	110
Total stock-based compensation expense	$ 850	$ 446

Stock options

The assumptions used in Black-Scholes for stock options granted were as follows:

	Year ended December 31,	
	2020	**2019**
Expected volatility	84.8%	76.1%
Weighted-average risk-free interest rate	0.4%	2.2%
Expected dividend yield	—	—
Expected term (in years)	6.0	5.9

A summary of option activity under the 2018 Plan during the year ended December 31, 2020 was as follows:

	Number of options	Weighted average exercise price per share	Weighted average remaining contractual life (in years)	Aggregate intrinsic value(2) (in thousands)
Outstanding at December 31, 2019	17,903,323	$ 0.15		
Granted	18,200,652	0.31		
Exercised	(54,166)	0.19		
Forfeited	(41,250)	0.15		
Outstanding at December 31, 2020	36,008,559	$ 0.23	9.1	$ 23,689
Exercisable at December 31, 2020	7,525,398	$ 0.15	8.4	$ 5,551
Expected to vest after December 31, 2020(1)	28,483,161	$ 0.25	9.3	$ 18,138

(1) This represents the number of unvested options outstanding as of December 31, 2020 that are expected to vest in the future.

(2) The aggregate intrinsic value is calculated as the difference between the exercise price of the underlying options and the estimated fair value of the common stock for the options that were in the money as of December 31, 2020.

During the year ended December 31, 2020 the weighted average grant-date fair value of the stock options granted was $0.31 per share. The aggregate intrinsic value of stock options exercised during the year ended December 31, 2020 was approximately $19,000 while the Company received $11,000 in proceeds for the exercise of these options. There were no options exercised during the year ended December 31, 2019.

As of December 31, 2020, there was $5.8 million of unrecognized compensation cost related to unvested stock options, which is expected to be recognized over a weighted-average period of approximately 3.2 years.

Restricted stock

In 2018, the Company issued 19,912,903 shares of restricted common stock at a post-split fair value of $0.0003 per share. The restricted shares vest in 48 equal monthly installments, commencing on January 1, 2018. The restricted shares vest at 4,978,226 shares per year and will be fully vested by December 31, 2021.

If the holders of the above restricted common stock cease to have a business relationship with the Company, the Company may reacquire any unvested shares of common stock held by these individuals for the original purchase price or fair value, whichever is lower at the time of repurchase. The amounts received to date for the purchase price of restricted stock are immaterial. The unvested shares of restricted common stock are not considered outstanding shares for accounting purposes until the shares vest.

In November 2018, the Company issued 1,896,467 shares of restricted stock to a consultant of the Company, with a vesting start date of May 1, 2018. The Company subsequently executed a promissory note to provide the consultant a $0.1 million loan related to the taxes associated with the restricted stock award. The consultant subsequently made two promissory note payments approximating $12,000 each during 2019. On November 14, 2019, the Company terminated its relationship with the consultant and agreed to forgive the remaining outstanding promissory note balance of $86,000 while 918,601 shares were forfeited by the consultant. The remaining shares were deemed to be vested.

The Company recognized total compensation expense of $0.2 million related to the consultant's vested shares, of which $0.1 million was recognized for the year ended December 31, 2019.

A summary of the status of and change in unvested restricted stock as of December 31, 2020 was as follows:

	Shares		Weighted-average grant date fair value per share
Unvested as of December 31, 2019	9,956,452	$	0.0003
Vested	(4,978,226)	$	0.0003
Unvested as of December 31, 2020	4,978,226	$	0.0003

At December 31, 2020, there was less than $0.1 million of unrecognized stock-based compensation expense related to restricted stock that is expected to vest. These costs are expected to be recognized over a weighted-average remaining vesting period of 1.0 year.

13. Net loss per share attributable to common stockholders

The following table summarizes the computation of basic and diluted net loss per share attributable to common stockholders of the Company:

	Year ended December 31,	
	2020	2019
	(in thousands, except share and per share amounts)	
Numerator:		
Net loss attributable to common stockholders	$ (45,704)	$ (19,297)
Denominator:		
Weighted average number of common shares, basic and diluted	20,834,742	11,825,835
Net loss per common share attributable to common stockholders, basic and diluted	$ (2.19)	$ (1.63)

The Company's potential dilutive securities, which include convertible preferred stock, unvested restricted stock and common stock options, have been excluded from the computation of diluted net loss per share as the effects would be anti-dilutive. Therefore, the weighted average number of common shares outstanding used to calculate both basic and diluted net loss per share attributable to common stockholders is the same. The Company excluded the following potential common shares, presented based on amounts outstanding at period end, from the computation of diluted net loss per share attributable to common stockholders for the period indicated because including them would have had an anti-dilutive effect:

	Year ended December 31,	
	2020	2019
Convertible preferred stock	179,519,032	51,421,404
Unvested restricted stock	4,978,226	9,956,452
Outstanding options to purchase common stock	36,008,559	17,903,323
Total	220,505,817	79,281,179

14. Income taxes

A reconciliation of the income tax expense computed using the federal statutory income tax rate to the Company's effective income tax rate is as follows:

	Year ended December 31,	
(in thousands)	2020	2019
Federal statutory rate	21.0%	21.0%
Change in valuation allowance	(29.6%)	(17.9%)
Permanent items	0.8%	(5.9%)
State income taxes, net of federal benefit	6.8%	1.7%
Research and development tax credits	1.0%	1.1%
Total	—%	—%

The components of the Company's deferred taxes are as follows:

(in thousands)	December 31, 2020	December 31, 2019
Deferred tax assets:		
Net operating loss carryforwards	$ 12,973	$ 2,817
Capitalized costs—net of amortization	855	491
Research and development tax credits	682	205
Antidilultion liability	2,815	601
Other	210	101
Accrued expenses	905	140
Total deferred tax assets	18,440	4,355
Deferred tax liabilities:		
Property and equipment	(1,061)	(544)
Total deferred tax liabilities	(1,061)	(544)
Total deferred tax assets, net	17,379	3,811
Less: valuation allowance	(17,379)	(3,811)
Deferred tax assets, net of valuation allowance	$ —	$ —

The Company has incurred net operating losses in each year since inception. The Company had no income tax expense due to the operating loss incurred for years ended December 31, 2020 and 2019. Management has evaluated the positive and negative evidence bearing upon the realizability of the Company's net deferred tax assets and has determined that it is more likely than not that the Company will not recognize the benefits of the net deferred tax assets. As a result, the Company has recorded a full valuation allowance at December 31, 2020 and 2019. The valuation allowance increased by $13.6 million in 2020, due to the increase in deferred tax assets, primarily due to net operating loss carryforwards and increase in deferred tax assets associated with current year temporary items. The valuation allowance increased by $3.5 million in 2019, primarily due to the increase in deferred tax assets, primarily due to net operating loss carryforwards.

Realization of the future tax benefits is dependent on many factors, including the Company's ability to generate taxable income within the net operating loss carryforward period. The Company's ability to utilize these federal and state net operating loss carryforwards may be limited in the future if the Company experiences an ownership change pursuant to Internal Revenue Code 382. An ownership change occurs when the ownership percentages of 5% or greater shareholders change by more than 50% over a three-year period. As of December 31, 2020, the Company has not completed a study to assess whether a change of control has occurred and whether the net operating losses and credits are limited due to a change in ownership.

As of December 31, 2020, the Company had approximately $49.2 million of pre-tax federal and $41.6 million of pre-tax state net operating loss carryforwards. The federal net operating losses have an indefinite life and the state net operating losses will start to expire in 2038. Additionally, as of December 31, 2020, the Company had approximately $0.3 million of federal and $0.4 million of Massachusetts tax credits that expire starting in 2039 and 2034, respectively.

As of December 31, 2020 and 2019, the Company had no uncertain tax positions. The Company recognizes both interest and penalties associated with unrecognized tax benefits as a component of income tax expense. The Company has not recorded any interest or penalties for unrecognized tax benefits since its inception.

The Company files income tax returns in the United States, the Commonwealth of Massachusetts, and Pennsylvania, in all tax years since inception. In addition, the Company will file an income tax return in

Connecticut for the year ended December 31, 2020. The Company is not currently under examination by the Internal Revenue Service or any other jurisdiction for these years. All tax years remain open to tax examination. To the extent the Company has tax attribute carryforwards, the tax years in which the attribute was generated may be adjusted upon examination by the Internal Revenue Service or state tax authorities to the extent utilized in a future period. No federal or state tax audits are currently in process.

15. Related party transactions

For the years ended December 31, 2020 and 2019, the Company made total payments of $0.4 million to the five founder shareholders for scientific consulting and other expenses. These same individuals also vested in 4,978,226 shares of restricted stock for each of the years ended December 31, 2020 and 2019.

An executive of Beam is a board member of the Company. In 2018, Beam purchased 501,672 shares of the Series A Preferred at a price of $0.598 per share, which also included rights to the second tranche and third tranche, as further described in Note 9, Preferred Stock tranche liability. Beam subsequently purchased 752,508 and 1,254,181 shares of Series A Preferred at a price of $0.598 per share upon the settlement of the second tranche and third tranche in 2019 and 2020, respectively.

From February 2019 through December 2019, the Company leased office space from Beam in Cambridge, Massachusetts. Total rent payments under this sublease was less than $0.1 million.

In April 2019, the Company and Beam entered into a collaboration and license agreement. As partial consideration for the license rights granted by Beam, the Company paid a one-time, nonrefundable fee through issuing 2,556,322 shares of its common stock with a fair value of $0.3 million. Refer to Note 8, License agreements.

In July 2019, the Company agreed to be designated as Beam's collaboration partner in an NHP study connected to Beam's development and option agreement with Acuitas. As a result, Beam granted the Company a non-exclusive, royalty-free sublicense under Beam's right, title and interest in and to certain Acuitas technology, solely to the extent necessary to enable the Company to perform the NHP study activities. The Company paid to Beam a one-time payment of $0.1 million upon execution of the agreement and is responsible for certain out-of-pocket costs incurred by Beam in connection with the performance of the NHP study activities. The Company incurred research and development expense of $0.0 million and $0.1 million related to these reimbursement payments to Beam for the years ended December 31, 2020 and 2019, respectively.

In October 2020, the Company and Beam entered into a materials exchange agreement wherein the parties agreed that Beam would provide certain mRNA, gRNA, and protein to the Company and that the Company would provide certain gRNAs to Beam at an agreed upon price per each material provided. For the year ended December 31, 2020, the Company recognized $0.2 million as research and development expense related to payments made for materials purchased from Beam and also recognized $0.3 million as a reduction to research and development expense related to reimbursements received for materials sold to Beam.

An officer of the Company is affiliated with Massachusetts General Hospital ("MGH") as a physician. In February 2019 and November of 2019, the Company entered into an Option License Agreement and Patent License Agreement, respectively, with MGH. Upon execution of the agreements in 2019, the Company incurred $0.2 million for option and license issue fees, which were recorded as research and development expense. In 2020, the Company incurred $0.1 million for an annual license fee, which was recorded as research and development expense.

An executive of Broad is a board member of the Company. In March 2019, the Company simultaneously entered into the Harvard/Broad License Agreement and Broad License Agreement for certain base editing technologies pursuant to which the Company received exclusive, worldwide, sublicensable, royalty-bearing licenses under

specified patent rights to develop and commercialize licensed products and nonexclusive, worldwide, sublicensable, royalty-bearing licenses under certain patent rights to research and develop licensed products. As partial consideration for the rights granted under the license agreements, the Company paid $0.2 million in non-refundable upfront license fees and also issued 1,842,725 shares of its common stock to Broad with a fair value of $0.2 million. Additional consideration under the license agreements include antidilution rights and success payments. See Note 8, License agreements.

In March 2018, the Company entered into a promissory note with one of its founders. The amount of the loan, together with accrued and unpaid interest, was payable upon the closing of the Company's first equity financing of at least $5.0 million. The Company borrowed $0.1 million from the founder in April 2018. The $0.1 million was fully repaid, plus an immaterial amount of interest, by the Company in September 2018.

16. Employee benefit plans

The Company has a defined-contribution plan established under Section 401(k) of the Internal Revenue Code (the "401(k) Plan"), which covers substantially all employees. Employees are eligible to participate in the 401(k) Plan beginning on the first day of the month following commencement of their employment. The 401(k) Plan includes a salary deferral arrangement pursuant to which participants may elect to reduce their current compensation by up to the statutorily prescribed limit, equal to $19,500 in 2020, and have the amount of the reduction contributed to the 401(k) Plan. As of January 1, 2020 the Company matches 100% of each participant's annual contribution to the 401(k) plan up to 3% of the participant's salary and then 50% of each participant's contribution up to 2% of the participant's salary. The match immediately vests 100%. The matching contributions by the Company to the 401(k) plan were $0.1 million for the year ended December 31, 2020.

17. Subsequent events

The Company evaluated all subsequent events through April 16, 2021 the date that these consolidated financial statements were issued, to determine if such events should be reflected in these consolidated financial statements.

Convertible preferred stock

On January 14, 2021, the Company issued 77,163,022 shares of Series B Preferred at a price of $1.22 per share, resulting in gross cash proceeds of $94.0 million. The terms of the Series B Preferred are substantially the same as the terms of the Series A and Series A-2 Preferred, except for the liquidation preference per share, which is equal to the per share price paid, as well as the annual dividend rate per share, which is $0.10. In connection with the issuance, the Company increased the number of authorized shares of preferred stock from 179,519,033 shares to 256,682,054 shares and increased the number of authorized shares of common stock from 255,000,000 to 355,000,000.

2018 Plan

In January 2021, the Company increased the number of shares of common stock authorized for issuance under the 2018 Plan from 46,803,210 shares to 63,757,710 shares.

Lease amendment

In January 2021, the Company amended its current lease for office and laboratory space in Cambridge by expanding the lease for an additional 2,980 square feet, which included aggregate lease payments of $0.4 million.

Termination of the broad license agreement

In February 2021, the Company provided written notice to Broad of its intent to terminate the Broad License Agreement, in which termination would be effective in June 2021.

Table of Contents

shares

Verve Therapeutics, Inc.

Common stock

Joint Book-Running Managers

J.P. Morgan Jefferies Guggenheim Securities William Blair

, 2021

Through and including , 2021 (the 25th day after the date of this prospectus), all dealers effecting transactions in the Common Stock, whether or not participating in this offering, may be required to deliver a prospectus. This delivery requirement is in addition to a dealer's obligation to deliver a prospectus when acting as an underwriter and with respect to an unsold allotment or subscription.

Part II

Information not required in prospectus

Item 13. Other expenses of issuance and distribution.

The following table sets forth the expenses to be incurred in connection with the offering described in this registration statement, other than underwriting discounts and commissions, all of which will be paid by the registrant. All amounts are estimates except the Securities and Exchange Commission, or SEC, registration fee, the Financial Industry Regulatory Authority, Inc. filing fee and the Nasdaq Global Market initial listing fee.

	Amount
Securities and Exchange Commission registration fee	$ *
Financial Industry Regulatory Authority, Inc. filing fee	*
Nasdaq Global Market initial listing fee	*
Accountants' fees and expenses	*
Legal fees and expenses	*
Transfer agent's fees and expenses	*
Printing and engraving expenses	*
Miscellaneous	*
Total expenses	$ *

* To be filed by amendment.

Item 14. Indemnification of directors and officers.

Section 102 of the Delaware General Corporation Law, or the DGCL, permits a corporation to eliminate the personal liability of its directors or its stockholders for monetary damages for a breach of fiduciary duty as a director, except where the director breached his or her duty of loyalty, failed to act in good faith, engaged in intentional misconduct or knowingly violated a law, authorized the payment of a dividend or approved a stock repurchase in violation of the DGCL or obtained an improper personal benefit. Our certificate of incorporation that will be effective upon the closing of this offering provides that no director shall be personally liable to us or our stockholders for monetary damages for any breach of fiduciary duty as a director, notwithstanding any provision of law imposing such liability, except to the extent that the DGCL prohibits the elimination or limitation of liability of directors for breaches of fiduciary duty.

Section 145 of the DGCL provides that a corporation has the power to indemnify a director, officer, employee or agent of the corporation and certain other persons serving at the request of the corporation in related capacities against expenses (including attorneys' fees), judgments, fines and amounts paid in settlements actually and reasonably incurred by the person in connection with an action, suit or proceeding to which he or she is or is threatened to be made a party by reason of such position, if such person acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the best interests of the corporation, and, in any criminal action or proceeding, had no reasonable cause to believe his or her conduct was unlawful, except that, in the case of actions brought by or in the right of the corporation, no indemnification shall be made with respect to any claim, issue or matter as to which such person shall have been adjudged to be liable to the corporation unless and only to the extent that the Delaware Court of Chancery or other adjudicating court determines that, despite the adjudication of liability but in view of all of the circumstances of the case, such person is fairly and reasonably entitled to indemnification for such expenses which the Court of Chancery or such other court shall deem proper.

Our certificate of incorporation that will be effective upon the closing of the offering provides that we will indemnify each person who was or is a party or threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (other than an action by or in the right of us), by reason of the fact that he or she is or was, or has agreed to become, our director or officer, or is or was serving, or has agreed to serve, at our request as a director, officer, partner, employee or trustee of, or in a similar capacity with, another corporation, partnership, joint venture, trust or other enterprise (all such persons being referred to as an Indemnitee), or by reason of any action alleged to have been taken or omitted in such capacity, against all expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred in connection with such action, suit or proceeding and any appeal therefrom if such Indemnitee acted in good faith and in a manner he or she reasonably believed to be in, or not opposed to, our best interests, and, with respect to any criminal action or proceeding, he or she had no reasonable cause to believe his or her conduct was unlawful.

Our certificate of incorporation that will be effective upon the closing of the offering also provides that we will indemnify any Indemnitee who was or is a party to an action or suit by or in the right of us to procure a judgment in our favor by reason of the fact that the Indemnitee is or was, or has agreed to become, our director or officer, or is or was serving, or has agreed to serve, at our request as a director, officer, partner, employee or trustee of, or in a similar capacity with, another corporation, partnership, joint venture, trust or other enterprise, or by reason of any action alleged to have been taken or omitted in such capacity, against all expenses (including attorneys' fees) and, to the extent permitted by law, amounts paid in settlement actually and reasonably incurred in connection with such action, suit or proceeding, and any appeal therefrom, if the Indemnitee acted in good faith and in a manner he or she reasonably believed to be in, or not opposed to, our best interests, except that no indemnification shall be made with respect to any claim, issue or matter as to which such person shall have been adjudged to be liable to us, unless a court determines that, despite such adjudication but in view of all of the circumstances, he or she is entitled to indemnification of such expenses. Notwithstanding the foregoing, to the extent that any Indemnitee has been successful, on the merits or otherwise, he or she will be indemnified by us against all expenses (including attorneys' fees) actually and reasonably incurred by him or her or on his or her behalf in connection therewith. If we do not assume the defense, expenses must be advanced to an Indemnitee under certain circumstances.

In addition, we intend to enter into new indemnification agreements with all of our directors and executive officers prior to the completion of this offering. In general, these agreements provide that we will indemnify the executive officer or director to the fullest extent permitted by law for claims arising in his or her capacity as an executive officer or director of our company or in connection with his or her service at our request for another corporation or entity. The indemnification agreements also provide for procedures that will apply in the event that an executive officer or director makes a claim for indemnification and establish certain presumptions that are favorable to the executive officer or director.

We maintain a general liability insurance policy that covers certain liabilities of our directors and officers arising out of claims based on acts or omissions in their capacities as directors or officers.

The underwriting agreement we will enter into in connection with the offering of common stock being registered hereby provides that the underwriters will indemnify, under certain conditions, our directors and officers (as well as certain other persons) against certain liabilities arising in connection with such offering.

Insofar as the foregoing provisions permit indemnification of directors, executive officers or persons controlling us for liability arising under the Securities Act of 1933, as amended, or the Securities Act, we have been informed that, in the opinion of the SEC, such indemnification is against public policy as expressed in the Securities Act and is therefore unenforceable.

Item 15. Recent sales of unregistered securities.

Set forth below is information regarding shares of our common stock, shares of our preferred stock and stock options granted by us within the past three years that were not registered under the Securities Act. Also included is the consideration, if any, received by us for such shares and options and information relating to the section of the Securities Act, or rule of the SEC, under which exemption from registration was claimed.

(a) Issuance of preferred stock

In August 2018, we issued and sold 16,722,408 shares of our Series A preferred stock to five investors at a price per share of $0.5980 in cash, for an aggregate purchase price of $10.0 million.

In December 2018, we issued and sold 2,842,809 shares of our Series A preferred stock to two investors at a price per share of $0.5980 in cash, for an aggregate purchase price of $1.7 million.

In March 2019, we issued 1,672,240 shares of our Series A preferred stock to one investor in consideration for entering into a license and collaboration agreement.

In August 2019, we issued and sold 29,347,825 shares of our series A preferred stock to six investors at a price per share of $0.5980 in cash, for an aggregate purchase price of $17.5 million.

In October 2019, we issued and sold 836,122 shares of our Series A preferred stock to two investors at a price per share of $0.5980 in cash, for an aggregate purchase price of $0.5 million.

In March 2020, we issued and sold 49,749,167 shares of our Series A preferred stock to eight investors at a price per share of $0.5980 in cash, for an aggregate purchase price of $29.8 million.

In April 2020, we issued and sold 56,584,999 shares of our Series A-2 preferred stock to five investors at a price per share of $0.8041 in cash, for an aggregate purchase price of $45.5 million.

In June 2020, we issued and sold 21,763,462 shares of our Series A-2 preferred stock to two investors at a price per share of $0.8041 in cash, for an aggregate purchase price of $17.5 million.

In January 2021, we issued and sold 77,163,022 shares of our Series B preferred stock to 22 investors at a price per share of $1.2182 in cash, for an aggregate purchase price of $94.0 million.

No underwriters were involved in the foregoing issuances of securities. The securities described in this section (a) of Item 15 were issued to investors in reliance upon the exemption from the registration requirements of the Securities Act, as set forth in Section 4(a)(2) under the Securities Act and, in certain cases, Regulation D thereunder, relative to transactions by an issuer not involving any public offering, to the extent an exemption from such registration was required. The recipients of securities in each of these transactions acquired the securities for investment only and not with a view to or for sale in connection with any distribution thereof, and appropriate legends were affixed to the securities issued in these transactions. Each of the purchasers in these transactions was an accredited investor within the meaning of Rule 501 of Regulation D under the Securities Act. All purchasers received written disclosures that the securities had not been registered under the Securities Act and that any resale must be made pursuant to a registration statement or an available exemption from such registration.

(b) Issuances of common stock

In March 2019, we issued 2,556,322 shares of our common stock to two investors in consideration for entering into license and collaboration agreements.

In April 2019, we issued 2,556,322 shares of our common stock to one investor in consideration for entering into a license and collaboration agreement.

In September 2019, we issued 1,124,209 shares of our common stock to two investors pursuant to antidilution rights under license and collaboration agreements.

In March 2020, we issued 1,739,557 shares of our common stock to two investors pursuant to antidilution rights under license and collaboration agreements.

Between April 16, 2018 and April 16, 2021, we issued an aggregate of 19,912,903 shares of restricted common stock, for cash at a purchase price of $0.00025 per share, for an aggregate purchase price of $5,000.

In November 2018, we issued 1,896,467 shares of restricted common stock to a consultant in exchange for services. In November 2019, we terminated our relationship with the consultant and 918,601 shares were forfeited by the consultant. The remaining shares were deemed to be vested.

No underwriters were involved in the foregoing issuances of securities. The issuances of shares of common stock described in this section (b) of Item 15 were issued pursuant to written compensatory plans or arrangements with our employees, directors and consultants, in reliance on the exemption provided by Rule 701 promulgated under the Securities Act or pursuant to Section 4(a)(2) under the Securities Act. All recipients either received adequate information about our company or had access, through employment or other relationships, to such information.

(c) Stock option grants and option exercises

Between April 16, 2018 and April 16, 2021, we granted options to purchase an aggregate of 52,396,475 shares of common stock, with exercise prices ranging from $0.15 to $0.97 per share, to our employees, directors, advisors and consultants pursuant to our 2018 Equity Incentive Plan. Between April 16, 2018 and April 16, 2021, 451,353 shares of common stock have been issued upon the exercise of such stock options for aggregate consideration of $71,774.

The issuances of the securities described in this section (c) of Item 15 were deemed to be exempt from registration pursuant to Section 4(a)(2) of the Securities Act or Rule 701 promulgated under the Securities Act as transactions pursuant to compensatory benefit plans. The shares of common stock issued upon the exercise of options are deemed to be restricted securities for purposes of the Securities Act.

Item 16. Exhibits and financial statement schedules.

(a) Exhibits

Exhibit number	Description of exhibit
1.1*	Form of Underwriting Agreement
3.1	Amended and Restated Certificate of Incorporation of the Registrant
3.2	Amended and Restated Bylaws of the Registrant
3.3*	Form of Restated Certificate of Incorporation of the Registrant (to be effective upon the closing of this offering)
3.4*	Form of Amended and Restated Bylaws of the Registrant (to be effective upon the closing of this offering)
4.1*	Specimen Stock Certificate evidencing the shares of common stock
5.1*	Opinion of Wilmer Cutler Pickering Hale and Dorr LLP
10.1	Second Amended and Restated Investors' Rights Agreement, dated as of January 14, 2021, by and among the Registrant and the other parties thereto

Exhibit number	Description of exhibit
10.2	2018 Equity Incentive Plan
10.3	Form of Stock Option Agreement under the 2018 Equity Incentive Plan
10.4*	2021 Stock Incentive Plan
10.5*	Form of Stock Option Agreement under the 2021 Stock Incentive Plan
10.6*	Form of Restricted Stock Agreement under the 2021 Stock Incentive Plan
10.7*	Form of Restricted Stock Unit Agreement under the 2021 Stock Incentive Plan
10.8*	2021 Employee Stock Purchase Plan
10.9*	Summary of Non-Employee Director Compensation Program
10.10†	Collaboration and License Agreement, dated as of April 3, 2019, by and between the Registrant and Beam Therapeutics Inc.
10.11†	Amended and Restated Development and Option Agreement, dated as of October 6, 2020, by and between the Registrant and Acuitas Therapeutics, Inc.
10.12†	Non-Exclusive License Agreement, dated as of October 14, 2020, by and between the Registrant and Acuitas Therapeutics, Inc.
10.13†	Cas9 License Agreement, dated as of March 15, 2019, by and among the Registrant, The President and Fellows of Harvard College and The Broad Institute, Inc., as amended
10.14	Sublease, dated as of April 13, 2020, by and between the Registrant and Foghorn Therapeutics Inc., as amended
10.15	Offer Letter, dated as of April 16, 2019, by and between the Registrant and Sekar Kathiresan, M.D.
10.16	Offer Letter, dated as of July 29, 2019, by and between the Registrant and Andrew Ashe, J.D.
10.17	Offer Letter, dated as of July 26, 2019, by and between the Registrant and Andrew Bellinger, M.D., Ph.D.
10.18*	Form of indemnification agreement between the Registrant and each of its executive officers and directors
21.1	Subsidiaries of the Registrant
23.1*	Consent of Ernst & Young LLP, independent registered public accounting firm
23.2*	Consent of Wilmer Cutler Pickering Hale and Dorr LLP (included in Exhibit 5.1)
24.1*	Power of Attorney (included on signature page)

* To be filed by amendment.

† Certain portions of the exhibit are subject to confidential treatment.

(b) Financial statement schedules

No financial statement schedules are provided because the information called for is not required or is shown either in the financial statements or the related notes.

Item 17. Undertakings.

(a) Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise,

the registrant has been advised that in the opinion of the SEC such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the registrant of expenses incurred or paid by a director, officer or controlling person of the registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue.

(b) The undersigned registrant hereby undertakes that:

(1) For purposes of determining any liability under the Securities Act of 1933, the information omitted from the form of prospectus filed as part of this registration statement in reliance upon Rule 430A and contained in a form of prospectus filed by the registrant pursuant to Rule 424(b)(1) or (4) or 497(h) under the Securities Act shall be deemed to be part of this registration statement as of the time it was declared effective.

(2) For the purpose of determining any liability under the Securities Act of 1933, each post-effective amendment that contains a form of prospectus shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial *bona fide* offering thereof.

Signatures

Pursuant to the requirements of the Securities Act of 1933, as amended, the registrant has duly caused this Registration Statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Cambridge, Commonwealth of Massachusetts, on this day of , 2021.

VERVE THERAPEUTICS, INC.

By: _____

Sekar Kathiresan, M.D.
Chief Executive Officer

Signatures and power of attorney

We, the undersigned officers and directors of Verve Therapeutics, Inc., hereby severally constitute and appoint Sekar Kathiresan and Andrew Ashe, and each of them singly (with full power to each of them to act alone), our true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution in each of them for him or her and in his or her name, place and stead, and in any and all capacities, to sign any and all amendments (including post-effective amendments) to this Registration Statement, and any other registration statement for the same offering pursuant to Rule 462(b) under the Securities Act of 1933, and to file the same, with all exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite or necessary to be done in and about the premises, as full to all intents and purposes as he or she might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents or any of them, or their, his or her substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1933, this Registration Statement has been signed by the following persons in the capacities held on the dates indicated.

Signature	Title	Date
Sekar Kathiresan, M.D.	Chief Executive Officer, Director (Principal Executive Officer)	, 2021
Andrew Ashe, J.D.	President and Chief Operating Officer (Principal Financial Officer)	, 2021
Margaret Beaudoin	Vice President, Finance (Principal Accounting Officer)	, 2021
Burt Adelman, M.D.	Chairman of the Board	, 2021
John Evans	Director	, 2021
Anthony Philippakis, M.D., Ph.D.	Director	, 2021
Krishna Yeshwant, M.D.	Director	, 2021

Exhibit 3.1

AMENDED AND RESTATED

CERTIFICATE OF INCORPORATION

OF

VERVE THERAPEUTICS, INC.

(Pursuant to Sections 242 and 245 of the
General Corporation Law of the State of Delaware)

Verve Therapeutics, Inc., a corporation organized and existing under and by virtue of the provisions of the General Corporation Law of the State of Delaware (the "**General Corporation Law**"),

DOES HEREBY CERTIFY:

1. That the name of this corporation is Verve Therapeutics, Inc., and that this corporation was originally incorporated pursuant to the General Corporation Law on March 9, 2018 under the name Endcadia, Inc.

2. That the Board of Directors of the Corporation (the "**Board of Directors**") duly adopted resolutions proposing to amend and restate the Certificate of Incorporation of this corporation, declaring said amendment and restatement to be advisable and in the best interests of this corporation and its stockholders, and authorizing the appropriate officers of this corporation to solicit the consent of the stockholders therefor, which resolution setting forth the proposed amendment and restatement is as follows:

RESOLVED, that the Certificate of Incorporation of this corporation be amended and restated in its entirety to read as follows:

FIRST: The name of this corporation is Verve Therapeutics, Inc. (the "**Corporation**").

SECOND: The address of the registered office of the Corporation in the State of Delaware is Corporation Trust Center, 1209 Orange Street, in the City of Wilmington, County of New Castle 19801. The name of its registered agent at such address is The Corporation Trust Company.

THIRD: The nature of the business or purposes to be conducted or promoted is to engage in any lawful act or activity for which corporations may be organized under the General Corporation Law.

FOURTH: The total number of shares of all classes of stock which the Corporation shall have authority to issue is (i) 355,000,000 shares of Common Stock, $0.001 par value per share ("**Common Stock**"), and (ii) 256,682,054 shares of Preferred Stock, $0.001 par value per share ("**Preferred Stock**").

The following is a statement of the designations and the powers, privileges and rights, and the qualifications, limitations or restrictions thereof in respect of each class of capital stock of the Corporation.

A. COMMON STOCK

1. General. The voting, dividend and liquidation rights of the holders of the Common Stock are subject to and qualified by the rights, powers and preferences of the holders of the Preferred Stock set forth herein.

2. Voting. The holders of the Common Stock are entitled to one vote for each share of Common Stock held at all meetings of stockholders (and written actions in lieu of meetings); provided, however, that, except as otherwise required by law, holders of Common Stock, as such, shall not be entitled to vote on any amendment to this Amended and Restated Certificate of Incorporation that relates solely to the terms of one or more outstanding series of Preferred Stock if the holders of such affected series are entitled, either separately or together with the holders of one or more other such series, to vote thereon pursuant to this Amended and Restated Certificate of Incorporation or pursuant to the General Corporation Law. There shall be no cumulative voting. The number of authorized shares of Common Stock may be increased or decreased (but not below the number of shares thereof then outstanding) by (in addition to any vote of the holders of one or more series of Preferred Stock that may be required by the terms of this Amended and Restated Certificate of Incorporation) the affirmative vote of the holders of shares of capital stock of the Corporation representing a majority of the votes represented by all outstanding shares of capital stock of the Corporation entitled to vote, irrespective of the provisions of Section 242(b)(2) of the General Corporation Law.

B. PREFERRED STOCK

101,170,571 shares of the authorized Preferred Stock of the Corporation are hereby designated "**Series A Preferred Stock,**" 78,348,461 shares of the authorized Preferred Stock of the Corporation are hereby designated "**Series A-2 Preferred Stock**" and 77,163,022 shares of the authorized shares of Preferred Stock of the Corporation are hereby designated "**Series B Preferred Stock**," each with the following rights, preferences, powers, privileges and restrictions, qualifications and limitations. Unless otherwise indicated, references to "sections" or "subsections" in this Part B of this Article Fourth: refer to sections and subsections of Part B of this Article Fourth.

1. Dividends.

From and after the date of the issuance of any shares of Series A Preferred Stock, holders of such shares of Series A Preferred Stock shall have the right to receive dividends at the rate per annum of $0.05 per share (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Series A Preferred Stock); from and after the date of the issuance of any shares of Series A-2 Preferred Stock, holders of such shares of Series A-2 Preferred Stock shall have the right to receive dividends at the rate per annum of $0.06 per share (subject to appropriate adjustment in the event of any stock dividend,

stock split, combination or other similar recapitalization with respect to the Series A-2 Preferred Stock); and from and after the date of the issuance of any shares of Series B Preferred Stock, holders of such shares of Series B Preferred Stock shall have the right to receive dividends at the rate per annum of $0.10 per share (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Series B Preferred Stock) (collectively, the "**Dividends**"). Such Dividends shall be non-cumulative and shall be payable only when, as, and if declared by the Board of Directors and the Corporation shall be under no obligation to declare such Dividends. The Corporation shall not declare, pay or set aside any dividends on shares of any other class or series of capital stock of the Corporation (other than dividends on shares of Common Stock payable in shares of Common Stock) unless (in addition to the obtaining of any consents required elsewhere in this Amended and Restated Certificate of Incorporation) the holders of the Preferred Stock then outstanding shall first receive, or simultaneously receive, a dividend on each outstanding share of Preferred Stock in an amount at least equal to the greater of (i) the amount of the aggregate Dividends then declared on such share of Preferred Stock and not previously paid and (ii) (A) in the case of a dividend on Common Stock or any class or series that is convertible into Common Stock, that dividend per share of Preferred Stock as would equal the product of (1) the dividend payable on each share of such class or series determined, if applicable, as if all shares of such class or series had been converted into Common Stock and (2) the number of shares of Common Stock issuable upon conversion of a share of Preferred Stock, in each case calculated on the record date for determination of holders entitled to receive such dividend or (B) in the case of a dividend on any class or series that is not convertible into Common Stock, at a rate per share of Preferred Stock determined by (1) dividing the amount of the dividend payable on each share of such class or series of capital stock by the original issuance price of such class or series of capital stock (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to such class or series) and (2) multiplying such fraction by an amount equal to the Applicable Original Issue Price (as defined below); *provided that* if the Corporation declares, pays or sets aside, on the same date, a dividend on shares of more than one class or series of capital stock of the Corporation, the dividend payable to the holders of Preferred Stock pursuant to this Section 1 shall be calculated based upon the dividend on the class or series of capital stock that would result in the highest Preferred Stock dividend. The "**Series A Original Issue Price**" shall mean $0.5980 per share, subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Series A Preferred Stock. The "**Series A-2 Original Issue Price**" shall mean $0.8041 per share, subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Series A-2 Preferred Stock. The "**Series B Original Issue Price**" shall mean $1.2182 per share, subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Series B Preferred Stock. The "**Applicable Original Issue Price**" shall mean (i) the Series A Original Issue Price, in the case of the Series A Preferred Stock, (ii) the Series A-2 Original Issue Price, in the case of the Series A-2 Preferred Stock, and (iii) the Series B Original Issue Price, in the case of the Series B Preferred Stock.

2. Liquidation, Dissolution or Winding Up; Certain Mergers, Consolidations and Asset Sales.

2.1 Preferential Payments to Holders of Preferred Stock. In the event of any voluntary or involuntary liquidation, dissolution or winding up of the Corporation, the holders of shares of Preferred Stock then outstanding shall be entitled to be paid out of the assets of the Corporation available for distribution to its stockholders, and in the event of a Deemed Liquidation Event (as defined below), the holders of shares of Preferred Stock then outstanding shall be entitled to be paid out of the consideration payable to stockholders in such Deemed Liquidation Event or out of the Available Proceeds (as defined below), as applicable, before any payment shall be made to the holders of Common Stock by reason of their ownership thereof, an amount per share equal to the greater of (i) the Applicable Original Issue Price, plus any dividends declared but unpaid on the applicable series of Preferred Stock, or (ii) such amount per share as would have been payable had all shares of the applicable series of Preferred Stock been converted into Common Stock pursuant to Section 4 immediately prior to such liquidation, dissolution, winding up or Deemed Liquidation Event (assuming for this purpose the conversion into Common Stock of all shares of each other series of Preferred Stock if such conversion would result in the payment to holders of such series of Preferred Stock of an amount that is higher than the amounts set forth in Subsection 2.1(i)) (the amount payable pursuant to the first sentence of this Subsection 2.1 is hereinafter referred to as the "**Series A Liquidation Amoun**t" with respect to the Series A Preferred Stock, the amount payable pursuant to the first sentence of this Subsection 2.1 is hereinafter referred to as the "**Series A-2 Liquidation Amount**" with respect to the Series A-2 Preferred Stock and the amount payable pursuant to the first sentence of this Subsection 2.1 is hereinafter referred to as the "**Series B Liquidation Amount**" with respect to the Series B Preferred Stock). "**Applicable Liquidation Amount**" means the Series A Liquidation Amount with respect to the Series A Preferred Stock, the Series A-2 Liquidation Amount with respect to the Series A-2 Preferred Stock and the Series B Liquidation Amount with respect to the Series B Preferred Stock. If upon any such liquidation, dissolution or winding up of the Corporation or Deemed Liquidation Event, the assets of the Corporation available for distribution to its stockholders shall be insufficient to pay the holders of shares of Preferred Stock the full amount to which they shall be entitled under this Subsection 2.1, the holders of shares of Preferred Stock shall share ratably in any distribution of the assets available for distribution in proportion to the respective amounts which would otherwise be payable in respect of the shares held by them upon such distribution if all amounts payable on or with respect to such shares were paid in full.

2.2 Payments to Holders of Common Stock. In the event of any voluntary or involuntary liquidation, dissolution or winding up of the Corporation, after the payment in full of all Applicable Liquidation Amounts required to be paid to the holders of shares of Preferred Stock, the remaining assets of the Corporation available for distribution to its stockholders or, in the case of a Deemed Liquidation Event, the consideration not payable to the holders of shares of Preferred Stock pursuant to Section 2.1 or the remaining Available Proceeds, as the case may be, shall be distributed among the holders of shares of Common Stock, pro rata based on the number of shares held by each such holder.

2.3 Deemed Liquidation Events.

2.3.1 Definition. Each of the following events shall be considered a "**Deemed Liquidation Event**" unless the holders of a majority of the outstanding shares of Preferred Stock (the "**Requisite Holders**") elect otherwise by written notice sent to the Corporation at least ten days prior to the effective date of any such event:

(a) a merger or consolidation in which

(i) the Corporation is a constituent party or

(ii) a subsidiary of the Corporation is a constituent party and the Corporation issues shares of its capital stock pursuant to such merger or consolidation,

except any such merger or consolidation involving the Corporation or a subsidiary in which the shares of capital stock of the Corporation outstanding immediately prior to such merger or consolidation continue to represent, or are converted into or exchanged for shares of capital stock that represent, immediately following such merger or consolidation, a majority, by voting power, of the capital stock of (1) the surviving or resulting corporation; or (2) if the surviving or resulting corporation is a wholly owned subsidiary of another corporation immediately following such merger or consolidation, the parent corporation of such surviving or resulting corporation; or

(b) (i) the sale, lease, transfer, exclusive license or other disposition, in a single transaction or series of related transactions, by the Corporation or any subsidiary of the Corporation of all or substantially all the assets of the Corporation and its subsidiaries taken as a whole or (ii) the sale or disposition (whether by merger, consolidation or otherwise, and whether in a single transaction or a series of related transactions) of one or more subsidiaries of the Corporation if substantially all of the assets of the Corporation and its subsidiaries taken as a whole are held by such subsidiary or subsidiaries, in each case except where such sale, lease, transfer, exclusive license or other disposition is to a wholly owned subsidiary of the Corporation.

2.3.2 Effecting a Deemed Liquidation Event.

(a) The Corporation shall not have the power to effect a Deemed Liquidation Event referred to in Subsection 2.3.1(a)(i) unless the agreement or plan of merger or consolidation for such transaction (the "**Merger Agreement**") provides that the consideration payable to the stockholders of the Corporation in such Deemed Liquidation Event shall be paid to the holders of capital stock of the Corporation in accordance with Subsections 2.1 and 2.2.

(b) In the event of a Deemed Liquidation Event referred to in Subsection 2.3.1(a)(ii) or 2.3.1(b), if the Corporation does not effect a dissolution of the Corporation under the General Corporation Law within ninety (90) days after such Deemed Liquidation Event, then (i) the Corporation shall send a written notice to each holder of Preferred Stock no later than the ninetieth (90th) day after the Deemed Liquidation Event advising such holders of their right (and the requirements to be met to secure such right) pursuant to the terms of the following clause (ii) to require the redemption of such shares of Preferred Stock, and (ii) if the Requisite Holders so request in a written instrument delivered to the Corporation not later than one hundred twenty (120) days after such Deemed Liquidation Event, the Corporation shall use the consideration received by the Corporation for such Deemed Liquidation Event (net of

any retained liabilities associated with the assets sold or technology licensed, as determined in good faith by the Board of Directors), together with any other assets of the Corporation available for distribution to its stockholders, all to the extent permitted by Delaware law governing distributions to stockholders (the "**Available Proceeds**"), on the one hundred fiftieth (150th) day after such Deemed Liquidation Event (the "**Redemption Date**"), to redeem all outstanding shares of Preferred Stock at a price per share equal to the Applicable Liquidation Amount (the "**Redemption Price**"). Notwithstanding the foregoing, in the event of a redemption pursuant to the preceding sentence, if the Available Proceeds are not sufficient to redeem all outstanding shares of Preferred Stock, the Corporation shall redeem a pro rata portion of each holder's shares of Preferred Stock to the fullest extent of such Available Proceeds, based on the respective amounts which would otherwise be payable in respect of the shares to be redeemed if the Available Proceeds were sufficient to redeem all such shares, and shall redeem the remaining shares as soon as it may lawfully do so under Delaware law governing distributions to stockholders. The Corporation shall send written notice of the mandatory redemption (the "**Redemption Notice**") to each holder of record of Preferred Stock not less than forty (40) days prior to the Redemption Date. The Redemption Notice shall state:

(i) the number of shares of Preferred Stock held by the holder that the Corporation shall redeem on the Redemption Date specified in the Redemption Notice;

(ii) the Redemption Date and the Redemption Price;

(iii) the date upon which the holder's right to convert such shares terminates (as determined in accordance with Subsection 4.1); and

(iv) for holders of shares in certificated form, that the holder is to surrender to the Corporation, in the manner and at the place designated, his, her or its certificate or certificates representing the shares of Preferred Stock to be redeemed.

(c) Surrender of Certificates; Payment. On or before the Redemption Date, each holder of shares of Preferred Stock to be redeemed on such Redemption Date, unless such holder has exercised his, her or its right to convert such shares as provided in Section 4, shall, if a holder of shares in certificated form, surrender the certificate or certificates representing such shares (or, if such registered holder alleges that such certificate has been lost, stolen or destroyed, a lost certificate affidavit and agreement reasonably acceptable to the Corporation to indemnify the Corporation against any claim that may be made against the Corporation on account of the alleged loss, theft or destruction of such certificate) to the Corporation, in the manner and at the place designated in the Redemption Notice, and thereupon the Redemption Price for such shares shall be payable to the order of the person whose name appears on such certificate or certificates as the owner thereof. In the event less than all of the shares of Preferred Stock represented by a certificate are redeemed, a new certificate, instrument, or book entry representing the unredeemed shares of Preferred Stock shall promptly be issued to such holder. Prior to the distribution or redemption provided for in this Subsection 2.3.2(b), the Corporation shall not expend or dissipate the consideration received for such Deemed Liquidation Event, except to discharge expenses incurred in connection with such Deemed Liquidation Event or in the ordinary course of business.

2.3.3 Amount Deemed Paid or Distributed. The amount deemed paid or distributed to the holders of capital stock of the Corporation upon any such merger, consolidation, sale, transfer, exclusive license, other disposition or redemption shall be the cash or the value of the property, rights or securities to be paid or distributed to such holders pursuant to such Deemed Liquidation Event. The value of such property, rights or securities shall be determined in good faith by the Board of Directors.

2.3.4 Allocation of Escrow and Contingent Consideration. In the event of a Deemed Liquidation Event pursuant to Subsection 2.3.1(a)(i), if any portion of the consideration payable to the stockholders of the Corporation is payable only upon satisfaction of contingencies (the "**Additional Consideration**"), the Merger Agreement shall provide that (a) the portion of such consideration that is not Additional Consideration (such portion, the "**Initial Consideration**") shall be allocated among the holders of capital stock of the Corporation in accordance with Subsections 2.1 and 2.2 as if the Initial Consideration were the only consideration payable in connection with such Deemed Liquidation Event; and (b) any Additional Consideration which becomes payable to the stockholders of the Corporation upon satisfaction of such contingencies shall be allocated among the holders of capital stock of the Corporation in accordance with Subsections 2.1 and 2.2 after taking into account the previous payment of the Initial Consideration as part of the same transaction. For the purposes of this Subsection 2.3.4, consideration payable in connection with such a Deemed Liquidation Event that is placed into escrow or retained as a holdback to be available for (i) the satisfaction of obligations other than indemnification or similar obligations or claims in respect of the breach of representations, warranties or covenants, shall be deemed to be Initial Consideration and (ii) the satisfaction of any indemnification or similar obligation or claims, including, without limitation, in respect of the breach of representations, warranties, covenants or any specified indemnity, shall be deemed Additional Consideration.

3. Voting.

3.1 General. On any matter presented to the stockholders of the Corporation for their action or consideration at any meeting of stockholders of the Corporation (or by written consent of stockholders in lieu of meeting), each holder of outstanding shares of Preferred Stock shall be entitled to cast the number of votes equal to the number of whole shares of Common Stock into which the shares of Preferred Stock held by such holder are convertible as of the record date for determining stockholders entitled to vote on such matter. Except as provided by law or by the other provisions of this Amended and Restated Certificate of Incorporation, holders of Preferred Stock shall vote together with the holders of Common Stock as a single class and on an as-converted to Common Stock basis.

3.2 Election of Directors. The holders of record of the shares of Preferred Stock, exclusively and as a separate class, on an as converted to Common Stock basis, shall be entitled to elect three (3) directors of the Corporation (the "**Preferred Directors**") and the holders of record of the shares of Common Stock, exclusively and as a separate class, shall be entitled to

elect two (2) directors of the Corporation. Any director elected as provided in the preceding sentence may be removed without cause by, and only by, the affirmative vote of the holders of the shares of the class or series of capital stock entitled to elect such director or directors, given either at a special meeting of such stockholders duly called for that purpose or pursuant to a written consent of stockholders. If the holders of shares of Preferred Stock or Common Stock, as the case may be, fail to elect a sufficient number of directors to fill all directorships for which they are entitled to elect directors, voting exclusively and as a separate class, pursuant to the first sentence of this Subsection 3.2, then any directorship not so filled shall remain vacant until such time as the holders of the Preferred Stock or Common Stock, as the case may be, elect a person to fill such directorship by vote or written consent in lieu of a meeting; and no such directorship may be filled by stockholders of the Corporation other than by the stockholders of the Corporation that are entitled to elect a person to fill such directorship, voting exclusively and as a separate class. The holders of record of the shares of Common Stock and of any other class or series of voting stock (including the Preferred Stock), exclusively and voting together as a single class, shall be entitled to elect the balance of the total number of directors of the Corporation. At any meeting held for the purpose of electing a director, the presence in person or by proxy of the holders of a majority of the outstanding shares of the class or series entitled to elect such director shall constitute a quorum for the purpose of electing such director. Except as otherwise provided in this Subsection 3.2, a vacancy in any directorship filled by the holders of any class or series shall be filled only by vote or written consent in lieu of a meeting of the holders of such class or series or by any remaining director or directors elected by the holders of such class or series pursuant to this Subsection 3.2. The rights of the holders of the Preferred Stock under the first sentence of this Subsection 3.2 shall terminate on the first date following the Series B Original Issue Date (as defined below) on which there are issued and outstanding less than 9,782,608 shares of Preferred Stock (subject to appropriate adjustment in the event of any stock dividend, stock split, combination, or other similar recapitalization with respect to the Preferred Stock).

3.3 Preferred Stock Protective Provisions. At any time when any shares of Preferred Stock are outstanding, the Corporation shall not, either directly or indirectly by amendment, merger, consolidation or otherwise, do any of the following without (in addition to any other vote required by law or this Amended and Restated Certificate of Incorporation) the written consent or affirmative vote of the Requisite Holders given in writing or by vote at a meeting, consenting or voting (as the case may be) separately as a class, and any such act or transaction entered into without such consent or vote shall be null and void *ab initio*, and of no force or effect.

3.3.1 liquidate, dissolve or wind-up the business and affairs of the Corporation, effect any merger or any other Deemed Liquidation Event, or consent to any of the foregoing;

3.3.2 amend, alter or repeal any provision of this Amended and Restated Certificate of Incorporation or Bylaws of the Corporation;

3.3.3 create, or authorize the creation of, any additional class or series of capital stock unless the same ranks junior to any series of the existing Preferred Stock with respect to the distribution of assets on the liquidation, dissolution or winding up of the Corporation, the payment of dividends, rights of redemption and voting rights;

3.3.4 (i) reclassify, alter or amend any existing security of the Corporation that is pari passu with any series of the existing Preferred Stock in respect of the distribution of assets on the liquidation, dissolution or winding up of the Corporation, the payment of dividends, rights of redemption or voting rights, if such reclassification, alteration or amendment would render such other security senior to any series of the existing Preferred Stock in respect of any such right, preference, or privilege or (ii) reclassify, alter or amend any existing security of the Corporation that is junior to any series of the existing Preferred Stock in respect of the distribution of assets on the liquidation, dissolution or winding up of the Corporation, the payment of dividends, rights of redemption or voting rights, if such reclassification, alteration or amendment would render such other security senior to or pari passu with any series of the existing Preferred Stock in respect of any such right, preference or privilege;

3.3.5 cause or permit any of its subsidiaries to, without approval of the Board of Directors, sell, issue, sponsor, create or distribute any digital tokens, cryptocurrency or other blockchain-based assets (collectively, "**Tokens**"), including through a pre-sale, initial coin offering, token distribution event or crowdfunding, or through the issuance of any instrument convertible into or exchangeable for Tokens;

3.3.6 purchase or redeem (or permit any subsidiary to purchase or redeem) or pay or declare any dividend or make any distribution on, any shares of capital stock of the Corporation other than (i) redemptions of or dividends or distributions on the existing Preferred Stock as expressly authorized herein and (ii) repurchases of Common Stock at the lower of the original purchase price or then current fair market value pursuant to stock restriction agreements approved by the Board of Directors (including a majority of Preferred Directors) upon termination of a consultant, director or employee;

3.3.7 create, or authorize the creation of, or issue, or authorize the issuance of any debt security or create any lien or security interest (except for purchase money liens or statutory liens of landlords, mechanics, materialmen, workmen, warehousemen and other similar persons arising or incurred in the ordinary course of business) or incur other indebtedness for borrowed money, including but not limited to obligations and contingent obligations under guarantees, or permit any subsidiary to take any such action with respect to any debt security lien, security interest or other indebtedness for borrowed money, if the aggregate indebtedness of the Corporation and its subsidiaries for borrowed money following such action would exceed $10,000,000;

3.3.8 create, or hold capital stock in, any subsidiary that is not wholly owned (either directly or through one or more other subsidiaries) by the Corporation, or permit any subsidiary to create, or authorize the creation of, or issue or obligate itself to issue, any shares of any class or series of capital stock, or sell, transfer or otherwise dispose of any capital stock of any direct or indirect subsidiary of the Corporation, or permit any direct or indirect subsidiary to sell, lease, transfer, exclusively license or otherwise dispose (in a single transaction or series of related transactions) of all or substantially all of the assets of such subsidiary;

3.3.9 increase the number of shares of capital stock reserved under a plan, agreement or arrangement that may be issued to employees or directors of, consultants, advisors or other service providers to, the Corporation, or create any new such plan, agreement or arrangement;

3.3.10 increase or decrease the authorized number of directors constituting the Board of Directors; or

3.3.11 increase or decrease (other than for decreases resulting from conversion of the Preferred Stock) the authorized number of shares of Common Stock or Preferred Stock or any series thereof.

4. Optional Conversion.

The holders of the Preferred Stock shall have conversion rights as follows (the "**Conversion Rights**"):

4.1 Right to Convert.

4.1.1 Conversion Ratio. Each share of each series of Preferred Stock shall be convertible, at the option of the holder thereof, at any time and from time to time, and without the payment of additional consideration by the holder thereof, into such number of fully paid and non-assessable shares of Common Stock as is determined by dividing the Applicable Original Issue Price by the Conversion Price applicable to such series of Preferred Stock (as defined below) in effect at the time of conversion; provided that such holder may waive such option to convert upon written notice to the Corporation. The "**Conversion Price**" for the Series A Preferred Stock, Series A-2 Preferred Stock and Series B Preferred Stock shall initially be equal to $0.5980, $0.8041 and $1.2182, respectively. Each such initial Conversion Price, and the rate at which shares of the applicable series of Preferred Stock may be converted into shares of Common Stock, shall be subject to adjustment as provided below.

4.1.2 Termination of Conversion Rights. In the event of a liquidation, dissolution or winding up of the Corporation or a Deemed Liquidation Event, the Conversion Rights shall terminate at the close of business on the last full day preceding the date fixed for the payment of any such amounts distributable on such event to the holders of Preferred Stock.

4.2 Fractional Shares. No fractional shares of Common Stock shall be issued upon conversion of the Preferred Stock. In lieu of any fractional shares to which the holder would otherwise be entitled, the Corporation shall pay cash equal to such fraction multiplied by the fair market value of a share of Common Stock as determined in good faith by the Board of Directors. Whether or not fractional shares would be issuable upon such conversion shall be determined on the basis of the total number of shares of Preferred Stock the holder is at the time converting into Common Stock and the aggregate number of shares of Common Stock issuable upon such conversion.

4.3 Mechanics of Conversion.

4.3.1 Notice of Conversion. In order for a holder of Preferred Stock to voluntarily convert shares of Preferred Stock into shares of Common Stock, such holder shall (a) provide written notice to the Corporation's transfer agent at the office of the transfer agent for the Preferred Stock (or at the principal office of the Corporation if the Corporation serves as its own transfer agent) that such holder elects to convert all or any number of shares of one or more series of Preferred Stock held by such holder and, if applicable, any event on which such conversion is contingent and (b), if such holder's shares are certificated, surrender the certificate or certificates for such shares of Preferred Stock (or, if such registered holder alleges that such certificate has been lost, stolen or destroyed, a lost certificate affidavit and agreement reasonably acceptable to the Corporation to indemnify the Corporation against any claim that may be made against the Corporation on account of the alleged loss, theft or destruction of such certificate), at the office of the transfer agent for the Preferred Stock (or at the principal office of the Corporation if the Corporation serves as its own transfer agent). Such notice shall state such holder's name or the names of the nominees in which such holder wishes the shares of Common Stock to be issued. If required by the Corporation, any certificates surrendered for conversion shall be endorsed or accompanied by a written instrument or instruments of transfer, in form satisfactory to the Corporation, duly executed by the registered holder or his, her or its attorney duly authorized in writing. The close of business on the date of receipt by the transfer agent (or by the Corporation if the Corporation serves as its own transfer agent) of such notice and, if applicable, certificates (or lost certificate affidavit and agreement) shall be the time of conversion (the "**Conversion Time**"), and the shares of Common Stock issuable upon conversion of the specified shares shall be deemed to be outstanding of record as of such date. The Corporation shall, as soon as practicable after the Conversion Time (i) issue and deliver to such holder of Preferred Stock, or to his, her or its nominees, a notice of issuance of uncertificated shares and may, upon written request, issue and deliver a certificate for the number of full shares of Common Stock issuable upon such conversion in accordance with the provisions hereof and, may, if applicable and upon written request, issue and deliver a certificate for the number (if any) of the shares of Preferred Stock represented by any surrendered certificate that were not converted into Common Stock, (ii) pay in cash such amount as provided in Subsection 4.2 in lieu of any fraction of a share of Common Stock otherwise issuable upon such conversion and (iii) pay all declared but unpaid dividends on the shares of Preferred Stock converted.

4.3.2 Reservation of Shares. The Corporation shall at all times when the Preferred Stock shall be outstanding, reserve and keep available out of its authorized but unissued capital stock, for the purpose of effecting the conversion of the Preferred Stock, such number of its duly authorized shares of Common Stock as shall from time to time be sufficient to effect the conversion of all outstanding Preferred Stock; and if at any time the number of authorized but unissued shares of Common Stock shall not be sufficient to effect the conversion of all then outstanding shares of the Preferred Stock, the Corporation shall take such corporate action as may be necessary to increase its authorized but unissued shares of Common Stock to such number of shares as shall be sufficient for such purposes, including, without limitation, engaging in best efforts to obtain the requisite stockholder approval of any necessary amendment to this Amended and Restated Certificate of Incorporation. Before taking any action which would cause an adjustment reducing the Conversion Price applicable to a series of Preferred Stock below the then par value of the shares of Common Stock issuable upon conversion of such series of Preferred Stock, the Corporation will take any corporate action which may, in the opinion of its counsel, be necessary in order that the Corporation may validly and legally issue fully paid and non-assessable shares of Common Stock at the adjusted Conversion Price applicable to such series of Preferred Stock.

4.3.3 Effect of Conversion. All shares of Preferred Stock which shall have been surrendered for conversion as herein provided shall no longer be deemed to be outstanding and all rights with respect to such shares shall immediately cease and terminate at the Conversion Time, except only the right of the holders thereof to receive shares of Common Stock in exchange therefor, to receive payment in lieu of any fraction of a share otherwise issuable upon such conversion as provided in Subsection 4.2 and to receive payment of any dividends declared but unpaid thereon. Any shares of Preferred Stock so converted shall be retired and cancelled and may not be reissued as shares of such series, and the Corporation may thereafter take such appropriate action (without the need for stockholder action) as may be necessary to reduce the authorized number of shares of Preferred Stock accordingly.

4.3.4 No Further Adjustment. Upon any such conversion, no adjustment to the Conversion Price applicable to a series of Preferred Stock shall be made for any declared but unpaid dividends on the Preferred Stock surrendered for conversion or on the Common Stock delivered upon conversion.

4.3.5 Taxes. The Corporation shall pay any and all issue and other similar taxes that may be payable in respect of any issuance or delivery of shares of Common Stock upon conversion of shares of Preferred Stock pursuant to this Section 4. The Corporation shall not, however, be required to pay any tax which may be payable in respect of any transfer involved in the issuance and delivery of shares of Common Stock in a name other than that in which the shares of Preferred Stock so converted were registered, and no such issuance or delivery shall be made unless and until the person or entity requesting such issuance has paid to the Corporation the amount of any such tax or has established, to the satisfaction of the Corporation, that such tax has been paid.

4.4 Adjustments to Conversion Price for Diluting Issues.

4.4.1 Special Definitions. For purposes of this Article Fourth: , the following definitions shall apply:

(a) "**Option**" shall mean rights, options or warrants to subscribe for, purchase or otherwise acquire Common Stock or Convertible Securities.

(b) "**Series B Original Issue Date**" shall mean the date on which the first share of Series B Preferred Stock was issued.

(c) "**Convertible Securities**" shall mean any evidences of indebtedness, shares or other securities directly or indirectly convertible into or exchangeable for Common Stock, but excluding Options.

(d) "**Additional Shares of Common Stock**" shall mean all shares of Common Stock issued (or, pursuant to Subsection 4.4.4 below, deemed to be issued) by the Corporation after the Series B Original Issue Date, other than (1) the following shares of Common Stock and (2) shares of Common Stock deemed issued pursuant to the following Options and Convertible Securities (clauses (1) and (2), collectively, "**Exempted Securities**"):

(i) shares of Common Stock, Options or Convertible Securities issued as a dividend or distribution on Preferred Stock;

(ii) shares of Common Stock, Options or Convertible Securities issued by reason of a dividend, stock split, split-up or other distribution on shares of Common Stock that is covered by Subsection 4.5, 4.6, 4.7 or 4.8;

(iii) shares of Common Stock or Options issued to employees or directors of, or consultants or advisors to, the Corporation or any of its subsidiaries pursuant to a plan, agreement or arrangement approved by the Board of Directors (including a majority of the Preferred Directors);

(iv) shares of Common Stock or Convertible Securities actually issued upon the exercise of Options or shares of Common Stock actually issued upon the conversion or exchange of Convertible Securities, in each case provided such issuance is pursuant to the terms of such Option or Convertible Security;

(v) shares of Common Stock, Options or Convertible Securities issued to banks, equipment lessors or other financial institutions, or to real property lessors, pursuant to a debt financing, equipment leasing or real property leasing transaction approved by the Board of Directors (including a majority of the Preferred Directors);

(vi) shares of Common Stock, Options or Convertible Securities issued to suppliers or third-party service providers in connection with the provision of goods or services pursuant to transactions approved by the Board of Directors (including a majority of the Preferred Directors), *provided that* such issuances are not primarily for equity financing purposes;

(vii) shares of Common Stock, Options or Convertible Securities issued as acquisition consideration pursuant to the acquisition of another corporation by the Corporation by merger, purchase of substantially all of the assets or other reorganization or to a joint venture agreement, *provided that* such issuances are approved by the Board of Directors (including a majority of the Preferred Directors); or

(viii) shares of Common Stock, Options or Convertible Securities issued in connection with sponsored research, collaboration, technology license, development, manufacturing, marketing or other similar agreements or strategic transactions approved by the Board of Directors (including a majority of the Preferred Directors).

4.4.2 No Adjustment of Conversion Price. No adjustment in the Conversion Price applicable to a series of Preferred Stock shall be made as the result of the issuance or deemed issuance of Additional Shares of Common Stock if the Corporation receives written notice from the Requisite Holders agreeing that no such adjustment shall be made as the result of the issuance or deemed issuance of such Additional Shares of Common Stock.

4.4.3 Deemed Issue of Additional Shares of Common Stock.

(a) If the Corporation at any time or from time to time after the Series B Original Issue Date shall issue any Options or Convertible Securities (excluding Options or Convertible Securities which are themselves Exempted Securities) or shall fix a record date for the determination of holders of any class of securities entitled to receive any such Options or Convertible Securities, then the maximum number of shares of Common Stock (as set forth in the instrument relating thereto, assuming the satisfaction of any conditions to exercisability, convertibility or exchangeability but without regard to any provision contained therein for a subsequent adjustment of such number) issuable upon the exercise of such Options or, in the case of Convertible Securities and Options therefor, the conversion or exchange of such Convertible Securities, shall be deemed to be Additional Shares of Common Stock issued as of the time of such issue or, in case such a record date shall have been fixed, as of the close of business on such record date.

(b) If the terms of any Option or Convertible Security, the issuance of which resulted in an adjustment to the Conversion Price applicable to a series of Preferred Stock pursuant to the terms of Subsection 4.4.4, are revised as a result of an amendment to such terms or any other adjustment pursuant to the provisions of such Option or Convertible Security (but excluding automatic adjustments to such terms pursuant to anti-dilution or similar provisions of such Option or Convertible Security) to provide for either (1) any increase or decrease in the number of shares of Common Stock issuable upon the exercise, conversion and/or exchange of any such Option or Convertible Security or (2) any increase or decrease in the consideration payable to the Corporation upon such exercise, conversion and/or exchange, then, effective upon such increase or decrease becoming effective, the Conversion Price applicable to such series of Preferred Stock computed upon the original issue of such Option or Convertible Security (or upon the occurrence of a record date with respect thereto) shall be readjusted to such Conversion Price applicable to such series of Preferred Stock as would have obtained had such revised terms been in effect upon the original date of issuance of such Option or Convertible Security. Notwithstanding the foregoing, no readjustment pursuant to this clause (b) shall have the effect of increasing the Conversion Price applicable to a series of Preferred Stock to an amount which exceeds the lower of (i) the Conversion Price applicable to such series of Preferred Stock in effect immediately prior to the original adjustment made as a result of the issuance of such Option or Convertible Security, or (ii) the Conversion Price applicable to such series of Preferred Stock that would have resulted from any issuances of Additional Shares of Common Stock (other than deemed issuances of Additional Shares of Common Stock as a result of the issuance of such Option or Convertible Security) between the original adjustment date and such readjustment date.

(c) If the terms of any Option or Convertible Security (excluding Options or Convertible Securities which are themselves Exempted Securities), the issuance of which did not result in an adjustment to the Conversion Price applicable to a series of Preferred Stock pursuant to the terms of Subsection 4.4.4 (either because the consideration per

share (determined pursuant to Subsection 4.4.5) of the Additional Shares of Common Stock subject thereto was equal to or greater than the Conversion Price applicable to such series of Preferred Stock then in effect, or because such Option or Convertible Security was issued before the Series B Original Issue Date), are revised after the Series B Original Issue Date as a result of an amendment to such terms or any other adjustment pursuant to the provisions of such Option or Convertible Security (but excluding automatic adjustments to such terms pursuant to anti-dilution or similar provisions of such Option or Convertible Security) to provide for either (1) any increase in the number of shares of Common Stock issuable upon the exercise, conversion or exchange of any such Option or Convertible Security or (2) any decrease in the consideration payable to the Corporation upon such exercise, conversion or exchange, then such Option or Convertible Security, as so amended or adjusted, and the Additional Shares of Common Stock subject thereto (determined in the manner provided in Subsection 4.4.4(a) shall be deemed to have been issued effective upon such increase or decrease becoming effective.

(d) Upon the expiration or termination of any unexercised Option or unconverted or unexchanged Convertible Security (or portion thereof) which resulted (either upon its original issuance or upon a revision of its terms) in an adjustment to the Conversion Price applicable to a series of Preferred Stock pursuant to the terms of Subsection 4.4.4, the Conversion Price applicable to a series of Preferred Stock shall be readjusted to the Conversion Price applicable to such series of Preferred Stock as would have obtained had such Option or Convertible Security (or portion thereof) never been issued.

(e) If the number of shares of Common Stock issuable upon the exercise, conversion and/or exchange of any Option or Convertible Security, or the consideration payable to the Corporation upon such exercise, conversion and/or exchange, is calculable at the time such Option or Convertible Security is issued or amended but is subject to adjustment based upon subsequent events, any adjustment to the Conversion Price applicable to a series of Preferred Stock provided for in this Subsection 4.4.4 shall be effected at the time of such issuance or amendment based on such number of shares or amount of consideration without regard to any provisions for subsequent adjustments (and any subsequent adjustments shall be treated as provided in clauses (b) and (c) of this Subsection 4.4.4). If the number of shares of Common Stock issuable upon the exercise, conversion and/or exchange of any Option or Convertible Security, or the consideration payable to the Corporation upon such exercise, conversion and/or exchange, cannot be calculated at all at the time such Option or Convertible Security is issued or amended, any adjustment to the Conversion Price applicable to a series of Preferred Stock that would result under the terms of this Subsection 4.4.4 at the time of such issuance or amendment shall instead be effected at the time such number of shares and/or amount of consideration is first calculable (even if subject to subsequent adjustments), assuming for purposes of calculating such adjustment to the Conversion Price applicable to such series of Preferred Stock that such issuance or amendment took place at the time such calculation can first be made.

4.4.4 Adjustment of Conversion Price Upon Issuance of Additional Shares of Common Stock. In the event the Corporation shall at any time after the Series B Original Issue Date issue Additional Shares of Common Stock (including Additional Shares of Common Stock deemed to be issued pursuant to Subsection 4.4.4), without consideration or for a

consideration per share less than the Conversion Price applicable to a series of Preferred Stock in effect immediately prior to such issuance or deemed issuance, then the Conversion Price applicable to such series of Preferred Stock shall be reduced, concurrently with such issue, to a price (calculated to the nearest one-hundredth of a cent) determined in accordance with the following formula:

$$CP_2 = CP_1 * (A + B) \div (A + C).$$

For purposes of the foregoing formula, the following definitions shall apply:

(a) "**CP_2**" shall mean the Conversion Price applicable to such series of Preferred Stock in effect immediately after such issuance or deemed issuance of Additional Shares of Common Stock

(b) "**CP_1**" shall mean the Conversion Price applicable to such series of Preferred Stock in effect immediately prior to such issuance or deemed issuance of Additional Shares of Common Stock;

(c) "**A**" shall mean the number of shares of Common Stock outstanding immediately prior to such issuance or deemed issuance of Additional Shares of Common Stock (treating for this purpose as outstanding all shares of Common Stock issuable upon exercise of Options outstanding immediately prior to such issuance or deemed issuance or upon conversion or exchange of Convertible Securities (including the Preferred Stock) outstanding (assuming exercise of any outstanding Options therefor) immediately prior to such issue);

(d) "**B**" shall mean the number of shares of Common Stock that would have been issued if such Additional Shares of Common Stock had been issued or deemed issued at a price per share equal to CP_1 (determined by dividing the aggregate consideration received by the Corporation in respect of such issue by CP_1); and

(e) "**C**" shall mean the number of such Additional Shares of Common Stock issued in such transaction.

4.4.5 Determination of Consideration. For purposes of this Subsection 4.4, the consideration received by the Corporation for the issuance or deemed issuance of any Additional Shares of Common Stock shall be computed as follows:

(a) Cash and Property. Such consideration shall:

(i) insofar as it consists of cash, be computed at the aggregate amount of cash received by the Corporation, excluding amounts paid or payable for accrued interest;

(ii) insofar as it consists of property other than cash, be computed at the fair market value thereof at the time of such issue, as determined in good faith by the Board of Directors; and

(iii) in the event Additional Shares of Common Stock are issued together with other shares or securities or other assets of the Corporation for consideration which covers both, be the proportion of such consideration so received that is allocated to such Additional Shares of Common Stock, computed as provided in clauses (i) and (ii) above, as determined in good faith by the Board of Directors.

(b) Options and Convertible Securities. The consideration per share received by the Corporation for Additional Shares of Common Stock deemed to have been issued pursuant to Subsection 4.4.4, relating to Options and Convertible Securities, shall be determined by dividing:

(i) The total amount, if any, received or receivable by the Corporation as consideration for the issue of such Options or Convertible Securities, plus the minimum aggregate amount of additional consideration (as set forth in the instruments relating thereto, without regard to any provision contained therein for a subsequent adjustment of such consideration) payable to the Corporation upon the exercise of such Options or the conversion or exchange of such Convertible Securities, or in the case of Options for Convertible Securities, the exercise of such Options for Convertible Securities and the conversion or exchange of such Convertible Securities, by

(ii) the maximum number of shares of Common Stock (as set forth in the instruments relating thereto, without regard to any provision contained therein for a subsequent adjustment of such number) issuable upon the exercise of such Options or the conversion or exchange of such Convertible Securities, or in the case of Options for Convertible Securities, the exercise of such Options for Convertible Securities and the conversion or exchange of such Convertible Securities.

4.4.6 Multiple Closing Dates. In the event the Corporation shall issue on more than one date Additional Shares of Common Stock that are a part of one transaction or a series of related transactions and that would result in an adjustment to the Conversion Price applicable to a series of Preferred Stock pursuant to the terms of Subsection 4.4.4, and such issuance dates occur within a period of no more than ninety (90) days from the first such issuance to the final such issuance, then, upon the final such issuance, the Conversion Price applicable to such series of Preferred Stock shall be readjusted to give effect to all such issuances as if they occurred on the date of the first such issuance (and without giving effect to any additional adjustments as a result of any such subsequent issuances within such period).

4.5 Adjustment for Stock Splits and Combinations. If the Corporation shall at any time or from time to time after the Series B Original Issue Date effect a subdivision of the outstanding Common Stock, the Conversion Price applicable to a series of Preferred Stock in effect immediately before that subdivision shall be proportionately decreased so that the number of shares of Common Stock issuable on conversion of each share of such series shall be increased in proportion to such increase in the aggregate number of shares of Common Stock outstanding. If the Corporation shall at any time or from time to time after the Series B Original Issue Date combine the outstanding shares of Common Stock, the Conversion Price applicable to a series of Preferred Stock in effect immediately before the combination shall be proportionately increased

so that the number of shares of Common Stock issuable on conversion of each share of such series shall be decreased in proportion to such decrease in the aggregate number of shares of Common Stock outstanding. Any adjustment under this subsection shall become effective at the close of business on the date the subdivision or combination becomes effective.

4.6 Adjustment for Certain Dividends and Distributions. In the event the Corporation at any time or from time to time after the Series B Original Issue Date shall make or issue, or fix a record date for the determination of holders of Common Stock entitled to receive, a dividend or other distribution payable on the Common Stock in additional shares of Common Stock, then and in each such event the Conversion Price applicable to a series of Preferred Stock in effect immediately before such event shall be decreased as of the time of such issuance or, in the event such a record date shall have been fixed, as of the close of business on such record date, by multiplying the Conversion Price applicable to such series of Preferred Stock then in effect by a fraction:

(a) the numerator of which shall be the total number of shares of Common Stock issued and outstanding immediately prior to the time of such issuance or the close of business on such record date, and

(b) the denominator of which shall be the total number of shares of Common Stock issued and outstanding immediately prior to the time of such issuance or the close of business on such record date plus the number of shares of Common Stock issuable in payment of such dividend or distribution.

Notwithstanding the foregoing (i) if such record date shall have been fixed and such dividend is not fully paid or if such distribution is not fully made on the date fixed therefor, the Conversion Price applicable to a series of Preferred Stock shall be recomputed accordingly as of the close of business on such record date and thereafter the Conversion Price applicable to such series of Preferred Stock shall be adjusted pursuant to this subsection as of the time of actual payment of such dividends or distributions; and (ii) that no such adjustment shall be made if the holders of such series of Preferred Stock simultaneously receive a dividend or other distribution of shares of Common Stock in a number equal to the number of shares of Common Stock as they would have received if all outstanding shares of such series of Preferred Stock had been converted into Common Stock on the date of such event.

4.7 Adjustments for Other Dividends and Distributions. In the event the Corporation at any time or from time to time after the Series B Original Issue Date shall make or issue, or fix a record date for the determination of holders of Common Stock entitled to receive, a dividend or other distribution payable in securities of the Corporation (other than a distribution of shares of Common Stock in respect of outstanding shares of Common Stock) or in other property and the provisions of Section 1 do not apply to such dividend or distribution, then and in each such event the holders of Preferred Stock shall receive, simultaneously with the distribution to the holders of Common Stock, a dividend or other distribution of such securities or other property in an amount equal to the amount of such securities or other property as they would have received if all outstanding shares of Preferred Stock had been converted into Common Stock on the date of such event.

4.8 Adjustment for Merger or Reorganization, etc. Subject to the provisions of Subsection 2.3, if there shall occur any reorganization, recapitalization, reclassification, consolidation or merger involving the Corporation in which the Common Stock (but not the Preferred Stock) is converted into or exchanged for securities, cash or other property (other than a transaction covered by Subsections 4.4, 4.6 or 4.7), then, following any such reorganization, recapitalization, reclassification, consolidation or merger, each share of Preferred Stock shall thereafter be convertible in lieu of the Common Stock into which it was convertible prior to such event into the kind and amount of securities, cash or other property which a holder of the number of shares of Common Stock of the Corporation issuable upon conversion of one share of Preferred Stock immediately prior to such reorganization, recapitalization, reclassification, consolidation or merger would have been entitled to receive pursuant to such transaction; and, in such case, appropriate adjustment (as determined in good faith by the Board of Directors) shall be made in the application of the provisions in this Section 4 with respect to the rights and interests thereafter of the holders of the Preferred Stock, to the end that the provisions set forth in this Section 4 (including provisions with respect to changes in and other adjustments of the Conversion Price applicable to a series of Preferred Stock) shall thereafter be applicable, as nearly as reasonably may be, in relation to any securities or other property thereafter deliverable upon the conversion of such series of Preferred Stock.

4.9 Certificate as to Adjustments. Upon the occurrence of each adjustment or readjustment of the Conversion Price applicable to a series of Preferred Stock pursuant to this Section 4, the Corporation at its expense shall, as promptly as reasonably practicable but in any event not later than ten (10) days thereafter, compute such adjustment or readjustment in accordance with the terms hereof and furnish to each holder of Preferred Stock a certificate setting forth such adjustment or readjustment (including the kind and amount of securities, cash or other property into which the Preferred Stock is convertible) and showing in detail the facts upon which such adjustment or readjustment is based. The Corporation shall, as promptly as reasonably practicable after the written request at any time of any holder of Preferred Stock (but in any event not later than ten (10) days thereafter), furnish or cause to be furnished to such holder a certificate setting forth (i) the Conversion Price applicable to such series of Preferred Stock then in effect, and (ii) the number of shares of Common Stock and the amount, if any, of other securities, cash or property which then would be received upon the conversion of such series of Preferred Stock.

4.10 Notice of Record Date. In the event:

(a) the Corporation shall take a record of the holders of its Common Stock (or other capital stock or securities at the time issuable upon conversion of the Preferred Stock) for the purpose of entitling or enabling them to receive any dividend or other distribution, or to receive any right to subscribe for or purchase any shares of capital stock of any class or any other securities, or to receive any other security; or

(b) of any capital reorganization of the Corporation, any reclassification of the Common Stock of the Corporation, or any Deemed Liquidation Event; or

(c) of the voluntary or involuntary dissolution, liquidation or winding-up of the Corporation,

then, and in each such case, the Corporation will send or cause to be sent to the holders of the Preferred Stock a notice specifying, as the case may be, (i) the record date for such dividend, distribution or right, and the amount and character of such dividend, distribution or right, or (ii) the effective date on which such reorganization, reclassification, consolidation, merger, transfer, dissolution, liquidation or winding-up is proposed to take place, and the time, if any is to be fixed, as of which the holders of record of Common Stock (or such other capital stock or securities at the time issuable upon the conversion of the Preferred Stock) shall be entitled to exchange their shares of Common Stock (or such other capital stock or securities) for securities or other property deliverable upon such reorganization, reclassification, consolidation, merger, transfer, dissolution, liquidation or winding-up, and the amount per share and character of such exchange applicable to the Preferred Stock and the Common Stock. Such notice shall be sent at least ten (10) days prior to the record date or effective date for the event specified in such notice.

5. Mandatory Conversion.

5.1 Trigger Events. Upon either (a) the closing of the sale of shares of Common Stock to the public at a price of at least $2.4123 per share (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Common Stock), in a firm-commitment underwritten public offering pursuant to an effective registration statement under the Securities Act of 1933, as amended, resulting in at least $50,000,000 of proceeds, net of the underwriting discount and commissions, to the Corporation and in connection with such offering the Common Stock is listed for trading on the Nasdaq Global Market, the New York Stock Exchange or another exchange or marketplace approved the Board of Directors or (b) the date and time, or the occurrence of an event, specified by vote or written consent of the Requisite Holders (the time of such closing or the date and time specified or the time of the event specified in such vote or written consent is referred to herein as the "**Mandatory Conversion Time**"), then (i) all outstanding shares of Preferred Stock shall automatically be converted into shares of Common Stock, at the then effective conversion rate as calculated pursuant to Subsection 4.1.1. and (ii) such shares may not be reissued by the Corporation.

5.2 Procedural Requirements. All holders of record of shares of Preferred Stock shall be sent written notice of the Mandatory Conversion Time and the place designated for mandatory conversion of all such shares of Preferred Stock pursuant to this Section 5. Such notice need not be sent in advance of the occurrence of the Mandatory Conversion Time. Upon receipt of such notice, each holder of shares of Preferred Stock in certificated form shall surrender his, her or its certificate or certificates for all such shares (or, if such holder alleges that such certificate has been lost, stolen or destroyed, a lost certificate affidavit and agreement reasonably acceptable to the Corporation to indemnify the Corporation against any claim that may be made against the Corporation on account of the alleged loss, theft or destruction of such certificate) to the Corporation at the place designated in such notice. If so required by the Corporation, any certificates surrendered for conversion shall be endorsed or accompanied by written instrument or instruments of transfer, in form satisfactory to the Corporation, duly executed by the registered holder or by his, her or its attorney duly authorized in writing. All rights with respect to the Preferred Stock converted pursuant to Subsection 5.1, including the rights, if any, to receive notices and vote (other than as a holder of Common Stock), will terminate at the Mandatory Conversion Time (notwithstanding the failure of the holder or holders thereof to surrender any

certificates at or prior to such time), except only the rights of the holders thereof, upon surrender of any certificate or certificates of such holders (or lost certificate affidavit and agreement) therefor, to receive the items provided for in the next sentence of this Subsection 5.2. As soon as practicable after the Mandatory Conversion Time and, if applicable, the surrender of any certificate or certificates (or lost certificate affidavit and agreement) for Preferred Stock, the Corporation shall (a) issue and deliver to such holder, or to his, her or its nominees, a notice of issuance of uncertificated shares and may, upon written request, issue and deliver a certificate for the number of full shares of Common Stock issuable upon such conversion in accordance with the provisions hereof and (b) pay cash as provided in Subsection 4.2 in lieu of any fraction of a share of Common Stock otherwise issuable upon such conversion and the payment of any declared but unpaid dividends on the shares of Preferred Stock converted. Such converted Preferred Stock shall be retired and cancelled and may not be reissued as shares of such series, and the Corporation may thereafter take such appropriate action (without the need for stockholder action) as may be necessary to reduce the authorized number of shares of Preferred Stock accordingly.

6. Redeemed or Otherwise Acquired Shares. Any shares of Preferred Stock that are redeemed, converted or otherwise acquired by the Corporation or any of its subsidiaries shall be automatically and immediately cancelled and retired and shall not be reissued, sold or transferred. Neither the Corporation nor any of its subsidiaries may exercise any voting or other rights granted to the holders of Preferred Stock following redemption, conversion or acquisition.

7. Waiver. Any of the rights, powers, preferences and other terms of the Preferred Stock set forth herein may be waived on behalf of all holders of Preferred Stock by the affirmative written consent or vote of the Requisite Holders.

8. Notices. Any notice required or permitted by the provisions of this Article Fourth: to be given to a holder of shares of Preferred Stock shall be mailed, postage prepaid, to the post office address last shown on the records of the Corporation, or given by electronic communication in compliance with the provisions of the General Corporation Law, and shall be deemed sent upon such mailing or electronic transmission.

FIFTH: Subject to any additional vote required by this Amended and Restated Certificate of Incorporation or Bylaws, in furtherance and not in limitation of the powers conferred by statute, the Board of Directors is expressly authorized to make, repeal, alter, amend and rescind any or all of the Bylaws of the Corporation.

SIXTH: Subject to any additional vote required by this Amended and Restated Certificate of Incorporation, the number of directors of the Corporation shall be determined in the manner set forth in the Bylaws of the Corporation. Each director shall be entitled to one vote on each matter presented to the Board of Directors.

SEVENTH: Elections of directors need not be by written ballot unless the Bylaws of the Corporation shall so provide.

EIGHTH: Meetings of stockholders may be held within or without the State of Delaware, as the Bylaws of the Corporation may provide. The books of the Corporation may be kept outside the State of Delaware at such place or places as may be designated from time to time by the Board of Directors or in the Bylaws of the Corporation.

NINTH: To the fullest extent permitted by law, a director of the Corporation shall not be personally liable to the Corporation or its stockholders for monetary damages for breach of fiduciary duty as a director. If the General Corporation Law or any other law of the State of Delaware is amended after approval by the stockholders of this Article Ninth to authorize corporate action further eliminating or limiting the personal liability of directors, then the liability of a director of the Corporation shall be eliminated or limited to the fullest extent permitted by the General Corporation Law as so amended.

Any repeal or modification of the foregoing provisions of this Article Ninth by the stockholders of the Corporation shall not adversely affect any right or protection of a director of the Corporation existing at the time of, or increase the liability of any director of the Corporation with respect to any acts or omissions of such director occurring prior to, such repeal or modification.

TENTH: To the fullest extent permitted by applicable law, the Corporation is authorized to provide indemnification of (and advancement of expenses to) directors, officers and agents of the Corporation (and any other persons to which General Corporation Law permits the Corporation to provide indemnification) through Bylaw provisions, agreements with such agents or other persons, vote of stockholders or disinterested directors or otherwise, in excess of the indemnification and advancement otherwise permitted by Section 145 of the General Corporation Law.

Any amendment, repeal or modification of the foregoing provisions of this Article Tenth: shall not (a) adversely affect any right or protection of any director, officer or other agent of the Corporation existing at the time of such amendment, repeal or modification or (b) increase the liability of any director of the Corporation with respect to any acts or omissions of such director, officer or agent occurring prior to, such amendment, repeal or modification.

ELEVENTH: The Corporation renounces, to the fullest extent permitted by law, any interest or expectancy of the Corporation in, or in being offered an opportunity to participate in, any Excluded Opportunity. An "**Excluded Opportunity**" is any matter, transaction or interest that is presented to, or acquired, created or developed by, or which otherwise comes into the possession of, (i) any director of the Corporation who is not an employee of the Corporation or any of its subsidiaries, or (ii) any holder of Preferred Stock or any partner, member, director, stockholder, employee or agent of any such holder, other than someone who is an employee of the Corporation or any of its subsidiaries (collectively, "**Covered Persons**"), unless such matter, transaction or interest is presented to, or acquired, created or developed by, or otherwise comes into the possession of, a Covered Person expressly and solely in such Covered Person's capacity as a director of the Corporation.

TWELFTH: Unless the Corporation consents in writing to the selection of an alternative forum, the Court of Chancery in the State of Delaware shall be the sole and exclusive forum for any stockholder (including a beneficial owner) to bring (i) any derivative action or proceeding brought on behalf of the Corporation, (ii) any action asserting a claim of breach of fiduciary duty owed by any director, officer or other employee of the Corporation to the Corporation or the Corporation's stockholders, (iii) any action asserting a claim against the Corporation, its directors, officers or employees arising pursuant to any provision of the Delaware General Corporation Law or the Corporation's certificate of incorporation or bylaws or (iv) any action asserting a claim against the Corporation, its directors, officers or employees governed by the internal affairs doctrine, except for, as to each of (i) through (iv) above, any claim as to which the Court of Chancery determines that there is an indispensable party not subject to the jurisdiction of the Court of Chancery (and the indispensable party does not consent to the personal jurisdiction of the Court of Chancery within ten (10) days following such determination), which is vested in the exclusive jurisdiction of a court or forum other than the Court of Chancery, or for which the Court of Chancery does not have subject matter jurisdiction. If any provision or provisions of this Article Twelfth shall be held to be invalid, illegal or unenforceable as applied to any person or entity or circumstance for any reason whatsoever, then, to the fullest extent permitted by law, the validity, legality and enforceability of such provisions in any other circumstance and of the remaining provisions of this Article Twelfth (including, without limitation, each portion of any sentence of this Article Twelfth containing any such provision held to be invalid, illegal or unenforceable that is not itself held to be invalid, illegal or unenforceable) and the application of such provision to other persons or entities and circumstances shall not in any way be affected or impaired thereby.

* * *

3. That the foregoing amendment and restatement was approved by the holders of the requisite number of shares of this corporation in accordance with Section 228 of the General Corporation Law.

4. That this Certificate of Incorporation, which restates and integrates and further amends the provisions of this Corporation's Certificate of Incorporation, has been duly adopted in accordance with Sections 242 and 245 of the General Corporation Law.

[Signature Page Follows]

IN WITNESS WHEREOF, this Amended and Restated Certificate of Incorporation has been executed by a duly authorized officer of this corporation on this 13th day of January, 2021.

By: /s/ Sekar Kathiresan
Sekar Kathiresan
Chief Executive Officer

AMENDED AND RESTATED

BYLAWS OF

VERVE THERAPEUTICS, INC.

Adopted January 15, 2019

TABLE OF CONTENTS

BYLAWS

ARTICLE I — MEETINGS OF STOCKHOLDERS

1.1 ***Place of Meetings***. Meetings of stockholders of Verve Therapeutics, Inc. (the "**Company**") shall be held at any place, within or outside the State of Delaware, determined by the Company's board of directors (the "**Board**"). The Board may, in its sole discretion, determine that a meeting of stockholders shall not be held at any place, but may instead be held solely by means of remote communication as authorized by Section 211(a)(2) of the Delaware General Corporation Law (the "**DGCL**"). In the absence of any such designation or determination, stockholders' meetings shall be held at the Company's principal executive office.

1.2 ***Annual Meeting***. Unless directors are elected by written consent in lieu of an annual meeting as permitted by Section 211(b) of the DGCL, an annual meeting of stockholders shall be held for the election of directors at such date and time as may be designated by resolution of the Board from time to time. Stockholders may, unless the certificate of incorporation otherwise provides, act by written consent to elect directors; *provided, however,* that, if such consent is less than unanimous, such action by written consent may be in lieu of holding an annual meeting only if all of the directorships to which directors could be elected at an annual meeting held at the effective time of such action are vacant and are filled by such action. Any other proper business may be transacted at the annual meeting.

1.3 ***Special Meeting***. A special meeting of the stockholders may be called at any time by the Board, Chairperson of the Board, Chief Executive Officer or President (in the absence of a Chief Executive Officer) or by one or more stockholders holding shares in the aggregate entitled to cast not less than 10% of the votes at that meeting.

If any person(s) other than the Board calls a special meeting, the request shall:

(i) be in writing;

(ii) specify the time of such meeting and the general nature of the business proposed to be transacted; and

(iii) be delivered personally or sent by registered mail or by facsimile transmission to the Chairperson of the Board, the Chief Executive Officer, the President (in the absence of a Chief Executive Officer) or the Secretary of the Company.

The officer(s) receiving the request shall cause notice to be promptly given to the stockholders entitled to vote at such meeting, in accordance with these bylaws, that a meeting will be held at the time requested by the person or persons calling the meeting. No business may be transacted at such special meeting other than the business specified in such notice to stockholders. Nothing contained in this paragraph of this **section 1.3** shall be construed as limiting, fixing, or affecting the time when a meeting of stockholders called by action of the Board may be held.

1.4 ***Notice of Stockholders' Meetings***. Whenever stockholders are required or permitted to take any action at a meeting, a written notice of the meeting shall be given which shall state the place, if any, date and hour of the meeting, the means of remote communications, if any, by which stockholders and proxy holders may be deemed to be present in person and vote at such meeting, the record date for determining the stockholders entitled to vote at the meeting, if such date is different from the record date for determining stockholders entitled to notice of the meeting, and, in the case of a special meeting, the purpose or purposes for which the meeting is called. Except as otherwise provided in the DGCL, the certificate of incorporation or these bylaws, the written notice of any meeting of stockholders shall be given not less than 10 nor more than 60 days before the date of the meeting to each stockholder entitled to vote at such meeting as of the record date for determining the stockholders entitled to notice of the meeting.

1.5 ***Quorum***. Except as otherwise provided by law, the certificate of incorporation or these bylaws, at each meeting of stockholders the presence in person or by proxy of the holders of shares of stock having a majority of the votes which could be cast by the holders of all outstanding shares of stock entitled to vote at the meeting shall be necessary and sufficient to constitute a quorum. Where a separate vote by a class or series or classes or series is required, a majority of the outstanding shares of such class or series or classes or series, present in person or represented by proxy, shall constitute a quorum entitled to take action with respect to that vote on that matter, except as otherwise provided by law, the certificate of incorporation or these bylaws.

If, however, such quorum is not present or represented at any meeting of the stockholders, then either (i) the chairperson of the meeting, or (ii) the stockholders entitled to vote at the meeting, present in person or represented by proxy, shall have the power to adjourn the meeting from time to time, in the manner provided in **section 1.6**, until a quorum is present or represented.

1.6 ***Adjourned Meeting; Notice***. Any meeting of stockholders, annual or special, may adjourn from time to time to reconvene at the same or some other place, and notice need not be given of the adjourned meeting if the time, place, if any, thereof, and the means of remote communications, if any, by which stockholders and proxy holders may be deemed to be present in person and vote at such adjourned meeting are announced at the meeting at which the adjournment is taken. At the adjourned meeting, the Company may transact any business which might have been transacted at the original meeting. If the adjournment is for more than 30 days, a notice of the adjourned meeting shall be given to each stockholder of record entitled to vote at the meeting. If after the adjournment a new record date for stockholders entitled to vote is fixed for the adjourned meeting, the Board shall fix a new record date for notice of such adjourned meeting in accordance with Section 213(a) of the DGCL and **section 1.10** of these bylaws, and shall give notice of the adjourned meeting to each stockholder of record entitled to vote at such adjourned meeting as of the record date fixed for notice of such adjourned meeting.

1.7 ***Conduct of Business***. Meetings of stockholders shall be presided over by the Chairperson of the Board, if any, or in his or her absence by the Vice Chairperson of the Board, if any, or in the absence of the foregoing persons by the Chief Executive Officer, or in the absence of the foregoing persons by the President, or in the absence of the foregoing persons by a Vice President, or in the absence of the foregoing persons by a chairperson designated by the Board, or in the absence of such designation by a chairperson chosen at the meeting. The Secretary shall act as secretary of the meeting, but in his or her absence the chairperson of the meeting may appoint any person to act as secretary of the meeting. The chairperson of any meeting of stockholders shall determine the order of business and the procedure at the meeting, including such regulation of the manner of voting and the conduct of business, and shall have the power to adjourn the meeting to another place, if any, date or time, whether or not a quorum is present.

1.8 ***Voting***. The stockholders entitled to vote at any meeting of stockholders shall be determined in accordance with the provisions of **section 1.10** of these bylaws, subject to Section 217 (relating to voting rights of fiduciaries, pledgors and joint owners of stock) and Section 218 (relating to voting trusts and other voting agreements) of the DGCL.

Except as may be otherwise provided in the certificate of incorporation, each stockholder entitled to vote at any meeting of stockholders shall be entitled to one vote for each share of capital stock held by such stockholder which has voting power upon the matter in question. Voting at meetings of stockholders need not be by written ballot and, unless otherwise required by law, need not be conducted by inspectors of election unless so determined by the holders of shares of stock having a majority of the votes which could be cast by the holders of all outstanding shares of stock entitled to vote thereon which are present in person or by proxy at such meeting. If authorized by the Board, such requirement of a written ballot shall be satisfied by a ballot submitted by electronic transmission (as defined in **section 7.2** of these bylaws), *provided* that any such electronic transmission must either set forth or be submitted with information from which it can be determined that the electronic transmission was authorized by the stockholder or proxy holder.

Except as otherwise required by law, the certificate of incorporation or these bylaws, in all matters other than the election of directors, the affirmative vote of a majority of the voting power of the shares present in person or represented by proxy at the meeting and entitled to vote on the subject matter shall be the act of the stockholders. Except as otherwise required by law, the certificate of incorporation or these bylaws, directors shall be elected by a plurality of the voting power of the shares present in person or represented by proxy at the meeting and entitled to vote on the election of directors. Where a separate vote by a class or series or classes or series is required, in all matters other than the election of directors, the affirmative vote of the majority of shares of such class or series or classes or series present in person or represented by proxy at the meeting shall be the act of such class or series or classes or series, except as otherwise provided by law, the certificate of incorporation or these bylaws.

1.9 ***Stockholder Action by Written Consent Without a Meeting***. Unless otherwise provided in the certificate of incorporation, any action required by the DGCL to be taken at any annual or special meeting of stockholders of a corporation, or any action which may be taken at any annual or special meeting of such stockholders, may be taken without a meeting, without prior notice and without a vote, if a consent or consents in writing, setting forth the action so taken, shall be signed by the holders of outstanding stock having not less than the minimum number of votes that would be necessary to authorize or take such action at a meeting at which all shares entitled to vote thereon were present and voted.

No written consent shall be effective to take the corporate action referred to therein unless written consents signed by a sufficient number of holders to take action are delivered to the Company in the manner required by Section 228 of the DGCL within 60 days of the first date on which a written consent is so delivered to the Company. Any person executing a consent may provide, whether through instruction to an agent or otherwise, that such a consent will be effective at a future time (including a time determined upon the happening of an event), no later than 60 days after such instruction is given or such provision is made, if evidence of such instruction or provision is provided to the Company. Unless otherwise provided, any such consent shall be revocable prior to its becoming effective.

An electronic transmission (as defined in **section 7.2**) consenting to an action to be taken and transmitted by a stockholder or proxy holder, or by a person or persons authorized to act for a stockholder or proxy holder, shall be deemed to be written and signed for purposes of this section, *provided* that any such electronic transmission sets forth or is delivered with information from which the Company can determine (i) that the electronic transmission was transmitted by the stockholder or proxy holder or by a person or persons authorized to act for the stockholder or proxy holder and (ii) the date on which such stockholder or proxy holder or authorized person or persons transmitted such electronic transmission.

In the event that the Board shall have instructed the officers of the Company to solicit the vote or written consent of the stockholders of the Company, an electronic transmission of a stockholder written consent given pursuant to such solicitation may be delivered to the Secretary or the President of the Company or to a person designated by the Secretary or the President. The Secretary or the President of the Company or a designee of the Secretary or the President shall cause any such written consent by electronic transmission to be reproduced in paper form and inserted into the corporate records.

Prompt notice of the taking of the corporate action without a meeting by less than unanimous written consent shall be given to those stockholders who have not consented in writing and who, if the action had been taken at a meeting, would have been entitled to notice of the meeting if the record date for notice of such meeting had been the date that written consents signed by a sufficient number of holders to take the action were delivered to the Company as provided in Section 228 of the DGCL. In the event that the action which is consented to is such as would have required the filing of a certificate under any provision of the DGCL, if such action had been voted on by stockholders at a meeting thereof, the certificate filed under such provision shall state, in lieu of any statement required by such provision concerning any vote of stockholders, that written consent has been given in accordance with Section 228 of the DGCL.

1.10 ***Record Dates***. In order that the Company may determine the stockholders entitled to notice of any meeting of stockholders or any adjournment thereof, the Board may fix a record date, which record date shall not precede the date upon which the resolution fixing the record date is adopted by the Board and which record date shall not be more than 60 nor less than 10 days before the date of such meeting. If the Board so fixes a date, such date shall also be the record date for determining the stockholders entitled to vote at such meeting unless the Board determines, at the time it fixes such record date, that a later date on or before the date of the meeting shall be the date for making such determination.

If no record date is fixed by the Board, the record date for determining stockholders entitled to notice of and to vote at a meeting of stockholders shall be at the close of business on the day next preceding the day on which notice is given, or, if notice is waived, at the close of business on the day next preceding the day on which the meeting is held.

A determination of stockholders of record entitled to notice of or to vote at a meeting of stockholders shall apply to any adjournment of the meeting; *provided, however,* that the Board may fix a new record date for determination of stockholders entitled to vote at the adjourned meeting, and in such case shall also fix as the record date for stockholders entitled to notice of such adjourned meeting the same or an earlier date as that fixed for determination of stockholders entitled to vote in accordance with the provisions of Section 213 of the DGCL and this **section 1.10** at the adjourned meeting.

In order that the Company may determine the stockholders entitled to consent to corporate action in writing without a meeting, the Board may fix a record date, which record date shall not precede the date upon which the resolution fixing the record date is adopted by the Board, and which date shall not be more than 10 days after the date upon which the resolution fixing the record date is adopted by the Board. If no record date has been fixed by the Board, the record date for determining stockholders entitled to consent to corporate action in writing without a meeting, when no prior action by the Board is required by law, shall be the first date on which a signed written consent setting forth the action taken or proposed to be taken is delivered to the Company in accordance with applicable law. If no record date has been fixed by the Board and prior action by the Board is required by law, the record date for determining stockholders entitled to consent to corporate action in writing without a meeting shall be at the close of business on the day on which the Board adopts the resolution taking such prior action.

In order that the Company may determine the stockholders entitled to receive payment of any dividend or other distribution or allotment of any rights or the stockholders entitled to exercise any rights in respect of any change, conversion or exchange of stock, or for the purpose of any other lawful action, the Board may fix a record date, which record date shall not precede the date upon which the resolution fixing the record date is adopted, and which record date shall be not more than 60 days prior to such action. If no record date is fixed, the record date for determining stockholders for any such purpose shall be at the close of business on the day on which the Board adopts the resolution relating thereto.

1.11 ***Proxies***. Each stockholder entitled to vote at a meeting of stockholders or to express consent or dissent to corporate action in writing without a meeting may authorize another person or persons to act for such stockholder by proxy authorized by an instrument in writing or by a transmission permitted by law filed in accordance with the procedure established for the meeting, but no such proxy shall be voted or acted upon after three years from its date, unless the proxy provides for a longer period. The revocability of a proxy that states on its face that it is irrevocable shall be governed by the provisions of Section 212 of the DGCL.

1.12 ***List of Stockholders Entitled to Vote***. The Company shall prepare, at least ten days before every meeting of stockholders, a complete list of the stockholders entitled to vote at the meeting; *provided, however,* if the record date for determining the stockholders entitled to vote is less than 10 days before the meeting date, the list shall reflect the stockholders entitled to vote as of the tenth day before the meeting date, arranged in alphabetical order, and showing the address of each stockholder and the number of shares registered in the name of each stockholder. The Company shall not be required to include electronic mail addresses or other electronic contact information on such list. Such list shall be open to the examination of any stockholder for any purpose germane to the meeting for a period of at least ten days prior to the meeting: (i) on a

reasonably accessible electronic network, *provided* that the information required to gain access to such list is provided with the notice of the meeting, or (ii) during ordinary business hours, at the Company's principal place of business. In the event that the Company determines to make the list available on an electronic network, the Company may take reasonable steps to ensure that such information is available only to stockholders of the Company. If the meeting is to be held at a place, then a list of stockholders entitled to vote at the meeting shall be produced and kept at the time and place of the meeting during the whole time thereof, and may be examined by any stockholder who is present. If the meeting is to be held solely by means of remote communication, then such list shall also be open to the examination of any stockholder during the whole time of the meeting on a reasonably accessible electronic network, and the information required to access such list shall be provided with the notice of the meeting.

ARTICLE II — DIRECTORS

2.1 ***Powers***. The business and affairs of the Company shall be managed by or under the direction of the Board, except as may be otherwise provided in the DGCL or the certificate of incorporation.

2.2 ***Number of Directors***. The Board shall consist of one or more members, each of whom shall be a natural person. Unless the certificate of incorporation fixes the number of directors, the number of directors shall be determined from time to time by resolution of the Board. No reduction of the authorized number of directors shall have the effect of removing any director before that director's term of office expires.

2.3 ***Election, Qualification and Term of Office of Directors***. Except as provided in **section 2.4** of these bylaws, and subject to **sections 1.2** and **1.9** of these bylaws, directors shall be elected at each annual meeting of stockholders. Directors need not be stockholders unless so required by the certificate of incorporation or these bylaws. The certificate of incorporation or these bylaws may prescribe other qualifications for directors. Each director shall hold office until such director's successor is elected and qualified or until such director's earlier death, resignation or removal.

2.4 ***Resignation and Vacancies***. Any director may resign at any time upon notice given in writing or by electronic transmission to the Company. A resignation is effective when the resignation is delivered unless the resignation specifies a later effective date or an effective date determined upon the happening of an event or events. A resignation which is conditioned upon the director failing to receive a specified vote for reelection as a director may provide that it is irrevocable. Unless otherwise provided in the certificate of incorporation or these bylaws, when one or more directors resign from the Board, effective at a future date, a majority of the directors then in office, including those who have so resigned, shall have power to fill such vacancy or vacancies, the vote thereon to take effect when such resignation or resignations shall become effective.

Unless otherwise provided in the certificate of incorporation or these bylaws:

(i) Vacancies and newly created directorships resulting from any increase in the authorized number of directors elected by all of the stockholders having the right to vote as a single class may be filled by a majority of the directors then in office, although less than a quorum, or by a sole remaining director.

(ii) Whenever the holders of any class or classes of stock or series thereof are entitled to elect one or more directors by the provisions of the certificate of incorporation, vacancies and newly created directorships of such class or classes or series may be filled by a majority of the directors elected by such class or classes or series thereof then in office, or by a sole remaining director so elected.

If at any time, by reason of death or resignation or other cause, the Company should have no directors in office, then any officer or any stockholder or an executor, administrator, trustee or guardian of a stockholder, or other fiduciary entrusted with like responsibility for the person or estate of a stockholder, may call a special meeting of stockholders in accordance with the provisions of the certificate of incorporation or these bylaws, or may apply to the Court of Chancery for a decree summarily ordering an election as provided in Section 211 of the DGCL.

If, at the time of filling any vacancy or any newly created directorship, the directors then in office constitute less than a majority of the whole Board (as constituted immediately prior to any such increase), the Court of Chancery may, upon application of any stockholder or stockholders holding at least 10% of the voting stock at the time outstanding having the right to vote for such directors, summarily order an election to be held to fill any such vacancies or newly created directorships, or to replace the directors chosen by the directors then in office as aforesaid, which election shall be governed by the provisions of Section 211 of the DGCL as far as applicable.

A director elected to fill a vacancy shall be elected for the unexpired term of his or her predecessor in office and until such director's successor is elected and qualified, or until such director's earlier death, resignation or removal.

2.5 ***Place of Meetings; Meetings by Telephone***. The Board may hold meetings, both regular and special, either within or outside the State of Delaware.

Unless otherwise restricted by the certificate of incorporation or these bylaws, members of the Board, or any committee designated by the Board or any subcommittee, may participate in a meeting of the Board, or any such committee or subcommittee, by means of conference telephone or other communications equipment by means of which all persons participating in the meeting can hear each other, and such participation in a meeting shall constitute presence in person at the meeting.

2.6 ***Conduct of Business***. Meetings of the Board shall be presided over by the Chairperson of the Board, if any, or in his or her absence by the Vice Chairperson of the Board, if any, or in the absence of the foregoing persons by a chairperson designated by the Board, or in the absence of such designation by a chairperson chosen at the meeting. The Secretary shall act as secretary of the meeting, but in his or her absence the chairperson of the meeting may appoint any person to act as secretary of the meeting.

2.7 ***Regular Meetings***. Regular meetings of the Board may be held without notice at such time and at such place as shall from time to time be determined by the Board.

2.8 ***Special Meetings; Notice***. Special meetings of the Board for any purpose or purposes may be called at any time by the Chairperson of the Board, the Chief Executive Officer, the President, the Secretary or any two directors.

Notice of the time and place of special meetings shall be:

(i) delivered personally by hand, by courier or by telephone;

(ii) sent by United States first-class mail, postage prepaid;

(iii) sent by facsimile;

(iv) sent by electronic mail; or

(v) otherwise given by electronic transmission (as defined in **section 7.2**),

directed to each director at that director's address, telephone number, facsimile number, electronic mail address or other contact for notice by electronic transmission, as the case may be, as shown on the Company's records.

If the notice is (i) delivered personally by hand, by courier or by telephone, (ii) sent by facsimile, (i) sent by electronic mail or (iv) otherwise given by electronic transmission, it shall be delivered, sent or otherwise directed to each director, as applicable, at least 24 hours before the time of the holding of the meeting. If the notice is sent by United States mail, it shall be deposited in the United States mail at least four days before the time of the holding of the meeting. Any oral notice may be communicated to the director. The notice need not specify the place of the meeting (if the meeting is to be held at the Company's principal executive office) nor the purpose of the meeting.

2.9 ***Quorum; Voting***. At all meetings of the Board, a majority of the total authorized number of directors shall constitute a quorum for the transaction of business. If a quorum is not present at any meeting of the Board, then the directors present thereat may adjourn the meeting from time to time, without notice other than announcement at the meeting, until a quorum is present. A meeting at which a quorum is initially present may continue to transact business notwithstanding the withdrawal of directors, if any action taken is approved by at least a majority of the required quorum for that meeting.

The vote of a majority of the directors present at any meeting at which a quorum is present shall be the act of the Board, except as may be otherwise specifically provided by statute, the certificate of incorporation or these bylaws.

If the certificate of incorporation provides that one or more directors shall have more or less than one vote per director on any matter, every reference in these bylaws to a majority or other proportion of the directors shall refer to a majority or other proportion of the votes of the directors.

2.10 ***Board Action by Written Consent Without a Meeting***. Unless otherwise restricted by the certificate of incorporation or these bylaws, any action required or permitted to be taken at any meeting of the Board, or of any committee or subcommittee thereof, may be taken without a meeting if all members of the Board or committee or subcommittee, as the case may be, consent thereto in writing or by electronic transmission and the writing or writings or electronic transmission or transmissions are filed with the minutes of proceedings of the Board or committee or subcommittee. Such filing shall be in paper form if the minutes are maintained in paper form and shall be in electronic form if the minutes are maintained in electronic form. Any person (whether or not then a director) may provide, whether through instruction to an agent or otherwise, that a consent to action will be effective at a future time (including a time determined upon the happening of an event), no later than 60 days after such instruction is given or such provision is made and such consent shall be deemed to have been given for purposes of this **section 2.10** at such effective time so long as such person is then a director and did not revoke the consent prior to such time. Any such consent shall be revocable prior to its becoming effective.

2.11 ***Fees and Compensation of Directors***. Unless otherwise restricted by the certificate of incorporation or these bylaws, the Board shall have the authority to fix the compensation of directors.

2.12 ***Removal of Directors***. Unless otherwise restricted by statute, the certificate of incorporation or these bylaws, any director or the entire Board may be removed, with or without cause, by the holders of a majority of the shares then entitled to vote at an election of directors.

No reduction of the authorized number of directors shall have the effect of removing any director prior to the expiration of such director's term of office.

ARTICLE III — COMMITTEES

3.1 ***Committees of Directors***. The Board may designate one or more committees, each committee to consist of one or more of the directors of the Company. The Board may designate one or more directors as alternate members of any committee, who may replace any absent or disqualified member at any meeting of the committee. In the absence or disqualification of a member of a committee, the member or members thereof present at any meeting and not disqualified from voting, whether or not such member or members constitute a quorum, may unanimously appoint another member of the Board to act at the meeting in the place of any such absent or disqualified member. Any such committee, to the extent provided in the resolution of the Board or in these bylaws, shall have and may exercise all the powers and authority of the Board in the management of the business and affairs of the Company, and may authorize the seal of the Company to be affixed to all papers that may require it; but no such committee shall have the power or authority to (i) approve or adopt, or recommend to the stockholders, any action or matter (other than the election or removal of directors) expressly required by the DGCL to be submitted to stockholders for approval or (ii) adopt, amend or repeal any bylaw of the Company.

3.2 ***Committee Minutes***. Each committee and subcommittee shall keep regular minutes of its meetings and report the same to the Board, or the committee, when required.

3.3 ***Meetings and Actions of Committees***. A majority of the directors then serving on a committee or subcommittee shall constitute a quorum for the transaction of business by the committee or subcommittee, unless the certificate of incorporation, these bylaws, a resolution of the Board or a resolution of a committee that created the subcommittee requires a greater or lesser

number, *provided* that in no case shall a quorum be less than 1/3 of the directors then serving on the committee or subcommittee. The vote of the majority of the members of a committee or subcommittee present at a meeting at which a quorum is present shall be the act of the committee or subcommittee, unless the certificate of incorporation, these bylaws, a resolution of the Board or a resolution of a committee that created the subcommittee requires a greater number. Meetings and actions of committees and subcommittees shall otherwise be governed by, and held and taken in accordance with, the provisions of:

(i) **section 2.5** (Place of Meetings; Meetings by Telephone);

(ii) **section 2.7** (Regular Meetings);

(iii) **section 2.8** (Special Meetings; Notice);

(iv) **section 2.9** (Quorum; Voting);

(v) **section 2.10** (Board Action by Written Consent Without a Meeting); and

(vi) **section 7.5** (Waiver of Notice)

with such changes in the context of those bylaws as are necessary to substitute the committee or subcommittee and its members for the Board and its members. *However*:

(i) the time and place of regular meetings of committees and subcommittees may be determined either by resolution of the Board or by resolution of the committee or subcommittee;

(ii) special meetings of committees and subcommittees may also be called by resolution of the Board or the committee or subcommittee; and

(iii) notice of special meetings of committees and subcommittees shall also be given to all alternate members, as applicable, who shall have the right to attend all meetings of the committee or subcommittee. The Board, or, in the absence of any such action by the Board, the committee or subcommittee, may adopt rules for the government of any committee or subcommittee not inconsistent with the provisions of these bylaws.

Any provision in the certificate of incorporation providing that one or more directors shall have more or less than one vote per director on any matter shall apply to voting in any committee or subcommittee, unless otherwise provided in the certificate of incorporation or these bylaws.

3.4 ***Subcommittees***. Unless otherwise provided in the certificate of incorporation, these bylaws or the resolutions of the Board designating the committee, a committee may create one or more subcommittees, each subcommittee to consist of one or more members of the committee, and delegate to a subcommittee any or all of the powers and authority of the committee.

ARTICLE IV — OFFICERS

4.1 ***Officers***. The officers of the Company shall be a President and a Secretary. The Company may also have, at the discretion of the Board, a Chairperson of the Board, a Vice Chairperson of the Board, a Chief Executive Officer, one or more Vice Presidents, a Chief Financial Officer, a Treasurer, one or more Assistant Treasurers, one or more Assistant Secretaries and any such other officers as may be appointed in accordance with the provisions of these bylaws. Any number of offices may be held by the same person.

4.2 ***Appointment of Officers***. The Board shall appoint the officers of the Company, except such officers as may be appointed in accordance with the provisions of **section 4.3** of these bylaws.

4.3 ***Subordinate Officers***. The Board may appoint, or empower the Chief Executive Officer or, in the absence of a Chief Executive Officer, the President, to appoint, such other officers and agents as the business of the Company may require. Each of such officers and agents shall hold office for such period, have such authority and perform such duties as are provided in these bylaws or as the Board may from time to time determine.

4.4 ***Removal and Resignation of Officers***. Any officer may be removed, either with or without cause, by an affirmative vote of the majority of the Board at any regular or special meeting of the Board or, except in the case of an officer chosen by the Board, by any officer upon whom such power of removal may be conferred by the Board.

Any officer may resign at any time by giving written notice to the Company. Any resignation shall take effect at the date of the receipt of that notice or at any later time specified in that notice. Unless otherwise specified in the notice of resignation, the acceptance of the resignation shall not be necessary to make it effective. Any resignation is without prejudice to the rights, if any, of the Company under any contract to which the officer is a party.

4.5 ***Vacancies in Offices***. Any vacancy occurring in any office of the Company shall be filled by the Board or as provided in **section 4.3**.

4.6 ***Representation of Shares of Other Corporations***. Unless otherwise directed by the Board, the President or any other person authorized by the Board or the President is authorized to vote, represent and exercise on behalf of the Company all rights incident to any and all shares of any other corporation or corporations standing in the name of the Company. The authority granted herein may be exercised either by such person directly or by any other person authorized to do so by proxy or power of attorney duly executed by such person having the authority.

4.7 ***Authority and Duties of Officers***. Except as otherwise provided in these bylaws, the officers of the Company shall have such powers and duties in the management of the Company as may be designated from time to time by the Board and, to the extent not so provided, as generally pertain to their respective offices, subject to the control of the Board.

ARTICLE V — INDEMNIFICATION

5.1 ***Indemnification of Directors and Officers in Third Party Proceedings***. Subject to the other provisions of this **Article V**, the Company shall indemnify, to the fullest extent permitted by the DGCL, as now or hereinafter in effect, any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (a "**Proceeding**") (other than an action by or in the right of the Company) by reason of the fact that such person is or was a director or officer of the Company, or is or was a director or officer of the Company serving at the request of the Company as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, against expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by such person in connection with such Proceeding if such person acted in good faith and in a manner such person reasonably believed to be in or not opposed to the best interests of the Company, and, with respect to any criminal action or proceeding, had no reasonable cause to believe such person's conduct was unlawful. The termination of any Proceeding by judgment, order, settlement, conviction, or upon a plea of *nolo contendere* or its equivalent, shall not, of itself, create a presumption that the person did not act in good faith and in a manner which such person reasonably believed to be in or not opposed to the best interests of the Company, and, with respect to any criminal action or proceeding, had reasonable cause to believe that such person's conduct was unlawful.

5.2 ***Indemnification of Directors and Officers in Actions by or in the Right of the Company***. Subject to the other provisions of this **Article V**, the Company shall indemnify, to the fullest extent permitted by the DGCL, as now or hereinafter in effect, any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action or suit by or in the right of the Company to procure a judgment in its favor by reason of the fact that such person is or was a director or officer of the Company, or is or was a director or officer of the Company serving at the request of the Company as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise against expenses (including attorneys' fees) actually and reasonably incurred by such person in connection with the defense or settlement of such action or suit if such person acted in good faith and in a manner such person reasonably believed to be in or not opposed to the best interests of the Company; except that no indemnification shall be made in respect of any claim, issue or matter as to which such person shall have been adjudged to be liable to the Company unless and only to the extent that the Court of Chancery or the court in which such action or suit was brought shall determine upon application that, despite the adjudication of liability but in view of all the circumstances of the case, such person is fairly and reasonably entitled to indemnity for such expenses which the Court of Chancery or such other court shall deem proper.

5.3 ***Successful Defense***. To the extent that a present or former director or officer of the Company has been successful on the merits or otherwise in defense of any action, suit or proceeding described in **section 5.1** or **section 5.2**, or in defense of any claim, issue or matter therein, such person shall be indemnified against expenses (including attorneys' fees) actually and reasonably incurred by such person in connection therewith.

5.4 ***Indemnification of Others***. Subject to the other provisions of this **Article V**, the Company shall have power to indemnify its employees and agents to the extent not prohibited by the DGCL or other applicable law. The Board shall have the power to delegate to such person or persons the determination of whether employees or agents shall be indemnified.

5.5 ***Advanced Payment of Expenses***. Expenses (including attorneys' fees) actually and reasonably incurred by an officer or director of the Company in defending any Proceeding shall be paid by the Company in advance of the final disposition of such Proceeding upon receipt of a written request therefor (together with documentation reasonably evidencing such expenses) and an undertaking by or on behalf of the person to repay such amounts if it shall ultimately be determined that the person is not entitled to be indemnified under this **Article V** or the DGCL. Such expenses (including attorneys' fees) actually and reasonably incurred by former directors and officers or other employees and agents of the Company or by persons serving at the request of the Company as directors, officers, employees or agents of another corporation, partnership, joint venture, trust or other enterprise may be so paid upon such terms and conditions, if any, as the Company deems appropriate. The right to advancement of expenses shall not apply to any Proceeding (or any part of any Proceeding) for which indemnity is excluded pursuant to these bylaws, but shall apply to any Proceeding (or any part of any Proceeding) referenced in **section 5.6**(**ii**) or **5.6**(**iii**) prior to a determination that the person is not entitled to be indemnified by the Company.

Notwithstanding the foregoing, unless otherwise determined pursuant to **section 5.8**, no advance shall be made by the Company to an officer of the Company (except by reason of the fact that such officer is or was a director of the Company, in which event this paragraph shall not apply) in any Proceeding if a determination is reasonably and promptly made (i) by a majority vote of the directors who are not parties to such Proceeding, even though less than a quorum, or (ii) by a committee or subcommittee of such directors designated by majority vote of such directors, even though less than a quorum, or (iii) if there are no such directors, or if such directors so direct, by independent legal counsel in a written opinion, that facts known to the decision-making party at the time such determination is made demonstrate clearly and convincingly that such person acted in bad faith or in a manner that such person did not believe to be in or not opposed to the best interests of the Company.

5.6 ***Limitation on Indemnification***. Subject to the requirements in **section 5.3** and the DGCL, the Company shall not be obligated to indemnify any person pursuant to this **Article V** in connection with any Proceeding (or any part of any Proceeding):

(i) for which payment has actually been made to or on behalf of such person under any statute, insurance policy, indemnity provision, vote or otherwise, except with respect to any excess beyond the amount paid;

(ii) for an accounting or disgorgement of profits pursuant to Section 16(b) of the Securities Exchange Act of 1934, as amended, or similar provisions of federal, state or local statutory law or common law, if such person is held liable therefor (including pursuant to any settlement arrangements);

(iii) for any reimbursement of the Company by such person of any bonus or other incentive-based or equity-based compensation or of any profits realized by such person from the sale of securities of the Company, as required in each case under the Securities Exchange Act of 1934, as amended (including any such reimbursements that arise from an accounting restatement of the Company pursuant to Section 304 of the Sarbanes-Oxley Act of 2002 (the "**Sarbanes-Oxley Act**"), or the payment to the Company of profits arising from the purchase and sale by such person of securities in violation of Section 306 of the Sarbanes-Oxley Act), if such person is held liable therefor (including pursuant to any settlement arrangements);

(iv) initiated by such person, including any Proceeding (or any part of any Proceeding) initiated by such person against the Company or its directors, officers, employees, agents or other indemnitees, unless (a) the Board authorized the Proceeding (or the relevant part of the Proceeding) prior to its initiation, (b) the Company provides the indemnification, in its sole discretion, pursuant to the powers vested in the Company under applicable law, (c) otherwise required to be made under **section 5.7** or (d) otherwise required by applicable law; or

(v) if prohibited by applicable law.

5.7 ***Determination; Claim***. If a claim for indemnification or advancement of expenses under this is not paid by the Company or on its behalf within 90 days after receipt by the Company of a written request therefor, the claimant shall be entitled to an adjudication by a court of competent jurisdiction of his or her entitlement to such indemnification or advancement of expenses. To the extent not prohibited by law, the Company shall indemnify such person against all expenses actually and reasonably incurred by such person in connection with any action for indemnification or advancement of expenses from the Company under this **Article V**, to the extent such person is successful in such action, and, if requested by such person, shall advance such expenses to such person, subject to the provisions of **section 5.5**. In any such suit, the Company shall, to the fullest extent not prohibited by law, have the burden of proving that the claimant is not entitled to the requested indemnification or advancement of expenses.

5.8 ***Non-Exclusivity of Rights***. The indemnification and advancement of expenses provided by, or granted pursuant to, this **Article V** shall not be deemed exclusive of any other rights to which those seeking indemnification or advancement of expenses may be entitled under the certificate of incorporation or any statute, bylaw, agreement, vote of stockholders or disinterested directors or otherwise, both as to action in such person's official capacity and as to action in another capacity while holding such office. The Company is specifically authorized to enter into individual contracts with any or all of its directors, officers, employees or agents respecting indemnification and advancement of expenses, to the fullest extent not prohibited by the DGCL or other applicable law.

5.9 ***Insurance***. The Company may purchase and maintain insurance on behalf of any person who is or was a director, officer, employee or agent of the Company, or is or was serving at the request of the Company as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise against any liability asserted against such person and incurred by such person in any such capacity, or arising out of such person's status as such, whether or not the Company would have the power to indemnify such person against such liability under the provisions of the DGCL.

5.10 ***Survival***. The rights to indemnification and advancement of expenses conferred by this **Article V** shall continue as to a person who has ceased to be a director, officer, employee or agent and shall inure to the benefit of the heirs, executors and administrators of such a person.

5.11 ***Effect of Repeal or Modification***. A right to indemnification or to advancement of expenses arising under a provision of the certificate of incorporation or a bylaw shall not be eliminated or impaired by an amendment to the certificate of incorporation or these bylaws after the occurrence of the act or omission that is the subject of the civil, criminal, administrative or investigative action, suit or proceeding for which indemnification or advancement of expenses is sought, unless the provision in effect at the time of such act or omission explicitly authorizes such elimination or impairment after such action or omission has occurred.

5.12 ***Certain Definitions***. For purposes of this **Article V**, references to the "**Company**" shall include, in addition to the resulting corporation, any constituent corporation (including any constituent of a constituent) absorbed in a consolidation or merger which, if its separate existence had continued, would have had power and authority to indemnify its directors, officers, employees or agents, so that any person who is or was a director, officer, employee or agent of such constituent corporation, or is or was serving at the request of such constituent corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, shall stand in the same position under the provisions of this **Article V** with respect to the resulting or surviving corporation as such person would have with respect to such constituent corporation if its separate existence had continued. For purposes of this **Article V**, references to "**other enterprises**" shall include employee benefit plans; references to "**fines**" shall include any excise taxes assessed on a person with respect to an employee benefit plan; references to "**serving at the request of the Company**" shall include any service as a director, officer, employee or agent of the Company which imposes duties on, or involves services by, such director, officer, employee or agent with respect to an employee benefit plan, its participants or beneficiaries; and a person who acted in good faith and in a manner such person reasonably believed to be in the interest of the participants and beneficiaries of an employee benefit plan shall be deemed to have acted in a manner "**not opposed to the best interests of the Company**" as referred to in this **Article V**.

ARTICLE VI — STOCK

6.1 ***Stock Certificates; Partly Paid Shares***. The shares of the Company shall be represented by certificates, *provided* that the Board may provide by resolution or resolutions that some or all of any or all classes or series of its stock shall be uncertificated shares. Any such resolution shall not apply to shares represented by a certificate until such certificate is surrendered to the Company. Unless otherwise provided by resolution of the Board, every holder of stock represented by certificates shall be entitled to have a certificate signed by, or in the name of, the Company by any two officers of the Company representing the number of shares registered in certificate form. Any or all of the signatures on the certificate may be a facsimile. In case any officer, transfer agent or registrar who has signed or whose facsimile signature has been placed upon a certificate has ceased to be such officer, transfer agent or registrar before such certificate is issued, it may be issued by the Company with the same effect as if such person were such officer, transfer agent or registrar at the date of issue. The Company shall not have power to issue a certificate in bearer form.

The Company may issue the whole or any part of its shares as partly paid and subject to call for the remainder of the consideration to be paid therefor. Upon the face or back of each stock certificate issued to represent any such partly paid shares, or upon the books and records of the Company in the case of uncertificated partly paid shares, the total amount of the consideration to be paid therefor and the amount paid thereon shall be stated. Upon the declaration of any dividend on fully paid shares, the Company shall declare a dividend upon partly paid shares of the same class, but only upon the basis of the percentage of the consideration actually paid thereon.

6.2 ***Special Designation on Certificates***. If the Company is authorized to issue more than one class of stock or more than one series of any class, then the powers, designations, preferences and relative, participating, optional or other special rights of each class of stock or series thereof and the qualifications, limitations or restrictions of such preferences and/or rights shall be set forth in full or summarized on the face or back of the certificate that the Company shall issue to represent such class or series of stock; *provided* that, except as otherwise provided in Section 202 of the DGCL, in lieu of the foregoing requirements, there may be set forth on the face or back of the certificate that the Company shall issue to represent such class or series of stock, a statement that the Company will furnish without charge to each stockholder who so requests the powers, designations, preferences and relative, participating, optional or other special rights of each class of stock or series thereof and the qualifications, limitations or restrictions of such preferences and/or rights.

Within a reasonable time after the issuance or transfer of uncertificated stock, the registered owner thereof shall be given a notice, in writing or by electronic transmission, containing the information required to be set forth or stated on certificates pursuant to this **section 6.2** or Sections 156, 202(a), 218(a) or 364 of the DGCL or with respect to this **section 6.2** a statement that the Company will furnish without charge to each stockholder who so requests the powers, designations, preferences and relative, participating, optional or other special rights of each class of stock or series thereof and the qualifications, limitations or restrictions of such preferences and/or rights. Except as otherwise expressly provided by law, the rights and obligations of the holders of uncertificated stock and the rights and obligations of the holders of certificates representing stock of the same class and series shall be identical.

6.3 ***Lost Certificates***. Except as provided in this **section 6.3**, no new certificates for shares shall be issued to replace a previously issued certificate unless the latter is surrendered to the Company and cancelled at the same time. The Company may issue a new certificate of stock or uncertificated shares in the place of any certificate theretofore issued by it, alleged to have been lost, stolen or destroyed, and the Company may require the owner of the lost, stolen or destroyed certificate, or such owner's legal representative, to give the Company a bond sufficient to indemnify it against any claim that may be made against it on account of the alleged loss, theft or destruction of any such certificate or the issuance of such new certificate or uncertificated shares.

6.4 ***Dividends***. The Board, subject to any restrictions contained in the certificate of incorporation or applicable law, may declare and pay dividends upon the shares of the Company's capital stock. Dividends may be paid in cash, in property or in shares of the Company's capital stock, subject to the provisions of the certificate of incorporation.

The Board may set apart out of any of the funds of the Company available for dividends a reserve or reserves for any proper purpose and may abolish any such reserve.

6.5 ***Stock Transfer Agreements***. The Company shall have power to enter into and perform any agreement with any number of stockholders of any one or more classes of stock of the Company to restrict the transfer of shares of stock of the Company of any one or more classes owned by such stockholders in any manner not prohibited by the DGCL.

6.6 ***Registered Stockholders***. The Company:

(i) shall be entitled to treat the person registered on its books as the owner of any share or shares as the person exclusively entitled to receive dividends, vote, receive notifications and otherwise exercise all the rights and powers of an owner of such share or shares; and

(ii) shall not be bound to recognize any equitable or other claim to or interest in such share or shares on the part of another person, whether or not it shall have express or other notice thereof, except as otherwise provided by the laws of Delaware.

6.7 ***Transfers***. Transfers of record of shares of stock of the Company shall be made only upon its books by the holders thereof, in person or by an attorney duly authorized, and, if such stock is certificated, upon the surrender of a certificate or certificates for a like number of shares, properly endorsed or accompanied by proper evidence of succession, assignation or authority to transfer.

ARTICLE VII — MANNER OF GIVING NOTICE AND WAIVER

7.1 ***Notice of Stockholder Meetings***. Notice of any meeting of stockholders, if mailed, is given when deposited in the United States mail, postage prepaid, directed to the stockholder at such stockholder's address as it appears on the Company's records. An affidavit of the Secretary or an Assistant Secretary of the Company or of the transfer agent or other agent of the Company that the notice has been given shall, in the absence of fraud, be *prima facie* evidence of the facts stated therein.

7.2 ***Notice by Electronic Transmission***. Without limiting the manner by which notice otherwise may be given effectively to stockholders pursuant to the DGCL, the certificate of incorporation or these bylaws, any notice to stockholders given by the Company under any provision of the DGCL, the certificate of incorporation or these bylaws shall be effective if given by a form of electronic transmission consented to by the stockholder to whom the notice is given. Any such consent shall be revocable by the stockholder by written notice to the Company. Any such consent shall be deemed revoked if:

(i) the Company is unable to deliver by electronic transmission two consecutive notices given by the Company in accordance with such consent; and

(ii) such inability becomes known to the Secretary or an Assistant Secretary of the Company or to the transfer agent, or other person responsible for the giving of notice.

However, the inadvertent failure to treat such inability as a revocation shall not invalidate any meeting or other action.

Any notice given pursuant to the preceding paragraph shall be deemed given:

(i) if by facsimile telecommunication, when directed to a number at which the stockholder has consented to receive notice;

(ii) if by electronic mail, when directed to an electronic mail address at which the stockholder has consented to receive notice;

(iii) if by a posting on an electronic network together with separate notice to the stockholder of such specific posting, upon the later of (A) such posting and (B) the giving of such separate notice; and

(iv) if by any other form of electronic transmission, when directed to the stockholder.

An affidavit of the Secretary or an Assistant Secretary or of the transfer agent or other agent of the Company that the notice has been given by a form of electronic transmission shall, in the absence of fraud, be *prima facie* evidence of the facts stated therein.

An "**electronic transmission**" means any form of communication, not directly involving the physical transmission of paper, including the use of, or participation in, one or more electronic networks or databases (including one or more distributed electronic networks or databases), that creates a record that may be retained, retrieved and reviewed by a recipient thereof, and that may be directly reproduced in paper form by such a recipient through an automated process.

Notice by a form of electronic transmission shall not apply to Sections 164, 296, 311, 312 or 324 of the DGCL.

7.3 ***Notice to Stockholders Sharing an Address***. Except as otherwise prohibited under the DGCL, without limiting the manner by which notice otherwise may be given effectively to stockholders, any notice to stockholders given by the Company under the provisions of the DGCL, the certificate of incorporation or these bylaws shall be effective if given by a single written notice to stockholders who share an address if consented to by the stockholders at that address to whom such notice is given. Any such consent shall be revocable by the stockholder by written notice to the Company. Any stockholder who fails to object in writing to the Company, within 60 days of having been given written notice by the Company of its intention to send the single notice, shall be deemed to have consented to receiving such single written notice.

7.4 ***Notice to Person with Whom Communication is Unlawful***. Whenever notice is required to be given, under the DGCL, the certificate of incorporation or these bylaws, to any person with whom communication is unlawful, the giving of such notice to such person shall not be required and there shall be no duty to apply to any governmental authority or agency for a license or permit to give such notice to such person. Any action or meeting which shall be taken or held without notice to any such person with whom communication is unlawful shall have the same force and effect as if such notice had been duly given. In the event that the action taken by the Company is such as to require the filing of a certificate under the DGCL, the certificate shall state, if such is the fact and if notice is required, that notice was given to all persons entitled to receive notice except such persons with whom communication is unlawful.

7.5 ***Waiver of Notice***. Whenever notice is required to be given under any provision of the DGCL, the certificate of incorporation or these bylaws, a written waiver, signed by the person entitled to notice, or a waiver by electronic transmission by the person entitled to notice, whether before or after the time of the event for which notice is to be given, shall be deemed equivalent to notice. Attendance of a person at a meeting shall constitute a waiver of notice of such meeting, except when the person attends a meeting for the express purpose of objecting at the beginning of the meeting, to the transaction of any business because the meeting is not lawfully called or convened. Neither the business to be transacted at, nor the purpose of, any regular or special meeting of the stockholders need be specified in any written waiver of notice or any waiver by electronic transmission unless so required by the certificate of incorporation or these bylaws.

ARTICLE VIII — GENERAL MATTERS

8.1 ***Fiscal Year***. The fiscal year of the Company shall be fixed by resolution of the Board and may be changed by the Board.

8.2 ***Seal***. The Company may adopt a corporate seal, which shall be in such form as may be approved from time to time by the Board. The Company may use the corporate seal by causing it or a facsimile thereof to be impressed or affixed or in any other manner reproduced.

8.3 ***Annual Report***. The Company shall cause an annual report to be sent to the stockholders of the Company to the extent required by applicable law. If and so long as there are fewer than 100 holders of record of the Company's shares, the requirement of sending an annual report to the stockholders of the Company is expressly waived (to the extent permitted under applicable law).

8.4 ***Construction; Definitions***. Unless the context requires otherwise, the general provisions, rules of construction and definitions in the DGCL shall govern the construction of these bylaws. Without limiting the generality of this provision, the singular number includes the plural, the plural number includes the singular, and the term "person" includes both a corporation and a natural person.

ARTICLE IX — AMENDMENTS

These bylaws may be adopted, amended or repealed by the stockholders entitled to vote. However, the Company may, in its certificate of incorporation, confer the power to adopt, amend or repeal bylaws upon the directors. The fact that such power has been so conferred upon the directors shall not divest the stockholders of the power, nor limit their power to adopt, amend or repeal bylaws.

A bylaw amendment adopted by stockholders which specifies the votes that shall be necessary for the election of directors shall not be further amended or repealed by the Board.

Exhibit 10.1

SECOND AMENDED AND RESTATED INVESTORS' RIGHTS AGREEMENT

THIS SECOND AMENDED AND RESTATED INVESTORS' RIGHTS AGREEMENT (this "**Agreement**") is made as of the 14th day of January, 2021, by and among Verve Therapeutics, Inc. a Delaware corporation (f/k/a Endcadia, Inc.) (the "**Company**"), and each of the investors listed on Schedule A hereto, each of which is referred to in this Agreement as an "**Investor**".

RECITALS

WHEREAS, certain of the Investors (the "**Existing Investors**") hold shares of the Company's Series A Preferred Stock or Series A-2 Preferred Stock and/or shares of Common Stock issued upon conversion thereof and possess registration rights, information rights, rights of first offer, and other rights pursuant to that certain Investors' Rights Agreement dated as of April 10, 2020, by and among the Company and such Investors (the "**Prior Agreement**"); and

WHEREAS, the Existing Investors are holders of at least two thirds of the Registrable Securities (as defined in the Prior Agreement), and desire to amend and restate the Prior Agreement in its entirety and to accept the rights created pursuant to this Agreement in lieu of the rights granted to them under the Prior Agreement; and

WHEREAS, certain of the Investors are parties to that certain Series B Preferred Stock Purchase Agreement of even date herewith by and among the Company and such Investors (the "**Purchase Agreement**"), and it is a condition to closing under the Purchase Agreement that the Company and the Existing Investors amend and restate the Prior Agreement as set forth herein;

NOW, THEREFORE, the Existing Investors hereby agree that the Prior Agreement is hereby amended and restated in its entirety by this Agreement, and the parties to this Agreement further agree as follows:

1. Definitions.

For purposes of this Agreement:

1.1 "**Affiliate**" means, with respect to any specified Person, any Person, entity or firm which, directly or indirectly, controls, is controlled by or is under common control with such Person, including, without limitation, any general partner, limited partner, manager, member, managing member, officer, director, employee or trustee of such Person or any trust for the benefit of any of the foregoing or any Affiliate of the foregoing, or any venture capital or other investment fund or registered investment company now or hereafter existing that is controlled by one or more general partners, managing members or investment advisors of, or shares the same management company or investment adviser with, such Person; provided, however, that (a)(i) each Wellington Investor shall be deemed to be an "Affiliate" of each other Wellington Investor, and (ii) an entity that is an "Affiliate" of a Wellington Investor shall not be deemed to be an "Affiliate" of any other Wellington Investor unless such entity is a Wellington Investor (and, for the avoidance of doubt, an "Affiliate" of such entity shall not be deemed an "Affiliate" of any Wellington Investor solely by virtue of being an "Affiliate" of such entity) and (b) (i) each Janus Investor shall be deemed to be an "Affiliate" of each other Janus Investor, and (ii) an entity that is an "Affiliate" of a Janus Investor shall not be deemed to be an "Affiliate" of any other Janus Investor unless such entity is

a Janus Investor (and, for the avoidance of doubt, an "Affiliate" of such entity shall not be deemed an "Affiliate" of any Janus Investor solely by virtue of being an "Affiliate" of such entity). For purposes of this definition, the term "control" when used with respect to any Person shall mean the power to direct the management or policies of such Person, directly or indirectly, whether through ownership of voting securities, by contract or otherwise, and the terms "controlling" and "controlled" shall have correlative meanings. Notwithstanding the foregoing, where the term "Person" refers to Novo Holdings A/S, in lieu of the foregoing definition, the term "Affiliate" shall mean Novo Ventures (US), Inc., Novo Holdings Equity US Inc. and Novo Holdings Equity Asia Pte. Ltd. (collectively with Novo Holdings A/S, the "**Novo Entities**"), any partner, executive officer or director of the Novo Entities or any venture capital fund or other Person now or hereafter existing formed for the purpose of making investments in other Persons that is controlled by or under common control with a Novo Entity, and for the avoidance of doubt, shall not include any other affiliate of the Novo Entities.

1.2 "**Baker Brothers**" means, collectively, 667, L.P. and Baker Brothers Life Sciences, L.P.

1.3 "**Board of Directors**" means the board of directors of the Company.

1.4 "**Certificate of Incorporation**" means the Company's Amended and Restated Certificate of Incorporation, as amended and/or restated from time to time.

1.5 "**Common Stock**" means shares of the Company's common stock, par value $0.001 per share.

1.6 "**Competitor**" means a person or entity engaged, directly or indirectly (including through any partnership, limited liability company, corporation, joint venture or similar arrangement (whether now existing or formed hereafter)), in the business of the Company, but shall not include (a) any financial investment firm or collective investment vehicle solely by virtue of its ownership (and/or its Affiliates' ownership) of an equity interest in any Competitor held solely for investment purposes, (b) GV 2017, L.P., GV 2019, L.P., or any of its affiliated funds ("**GV**"), (c) any Affiliate of GV, solely as a result of any affiliation between such Affiliate and Alphabet Inc. (including any Affiliate of Alphabet Inc.), (d) ARCH Venture Fund X, L.P. or any of its Affiliates that are not operating companies ("**Arch**"), (e) F-Prime Capital Partners Healthcare Fund V LP or any of its Affiliates that are not operating companies ("**F-Prime**"), (f) Biomatics Capital Partners, L.P. ("**Biomatics**"), (g) Beam Therapeutics, Inc., (h) the Wellington Investors or any of their Affiliates that are not operating companies, (i) Rock Springs Capital Master Fund LP or any of its Affiliates that are not operating companies ("**Rock Springs**"), (j) Four Pines Master Fund LP or any of its Affiliates that are not operating companies ("**Four Pines**"), (k) Citadel Multi-Strategy Equities Master Fund Ltd. or any of its Affiliates that are not operating companies ("**Surveyor**"), (l) Novo Holdings A/S or any of its Affiliates that are not operating companies ("**Novo**"), (m) Redmile Biopharma Investments II, L.P. or any of its Affiliates that are not operating companies ("**Redmile**"), (n) RA Capital Healthcare Fund, L.P. or RA Capital Nexus Fund II, L.P. or any of its Affiliates that are not operating companies ("**RA Capital**"), (o) Casdin Partners Master Fund, L.P., Casdin Private Growth Equity Fund, L.P. or any of its Affiliates that are not operating companies ("**Casdin**") or (p) the Janus Investors.

1.7 "**Damages**" means any loss, damage, claim or liability (joint or several) to which a party hereto may become subject under the Securities Act, the Exchange Act, or other federal or state law, insofar as such loss, damage, claim or liability (or any action in respect thereof) arises out of or is based upon: (a) any untrue statement or alleged untrue statement of a material fact contained in any registration statement of the Company, including any preliminary prospectus or final prospectus contained therein or any amendments or supplements thereto; (b) an omission or alleged omission to state therein a material fact required to be stated therein, or necessary to make the statements therein not misleading; or (c) any violation or alleged violation by the indemnifying party (or any of its agents or Affiliates) of the Securities Act, the Exchange Act, any state securities law, or any rule or regulation promulgated under the Securities Act, the Exchange Act, or any state securities law.

1.8 "**Derivative Securities**" means any securities or rights convertible into, or exercisable or exchangeable for (in each case, directly or indirectly)**,** Common Stock, including options and warrants.

1.9 "**Exchange Act**" means the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder.

1.10 "**Excluded Registration**" means (a) a registration relating to the sale or grant of securities to employees of the Company or a subsidiary pursuant to a stock option, stock purchase, equity incentive or similar plan; (b) a registration relating to an SEC Rule 145 transaction; (c) a registration on any form that does not include substantially the same information as would be required to be included in a registration statement covering the sale of the Registrable Securities; or (d) a registration in which the only Common Stock being registered is Common Stock issuable upon conversion of debt securities that are also being registered.

1.11 "**Form S-1**" means such form under the Securities Act as in effect on the date hereof or any successor registration form under the Securities Act subsequently adopted by the SEC.

1.12 "**Form S-3**" means such form under the Securities Act as in effect on the date hereof or any registration form under the Securities Act subsequently adopted by the SEC that permits forward incorporation of substantial information by reference to other documents filed by the Company with the SEC.

1.13 "**GAAP**" means generally accepted accounting principles in the United States as in effect from time to time.

1.14 "**Holder**" means any holder of Registrable Securities who is a party to this Agreement.

1.15 "**Immediate Family Member**" means a child, stepchild, grandchild, parent, stepparent, grandparent, spouse, life partner or similar statutorily recognized domestic partner, sibling, mother-in-law, father-in-law, son-in-law, daughter-in-law, brother-in-law, or sister-in-law, including adoptive relationships of a natural person referred to herein.

1.16 "**Initiating Holders**" means, collectively, Holders who properly initiate a registration request under this Agreement.

1.17 "**IPO**" means the Company's first underwritten public offering of its Common Stock under the Securities Act.

1.18 "**Janus Investors**" means Investors, or permitted transferees of shares of capital stock of the Company held by Investors, that are advisory or subadvisory clients of Janus Capital Management LLC, including, without limitation, the Janus Henderson Global Life Sciences Fund, Janus Henderson Capital Funds Plc-Janus Henderson Global Life Sciences Fund, Janus Henderson Horizon Fund-Biotechnology Fund, and Janus Henderson Biotech Innovation Master Fund Limited.

1.19 "**Key Employee**" means any (i) executive-level employee and (ii) any other member of senior management (vice president or higher level).

1.20 "**Major Investor**" means any Investor that, individually or together with such Investor's Affiliates, holds at least 6,500,000 shares of Registrable Securities (as adjusted for any stock split, stock dividend, combination, or other recapitalization or reclassification effected after the date hereof).

1.21 "**New Securities**" means, collectively, equity securities of the Company, whether or not currently authorized, as well as rights, options, or warrants to purchase such equity securities, or securities of any type whatsoever that are, or may become, convertible or exchangeable into or exercisable for such equity securities.

1.22 "**Person**" means any individual, corporation, partnership, trust, limited liability company, association or other entity.

1.23 "**Preferred Director**" means any director of the Company that the holders of record of the Preferred Stock are entitled to elect, exclusively and as a separate class, pursuant to the Certificate of Incorporation.

1.24 "**Preferred Stock**" means, collectively, shares of the Company's Series A Preferred Stock, the Company's Series A-2 Preferred Stock and the Company's Series B Preferred Stock.

1.25 "**Registrable Securities**" means (a) the Common Stock issuable or issued upon conversion of the Preferred Stock; (b) any Common Stock, or any Common Stock issued or issuable (directly or indirectly) upon conversion and/or exercise of any other securities of the Company, acquired by the Investors after the date hereof; and (c) any Common Stock issued as (or issuable upon the conversion or exercise of any warrant, right, or other security that is issued as) a dividend or other distribution with respect to, or in exchange for or in replacement of, the shares referenced in clauses (a) and (b) above; excluding in all cases, however, any Registrable Securities sold by a Person in a transaction in which the applicable rights under this Agreement are not assigned pursuant to Subsection 6.1, and excluding for purposes of Section 2 any shares for which registration rights have terminated pursuant to Subsection 2.13 of this Agreement.

1.26 "**Registrable Securities then outstanding**" means the number of shares determined by adding the number of shares of outstanding Common Stock that are Registrable Securities and the number of shares of Common Stock issuable (directly or indirectly) pursuant to then exercisable and/or convertible securities that are Registrable Securities.

1.27 "**Restricted Securities**" means the securities of the Company required to be notated with the legend set forth in Subsection 2.12(b) hereof.

1.28 "**SEC**" means the Securities and Exchange Commission.

1.29 "**SEC Rule 144**" means Rule 144 promulgated by the SEC under the Securities Act.

1.30 "**SEC Rule 145**" means Rule 145 promulgated by the SEC under the Securities Act.

1.31 "**Securities Act**" means the Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder.

1.32 "**Selling Expenses**" means all underwriting discounts, selling commissions, and stock transfer taxes applicable to the sale of Registrable Securities, and fees and disbursements of counsel for any Holder, except for the fees and disbursements of the Selling Holder Counsel borne and paid by the Company as provided in Subsection 2.6.

1.33 "**Series A Preferred Stock**" means shares of the Company's Series A Preferred Stock, par value $0.001 per share.

1.34 "**Series A-2 Preferred Stock**" means shares of the Company's Series A-2 Preferred Stock, par value $0.001 per share.

1.35 "**Series B Preferred Stock**" means shares of the Company's Series B Preferred Stock, par value $0.001 per share.

1.36 "**Wellington Biomed Fund**" means Wellington Biomedical Innovation Master Investors (Cayman) I L.P.

1.37 "**Wellington Investors**" means Investors, or permitted transferees of shares of capital stock of the Company held by Investors, that are advisory or subadvisory clients of Wellington Management Company LLP, including, without limitation, the Wellington Biomed Fund.

2. Registration Rights.

The Company covenants and agrees as follows:

2.1 Demand Registration.

(a) Form S-1 Demand. If at any time after the earlier of (i) five (5) years after the date of this Agreement or (ii) one hundred eighty (180) days after the effective date of the registration statement for the IPO, the Company receives a request from Holders of a majority of the Registrable Securities then outstanding that the Company file a Form S-1 registration statement with respect to at least forty percent (40%) of the Registrable Securities then outstanding then the Company shall (x) within ten (10) days after the date such request is given, give notice thereof (the "**Demand Notice**") to all Holders other than the Initiating Holders; and (y) as soon as practicable, and in any event within sixty (60) days after the date such request is given by the Initiating Holders, file a Form S-1 registration statement under the Securities Act covering all Registrable Securities that the Initiating Holders requested to be registered and any additional Registrable Securities requested to be included in such registration by any other Holders, as specified by notice given by each such Holder to the Company within twenty (20) days of the date the Demand Notice is given, and in each case, subject to the limitations of Subsections 2.1(c) and 2.3.

(b) Form S-3 Demand. If at any time when it is eligible to use a Form S-3 registration statement, the Company receives a request from Holders of at least twenty percent (20%) of the Registrable Securities then outstanding that the Company file a Form S-3 registration statement with respect to outstanding Registrable Securities of such Holders having an anticipated aggregate offering price, net of Selling Expenses, of at least $5 million, then the Company shall (i) within ten (10) days after the date such request is given, give a Demand Notice to all Holders other than the Initiating Holders; and (ii) as soon as practicable, and in any event within sixty (60) days after the date such request is given by the Initiating Holders, file a Form S-3 registration statement under the Securities Act covering all Registrable Securities requested to be included in such registration by any other Holders, as specified by notice given by each such Holder to the Company within twenty (20) days of the date the Demand Notice is given, and in each case, subject to the limitations of Subsections 2.1(c) and 2.3.

(c) Notwithstanding the foregoing obligations, if the Company furnishes to Holders requesting a registration pursuant to this Subsection 2.1 a certificate signed by the Company's chief executive officer stating that in the good faith judgment of the Board of Directors it would be materially detrimental to the Company and its stockholders for such registration statement to either become effective or remain effective for as long as such registration statement otherwise would be required to remain effective, because such action would (i) materially interfere with a significant acquisition, corporate reorganization, or other similar transaction involving the Company; (ii) require premature disclosure of material information that the Company has a bona fide business purpose for preserving as confidential; or (iii) render the Company unable to comply with requirements under the Securities Act or Exchange Act, then the Company shall have the right to defer taking action with respect to such filing, and any time periods with respect to filing or effectiveness thereof shall be tolled correspondingly, for a period of not more than one hundred twenty (120) days after the request of the Initiating Holders is given; *provided, however*, that the Company may not invoke this right more than twice in any twelve (12) month period; and *provided further that* the Company shall not register any securities for its own account or that of any other stockholder during such one hundred twenty (120) day period other than pursuant to a registration relating to the sale or grant of securities to employees of the Company or a subsidiary pursuant to a stock option, stock purchase, equity incentive or similar plan; a registration on any form that does not include substantially the same information as would be required to be included in a registration statement covering the sale of the Registrable Securities; or a registration in which the only Common Stock being registered is Common Stock issuable upon conversion of debt securities that are also being registered.

(d) The Company shall not be obligated to effect, or to take any action to effect, any registration pursuant to Subsection 2.1(a)(i) during the period that is sixty (60) days before the Company's good faith estimate of the date of filing of, and ending on a date that is one hundred eighty (180) days after the effective date of, a Company-initiated registration, *provided that* the Company is actively employing in good faith commercially reasonable efforts to cause such registration statement to become effective; (ii) after the Company has effected two registrations pursuant to Subsection 2.1(a); or (iii) if the Initiating Holders propose to dispose of shares of Registrable Securities that may be immediately registered on Form S-3 pursuant to a request made pursuant to Subsection 2.1(b). The Company shall not be obligated to effect, or to take any action to effect, any registration pursuant to Subsection 2.1(b) (i) during the period that is thirty (30) days before the Company's good faith estimate of the date of filing of, and ending on a date that is ninety (90) days after the effective date of, a Company-initiated registration, *provided that* the Company is actively employing in good faith commercially reasonable efforts to cause such registration statement to become effective; or (ii) if the Company has effected two registrations pursuant to Subsection 2.1(b) within the twelve (12) month period immediately preceding the date of such request. A registration shall not be counted as "effected" for purposes of this Subsection 2.1(d) until such time as the applicable registration statement has been declared effective by the SEC, unless the Initiating Holders withdraw their request for such registration, elect not to pay the registration expenses therefor, and forfeit their right to one demand registration statement pursuant to Subsection 2.6, in which case such withdrawn registration statement shall be counted as "effected" for purposes of this Subsection 2.1(d); *provided*, that if such withdrawal is during a period the Company has deferred taking action pursuant to Subsection 2.1(c), then the Initiating Holders may withdraw their request for registration and such registration will not be counted as "effected" for purposes of this Subsection 2.1(d).

2.2 Company Registration. If the Company proposes to register (including, for this purpose, a registration effected by the Company for stockholders other than the Holders) any of its Common Stock under the Securities Act in connection with the public offering of such securities solely for cash (other than in an Excluded Registration), the Company shall, at such time, promptly give each Holder notice of such registration. Upon the request of each Holder given within twenty (20) days after such notice is given by the Company, the Company shall, subject to the provisions of Subsection 2.3, cause to be registered all of the Registrable Securities that each such Holder has requested to be included in such registration. The Company shall have the right to terminate or withdraw any registration initiated by it under this Subsection 2.2 before the effective date of such registration, whether or not any Holder has elected to include Registrable Securities in such registration. The expenses (other than Selling Expenses) of such withdrawn registration shall be borne by the Company in accordance with Subsection 2.6.

2.3 Underwriting Requirements.

(a) If, pursuant to Subsection 2.1, the Initiating Holders intend to distribute the Registrable Securities covered by their request by means of an underwriting, they shall so advise the Company as a part of their request made pursuant to Subsection 2.1, and the Company shall include such information in the Demand Notice. The underwriter(s) will be selected by the Board of Directors and shall be reasonably acceptable to a majority in interest of the Initiating Holders. In such event, the right of any Holder to include such Holder's Registrable Securities in such registration shall be conditioned upon such Holder's participation in such underwriting and the inclusion of such Holder's Registrable Securities in the underwriting to the extent provided herein. All Holders proposing to distribute their securities through such underwriting shall (together with the Company as provided in Subsection 2.4(e)) enter into an underwriting agreement in customary form with the underwriter(s) selected for such underwriting. Notwithstanding any other provision of this Subsection 2.3, if the managing underwriter(s) advise(s) the Initiating Holders in writing that marketing factors require a limitation on the number of shares to be underwritten, then the Initiating Holders shall so advise all Holders of Registrable Securities that otherwise would be underwritten pursuant hereto, and the number of Registrable Securities that may be included in the underwriting shall be allocated among such Holders of Registrable Securities, including the Initiating Holders, in proportion (as nearly as practicable) to the number of Registrable Securities owned by each Holder or in such other proportion as shall mutually be agreed to by all such selling Holders; *provided, however*, that the number of Registrable Securities held by the Holders to be included in such underwriting shall not be reduced unless all other securities are first entirely excluded from the underwriting. To facilitate the allocation of shares in accordance with the above provisions, the Company or the underwriters may round the number of shares allocated to any Holder to the nearest one hundred (100) shares.

(b) In connection with any offering involving an underwriting of shares of the Company's capital stock pursuant to Subsection 2.2, the Company shall not be required to include any of the Holders' Registrable Securities in such underwriting unless the Holders accept the terms of the underwriting as agreed upon between the Company and its underwriters, and then only in such quantity as the underwriters in their sole discretion determine will not jeopardize the success of the offering by the Company. If the total number of securities, including Registrable Securities, requested by stockholders to be included in such offering exceeds the number of securities to be sold (other than by the Company) that the underwriters in their reasonable discretion determine is compatible with the success of the offering, then the Company shall be required to include in the offering only that number of such securities, including Registrable Securities, which the underwriters and the Company in their sole discretion determine will not jeopardize the success of the offering. If the underwriters determine that less than all of the Registrable Securities requested to be registered can be included in such offering, then the Registrable Securities that are included in such offering shall be allocated among the selling Holders in proportion (as nearly as practicable) to the number of Registrable Securities owned by each selling Holder or in such other proportions as shall mutually be agreed to by all such selling Holders. To facilitate the allocation of shares in accordance with the above provisions, the Company or the underwriters may round the number of shares allocated to any Holder to the nearest one hundred (100) shares. Notwithstanding the foregoing, in no event shall (i) the number of Registrable Securities included in the offering be reduced unless all other securities (other than securities to be sold by the Company) are first entirely excluded from the offering, or (ii) the number of Registrable Securities included in the offering be reduced below twenty percent (20%) of the total number of securities included in such offering, unless such offering is the IPO, in which case the selling Holders may be excluded further if the underwriters make the determination

described above and no other stockholder's securities are included in such offering. For purposes of the provision in this Subsection 2.3(b) concerning apportionment, for any selling Holder that is a partnership, limited liability company, or corporation, the partners, members, retired partners, retired members, stockholders, and Affiliates of such Holder, or the estates and Immediate Family Members of any such partners, retired partners, members, and retired members and any trusts for the benefit of any of the foregoing Persons, shall be deemed to be a single "selling Holder," and any pro rata reduction with respect to such "selling Holder" shall be based upon the aggregate number of Registrable Securities owned by all Persons included in such "selling Holder," as defined in this sentence.

(c) For purposes of Subsection 2.1, a registration shall not be counted as "effected" if, as a result of an exercise of the underwriter's cutback provisions in Subsection 2.3(a), fewer than fifty percent (50%) of the total number of Registrable Securities that Holders have requested to be included in such registration statement are actually included.

2.4 Obligations of the Company. Whenever required under this Section 2 to effect the registration of any Registrable Securities, the Company shall, as expeditiously as reasonably possible:

(a) prepare and file with the SEC a registration statement with respect to such Registrable Securities and use its commercially reasonable efforts to cause such registration statement to become effective and, upon the request of the Holders of a majority of the Registrable Securities registered thereunder, keep such registration statement effective for a period of up to one hundred twenty (120) days or, if earlier, until the distribution contemplated in the registration statement has been completed; *provided*, *however*, that such one hundred twenty (120) day period shall be extended for a period of time equal to the period the Holder refrains, at the request of an underwriter of Common Stock (or other securities) of the Company, from selling any securities included in such registration.

(b) prepare and file with the SEC such amendments and supplements to such registration statement, and the prospectus used in connection with such registration statement, as may be necessary to comply with the Securities Act in order to enable the disposition of all securities covered by such registration statement;

(c) furnish to the selling Holders such numbers of copies of a prospectus, including a preliminary prospectus, as required by the Securities Act, and such other documents as the Holders may reasonably request in order to facilitate their disposition of their Registrable Securities;

(d) use its commercially reasonable efforts to register and qualify the securities covered by such registration statement under such other securities or blue-sky laws of such jurisdictions as shall be reasonably requested by the selling Holders; *provided that* the Company shall not be required to qualify to do business or to file a general consent to service of process in any such states or jurisdictions, unless the Company is already subject to service in such jurisdiction and except as may be required by the Securities Act;

(e) in the event of any underwritten public offering, enter into and perform its obligations under an underwriting agreement, in usual and customary form, with the underwriter(s) of such offering;

(f) use its commercially reasonable efforts to cause all such Registrable Securities covered by such registration statement to be listed on a national securities exchange or trading system and each securities exchange and trading system (if any) on which similar securities issued by the Company are then listed;

(g) provide a transfer agent and registrar for all Registrable Securities registered pursuant to this Agreement and provide a CUSIP number for all such Registrable Securities, in each case not later than the effective date of such registration;

(h) promptly make available for inspection by the selling Holders, any managing underwriter(s) participating in any disposition pursuant to such registration statement, and any attorney or accountant or other agent retained by any such underwriter or selected by the selling Holders, all financial and other records, pertinent corporate documents, and properties of the Company, and cause the Company's officers, directors, employees, and independent accountants to supply all information reasonably requested by any such seller, underwriter, attorney, accountant, or agent, in each case, as necessary or advisable to verify the accuracy of the information in such registration statement and to conduct appropriate due diligence in connection therewith;

(i) notify each selling Holder, promptly after the Company receives notice thereof, of the time when such registration statement has been declared effective or a supplement to any prospectus forming a part of such registration statement has been filed; and

(j) after such registration statement becomes effective, notify each selling Holder of any request by the SEC that the Company amend or supplement such registration statement or prospectus.

In addition, the Company shall ensure that, at all times after any registration statement covering a public offering of securities of the Company under the Securities Act shall have become effective, its insider trading policy shall provide that the Company's directors may implement a trading program under Rule 10b5-1 of the Exchange Act.

2.5 Furnish Information. It shall be a condition precedent to the obligations of the Company to take any action pursuant to this Section 2 with respect to the Registrable Securities of any selling Holder that such Holder shall furnish to the Company such information regarding itself, the Registrable Securities held by it, and the intended method of disposition of such securities as is reasonably required to effect the registration of such Holder's Registrable Securities.

2.6 Expenses of Registration. All expenses (other than Selling Expenses) incurred in connection with registrations, filings, or qualifications pursuant to Section 2, including all registration, filing, and qualification fees; printers' and accounting fees; fees and disbursements of counsel for the Company; and the reasonable fees and disbursements, not to exceed $75,000, of one counsel for the selling Holders ("**Selling Holder Counsel**"), shall be borne and paid by the Company; *provided*, *however*, that the Company shall not be required to pay for any expenses of any registration proceeding begun pursuant to Subsection 2.1 if the registration request is subsequently withdrawn at the request of the Holders of a majority of the Registrable Securities to be registered (in which case all selling Holders shall bear such expenses pro rata based upon the number of Registrable Securities that were to be included in the withdrawn registration), unless the Holders of a majority of the Registrable Securities agree to forfeit their right to one registration pursuant to Subsections 2.1(a) or 2.1(b), as the case may be; *provided further that* if, at the time of such withdrawal, the Holders shall have learned of a material adverse change in the condition, business, or prospects of the Company from that known to the Holders at the time of their request and have withdrawn the request with reasonable promptness after learning of such information then the Holders shall not be required to pay any of such expenses and shall not forfeit their right to one registration pursuant to Subsection 2.1(a) or Subsection 2.1(b). All Selling Expenses relating to Registrable Securities registered pursuant to this Section 2 shall be borne and paid by the Holders pro rata on the basis of the number of Registrable Securities registered on their behalf.

2.7 Delay of Registration. No Holder shall have any right to obtain or seek an injunction restraining or otherwise delaying any registration pursuant to this Agreement as the result of any controversy that might arise with respect to the interpretation or implementation of this Section 2.

2.8 Indemnification. If any Registrable Securities are included in a registration statement under this Section 2:

(a) To the extent permitted by law, the Company will indemnify and hold harmless each selling Holder, and the partners, members, officers, directors, and stockholders of each such Holder; legal counsel and accountants for each such Holder; any underwriter (as defined in the Securities Act) for each such Holder; and each Person, if any, who controls such Holder or underwriter within the meaning of the Securities Act or the Exchange Act, against any Damages, and the Company will pay to each such Holder, underwriter, controlling Person, or other aforementioned Person any legal or other expenses reasonably incurred thereby in connection with investigating or defending any claim or proceeding from which Damages may result, as such expenses are incurred; *provided*, *however*, that the indemnity agreement contained in this Subsection 2.8(a) shall not apply to amounts paid in settlement of any such claim or proceeding if such settlement is effected without the consent of the Company, which consent shall not be unreasonably withheld, nor shall the Company be liable for any Damages to the extent that they arise out of or are based upon actions or omissions made in reliance upon and in conformity with written information furnished by or on behalf of any such Holder, underwriter, controlling Person, or other aforementioned Person expressly for use in connection with such registration.

(b) To the extent permitted by law, each selling Holder, severally and not jointly, will indemnify and hold harmless the Company, and each of its directors, each of its officers who has signed the registration statement, each Person (if any), who controls the Company within the meaning of the Securities Act, legal counsel and accountants for the Company, any underwriter (as defined in the Securities Act), any other Holder selling securities in such registration statement, and any controlling Person of any such underwriter or other Holder, against

any Damages, in each case only to the extent that such Damages arise out of or are based upon actions or omissions made in reliance upon and in conformity with written information furnished by or on behalf of such selling Holder expressly for use in connection with such registration; and each such selling Holder will pay to the Company and each other aforementioned Person any legal or other expenses reasonably incurred thereby in connection with investigating or defending any claim or proceeding from which Damages may result, as such expenses are incurred; *provided, however*, that the indemnity agreement contained in this Subsection 2.8(b) shall not apply to amounts paid in settlement of any such claim or proceeding if such settlement is effected without the consent of the Holder, which consent shall not be unreasonably withheld; and *provided further that* in no event shall the aggregate amounts payable by any Holder by way of indemnity or contribution under Subsections 2.8(b) and 2.8(d) exceed the proceeds from the offering received by such Holder (net of any Selling Expenses paid by such Holder), except in the case of fraud or willful misconduct by such Holder.

(c) Promptly after receipt by an indemnified party under this Subsection 2.8 of notice of the commencement of any action (including any governmental action) for which a party may be entitled to indemnification hereunder, such indemnified party will, if a claim in respect thereof is to be made against any indemnifying party under this Subsection 2.8, give the indemnifying party notice of the commencement thereof. The indemnifying party shall have the right to participate in such action and, to the extent the indemnifying party so desires, participate jointly with any other indemnifying party to which notice has been given, and to assume the defense thereof with counsel mutually satisfactory to the parties; *provided, however*, that an indemnified party (together with all other indemnified parties that may be represented without conflict by one counsel) shall have the right to retain one separate counsel, with the fees and expenses to be paid by the indemnifying party, if representation of such indemnified party by the counsel retained by the indemnifying party would be inappropriate due to actual or potential differing interests between such indemnified party and any other party represented by such counsel in such action. The failure to give notice to the indemnifying party within a reasonable time of the commencement of any such action shall relieve such indemnifying party of any liability to the indemnified party under this Subsection 2.8, to the extent that such failure materially prejudices the indemnifying party's ability to defend such action. The failure to give notice to the indemnifying party will not relieve it of any liability that it may have to any indemnified party otherwise than under this Subsection 2.8.

(d) To provide for just and equitable contribution to joint liability under the Securities Act in any case in which either: (i) any party otherwise entitled to indemnification hereunder makes a claim for indemnification pursuant to this Subsection 2.8 but it is judicially determined (by the entry of a final judgment or decree by a court of competent jurisdiction and the expiration of time to appeal or the denial of the last right of appeal) that such indemnification may not be enforced in such case, notwithstanding the fact that this Subsection 2.8 provides for indemnification in such case, or (ii) contribution under the Securities Act may be required on the part of any party hereto for which indemnification is provided under this Subsection 2.8, then, and in each such case, such parties will contribute to the aggregate losses, claims, damages, liabilities, or expenses to which they may be subject (after contribution from others) in such proportion as is appropriate to reflect the relative fault of each of the indemnifying party and the indemnified party in connection with the statements, omissions, or other actions that resulted in such loss, claim,

damage, liability, or expense, as well as to reflect any other relevant equitable considerations. The relative fault of the indemnifying party and of the indemnified party shall be determined by reference to, among other things, whether the untrue or allegedly untrue statement of a material fact, or the omission or alleged omission of a material fact, relates to information supplied by the indemnifying party or by the indemnified party and the parties' relative intent, knowledge, access to information, and opportunity to correct or prevent such statement or omission; *provided, however*, that, in any such case (x) no Holder will be required to contribute any amount in excess of the public offering price of all such Registrable Securities offered and sold by such Holder pursuant to such registration statement, and (y) no Person guilty of fraudulent misrepresentation (within the meaning of Section 11(f) of the Securities Act) will be entitled to contribution from any Person who was not guilty of such fraudulent misrepresentation; and *provided further that* in no event shall a Holder's liability pursuant to this Subsection 2.8(d), when combined with the amounts paid or payable by such Holder pursuant to Subsection 2.8(b), exceed the proceeds from the offering received by such Holder (net of any Selling Expenses paid by such Holder), except in the case of willful misconduct or fraud by such Holder.

(e) Notwithstanding the foregoing, to the extent that the provisions on indemnification and contribution contained in the underwriting agreement entered into in connection with the underwritten public offering are in conflict with the foregoing provisions, the provisions in the underwriting agreement shall control.

(f) Unless otherwise superseded by an underwriting agreement entered into in connection with the underwritten public offering, the obligations of the Company and Holders under this Subsection 2.8 shall survive the completion of any offering of Registrable Securities in a registration under this Section 2, and otherwise shall survive the termination of this Agreement.

2.9 Reports Under Exchange Act. With a view to making available to the Holders the benefits of SEC Rule 144 and any other rule or regulation of the SEC that may at any time permit a Holder to sell securities of the Company to the public without registration or pursuant to a registration on Form S-3, the Company shall:

(a) make and keep available adequate current public information, as those terms are understood and defined in SEC Rule 144, at all times after the effective date of the registration statement filed by the Company for the IPO;

(b) use commercially reasonable efforts to file with the SEC in a timely manner all reports and other documents required of the Company under the Securities Act and the Exchange Act (at any time after the Company has become subject to such reporting requirements); and

(c) furnish to any Holder, so long as the Holder owns any Registrable Securities, forthwith upon request (i) to the extent accurate, a written statement by the Company that it has complied with the reporting requirements of SEC Rule 144 (at any time after ninety (90) days after the effective date of the registration statement filed by the Company for the IPO), the Securities Act, and the Exchange Act (at any time after the Company has become subject to such

reporting requirements), or that it qualifies as a registrant whose securities may be resold pursuant to Form S-3 (at any time after the Company so qualifies) and (ii) such other information as may be reasonably requested in availing any Holder of any rule or regulation of the SEC that permits the selling of any such securities without registration (at any time after the Company has become subject to the reporting requirements under the Exchange Act) or pursuant to Form S-3 (at any time after the Company so qualifies to use such form).

2.10 Limitations on Subsequent Registration Rights. From and after the date of this Agreement, the Company shall not, without the prior written consent of the Holders of a majority of the Registrable Securities then outstanding, enter into any agreement with any holder or prospective holder of any securities of the Company that would (i) allow such holder or prospective holder to include such securities in any registration unless, under the terms of such agreement, such holder or prospective holder may include such securities in any such registration only to the extent that the inclusion of such securities will not reduce the number of the Registrable Securities of the Holders that are included or (ii) allow such holder or prospective holder to initiate a demand for registration of any securities held by such holder or prospective holder; *provided that* this limitation shall not apply to any additional Investor who becomes a party to this Agreement in accordance with Subsection 6.9.

2.11 "Market Stand-off" Agreement. Each Holder hereby agrees that it will not, without the prior written consent of the managing underwriter, during the period commencing on the date of the final prospectus relating to the IPO (such period not to exceed one hundred eighty (180) days) (i) lend; offer; pledge; sell; contract to sell; sell any option or contract to purchase; purchase any option or contract to sell; grant any option, right, or warrant to purchase; or otherwise transfer or dispose of, directly or indirectly, any shares of Common Stock or any securities convertible into or exercisable or exchangeable (directly or indirectly) for Common Stock held immediately before the effective date of the registration statement for the IPO or (ii) enter into any swap or other arrangement that transfers to another, in whole or in part, any of the economic consequences of ownership of such securities, whether any such transaction described in clause (i) or (ii) above is to be settled by delivery of Common Stock or other securities, in cash, or otherwise. The foregoing provisions of this Subsection 2.11 shall apply only to the IPO, shall not apply to transactions (including, without limitation, any swap, hedge or similar agreement or arrangement) or announcements, in each case, relating to securities acquired in the IPO or securities acquired in open market or other transactions from and after the IPO or that otherwise do not involve or relate to shares of Common Stock owned by a Holder prior to the IPO, shall not apply to the sale of any shares to an underwriter pursuant to an underwriting agreement, or the transfer of any shares to any trust for the direct or indirect benefit of the Holder or the immediate family of the Holder, *provided that* the trustee of the trust agrees to be bound in writing by the restrictions set forth herein, and *provided further that* any such transfer shall not involve a disposition for value, and shall be applicable to the Holders only if all officers and directors are subject to the same restrictions and the Company uses commercially reasonable efforts to obtain a similar agreement from all stockholders individually owning more than one percent (1%) of the Company's outstanding Common Stock (after giving effect to conversion into Common Stock of all outstanding Preferred Stock). Any discretionary waiver or termination of the restrictions of any or all of such agreements by the Company or the underwriters shall apply pro rata to all Holders subject to such agreements, based on the number of shares subject to such agreements. The

underwriters in connection with such registration are intended third-party beneficiaries of this Subsection 2.11 and shall have the right, power and authority to enforce the provisions hereof as though they were a party hereto. Each Holder further agrees to execute such agreements as may be reasonably requested by the underwriters in connection with such registration that are consistent with this Subsection 2.11 or that are necessary to give further effect thereto.

2.12 Restrictions on Transfer.

(a) The Preferred Stock and the Registrable Securities shall not be sold, pledged, or otherwise transferred, and the Company shall not recognize and shall issue stop-transfer instructions to its transfer agent with respect to any such sale, pledge, or transfer, except upon the conditions specified in this Agreement, which conditions are intended to ensure compliance with the provisions of the Securities Act. A transferring Holder will cause any proposed purchaser, pledgee, or transferee of the Preferred Stock and the Registrable Securities held by such Holder to agree to take and hold such securities subject to the provisions and upon the conditions specified in this Agreement. Notwithstanding the foregoing, the Company shall not require any transferee of shares pursuant to an effective registration statement or, following the IPO, SEC Rule 144, in each case, to be bound by the terms of this Agreement.

(b) Each certificate, instrument, or book entry representing (i) the Preferred Stock, (ii) the Registrable Securities, and (iii) any other securities issued in respect of the securities referenced in clauses (i) and (ii), upon any stock split, stock dividend, recapitalization, merger, consolidation, or similar event, shall (unless otherwise permitted by the provisions of Subsection 2.12(c)) be notated with a legend substantially in the following form:

> THE SECURITIES REPRESENTED HEREBY HAVE BEEN ACQUIRED FOR INVESTMENT AND HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933. SUCH SHARES MAY NOT BE SOLD, PLEDGED, OR TRANSFERRED IN THE ABSENCE OF SUCH REGISTRATION OR A VALID EXEMPTION FROM THE REGISTRATION AND PROSPECTUS DELIVERY REQUIREMENTS OF SAID ACT.
>
> THE SECURITIES REPRESENTED HEREBY MAY BE TRANSFERRED ONLY IN ACCORDANCE WITH THE TERMS OF AN AGREEMENT BETWEEN THE COMPANY AND THE STOCKHOLDER, A COPY OF WHICH IS ON FILE WITH THE SECRETARY OF THE COMPANY.

The Holders consent to the Company making a notation in its records and giving instructions to any transfer agent of the Restricted Securities in order to implement the restrictions on transfer set forth in this Subsection 2.12.

(c) The holder of such Restricted Securities, by acceptance of ownership thereof, agrees to comply in all respects with the provisions of this Section 2. Before any proposed sale, pledge, or transfer of any Restricted Securities, unless there is in effect a registration statement under the Securities Act covering the proposed transaction or following the IPO, the transfer is made pursuant to SEC Rule 144, the Holder thereof shall give notice to the Company of such Holder's intention to effect such sale, pledge, or transfer, provided that no such notice shall be required in connection if the intended sale, pledge or transfer complies with SEC Rule 144. Each such notice shall describe the manner and circumstances of the proposed sale, pledge, or transfer in sufficient detail and, if reasonably requested by the Company, shall be accompanied at such Holder's expense by either (i) a written opinion of legal counsel who shall, and whose legal opinion shall, be reasonably satisfactory to the Company, addressed to the Company, to the effect that the proposed transaction may be effected without registration under the Securities Act; (ii) a "no action" letter from the SEC to the effect that the proposed sale, pledge, or transfer of such Restricted Securities without registration will not result in a recommendation by the staff of the SEC that action be taken with respect thereto; or (iii) any other evidence reasonably satisfactory to counsel to the Company to the effect that the proposed sale, pledge, or transfer of the Restricted Securities may be effected without registration under the Securities Act, whereupon the Holder of such Restricted Securities shall be entitled to sell, pledge, or transfer such Restricted Securities in accordance with the terms of the notice given by the Holder to the Company. The Company will not require such a notice, legal opinion or "no action" letter (x) in any transaction in compliance with SEC Rule 144; or (y) in any transaction in which such Holder distributes Restricted Securities to an Affiliate of such Holder for no consideration; *provided that* each transferee agrees in writing to be subject to the terms of this Subsection 2.12. Each certificate, instrument, or book entry representing the Restricted Securities transferred as above provided shall be notated with, except if such transfer is made pursuant to SEC Rule 144, the appropriate restrictive legend set forth in Subsection 2.12(b), except that such certificate instrument, or book entry shall not be notated with such restrictive legend if, in the opinion of counsel for such Holder and the Company, such legend is not required in order to establish compliance with any provisions of the Securities Act.

2.13 Termination of Registration Rights. The right of any Holder to request registration or inclusion of Registrable Securities in any registration pursuant to Subsections 2.1 or 2.2 shall terminate upon the earliest to occur of:

(a) the closing of a Deemed Liquidation Event, as such term is defined in the Certificate of Incorporation;

(b) such time after consummation of the IPO as SEC Rule 144 or another similar exemption under the Securities Act is available for the sale of all of such Holder's shares without limitation during a three-month period without registration;

(c) the fifth anniversary of the consummation of the IPO.

3. Information and Observer Rights.

3.1 Delivery of Financial Statements. The Company shall deliver to each Major Investor, *provided that* the Board of Directors has not reasonably determined that such Major Investor is a Competitor of the Company:

(a) as soon as practicable, but in any event within one hundred twenty (120) days after the end of each fiscal year of the Company (i) a balance sheet as of the end of such year, (ii) statements of income and of cash flows for such year and (iii) a statement of stockholders' equity as of the end of such year, all such financial statements audited and certified by independent public accountants of recognized standing selected by the Company, *provided*, *however*, that if GV makes a bona fide determination that it is required to consolidate the financial results of the Company with those of GV, the Company shall provide the items set forth in this Section 3.1(a) within ninety (90) days after the end of each fiscal year, and unaudited copies of the items set forth in clause (a) within twenty-five (25) days after the end of each fiscal year;

(b) as soon as practicable, but in any event within thirty (30) days after the end of each quarter of each fiscal year of the Company, (i) unaudited statements of income and cash flows for such fiscal quarter, (ii) an unaudited balance sheet and (iii) a statement of stockholders' equity as of the end of such fiscal quarter, all prepared in accordance with GAAP (except that such financial statements may (i) be subject to normal year-end audit adjustments; and (ii) not contain all notes thereto that may be required in accordance with GAAP); *provided*, *however*, that if GV makes a bona fide determination that it is required to consolidate the financial results of the Company with those of GV, the Company shall provide the items set forth in clause (i) of this Section 3.1(b) within fifteen (15) days after the end of each quarter of each fiscal year of the Company;

(c) as soon as practicable, but in any event within thirty (30) days after the end of each quarter of each fiscal year of the Company, a statement showing the number of shares of each class and series of capital stock and securities convertible into or exercisable for shares of capital stock outstanding at the end of the period, the Common Stock issuable upon conversion or exercise of any outstanding securities convertible or exercisable for Common Stock and the exchange ratio or exercise price applicable thereto, and the number of shares of issued stock options and stock options not yet issued but reserved for issuance, if any, all in sufficient detail as to permit the Major Investors to calculate their respective percentage equity ownership in the Company; *provided*, *however*, that if GV makes a bona fide determination that it is required to consolidate the financial results of the Company with those of GV, the Company shall provide the items set forth in this Section 3.1(c) within fifteen (15) days after the end of each quarter of each fiscal year of the Company;

(d) as soon as practicable, but in any event thirty (30) days before the end of each fiscal year, a budget and business plan for the next fiscal year, prepared on a monthly basis, including balance sheets, income statements, and statements of cash flow for such months and, promptly after prepared, any other budgets or revised budgets prepared by the Company;

(e) such other information relating to the financial condition, business, prospects, or corporate affairs of the Company as any Major Investor may from time to time reasonably request; *provided*, *however*, that the Company shall not be obligated under this Subsection 3.1 to provide information (i) that the Company reasonably determines in good faith to be a trade secret or similarly confidential information; or (ii) the disclosure of which would adversely affect the attorney-client privilege between the Company and its counsel.

If, for any period, the Company has any subsidiary whose accounts are consolidated with those of the Company, then in respect of such period the financial statements delivered pursuant to the foregoing sections shall be the consolidated and consolidating financial statements of the Company and all such consolidated subsidiaries.

Notwithstanding anything else in this Subsection 3.1 to the contrary, the Company may cease providing the information set forth in this Subsection 3.1 during the period starting with the date thirty (30) days before the Company's good-faith estimate of the date of filing of a registration statement if it must do so to comply with the SEC rules applicable to such registration statement and related offering; *provided that* the Company's covenants under this Subsection 3.1 shall be reinstated at such time as the Company is no longer actively employing its commercially reasonable efforts to cause such registration statement to become effective.

3.2 Inspection. The Company shall permit each Major Investor (*provided that* the Board of Directors has not reasonably determined that such Major Investor is a Competitor), at such Major Investor's expense, to visit and inspect the Company's properties; examine its books of account and records; and discuss the Company's affairs, finances, and accounts with its officers, during normal business hours of the Company as may be reasonably requested by the Major Investor; *provided, however*, that the Company shall not be obligated pursuant to this Subsection 3.2 to provide access to any information that it reasonably and in good faith considers to be a trade secret or confidential information (unless covered by an enforceable confidentiality agreement, in form acceptable to the Company) or the disclosure of which would adversely affect the attorney-client privilege between the Company and its counsel.

3.3 Observer Rights. As long as, in each case, F-Prime owns not less than 1,672,241 shares of the Preferred Stock (or an equivalent amount of Common Stock issued upon conversion thereof), and Biomatics owns not less than 1,672,241 shares of Preferred Stock (or an equivalent amount of Common Stock issued upon conversion thereof), the Company shall invite a representative of F-Prime and Biomatics, respectively, subject to the foregoing, to attend all meetings of the Board of Directors in a nonvoting observer capacity and, in this respect, shall give such representative copies of all notices, minutes, consents, and other materials that it provides to its directors at the same time and in the same manner as provided to such directors; provided, however, that such representative shall agree to hold in confidence and trust and to act in a fiduciary manner with respect to all information so provided; provided further, that the Company reserves the right to withhold any information and to exclude such representative from any meeting or portion thereof if access to such information or attendance at such meeting could adversely affect the attorney-client privilege between the Company and its counsel or result in disclosure of trade secrets or a conflict of interest, or if such Investor or its representative is a Competitor.

3.4 Termination of Information and Observer Rights. The covenants set forth in Subsections 3.1, 3.2 and 3.3 shall terminate and be of no further force or effect (a) immediately before the consummation of the IPO, (b) when the Company first becomes subject to the periodic reporting requirements of Section 12(g) or 15(d) of the Exchange Act, or (c) upon the closing of a Deemed Liquidation Event, as such term is defined in the Certificate of Incorporation, in which the Major Investors receive cash, publicly traded securities or any combination thereof in exchange for the Company securities then held by the Major Investors, whichever event occurs first.

3.5 Confidentiality. Each Investor agrees that such Investor will keep confidential and will not disclose, divulge, or use for any purpose (other than to monitor its investment in the Company) any confidential information obtained from the Company pursuant to the terms of this Agreement (including notice of the Company's intention to file a registration statement), unless such confidential information (a) is known or becomes known to the public in general (other than as a result of a breach of this Subsection 3.5 by such Investor), (b) is or has been independently developed or conceived by such Investor without use of the Company's confidential information, or (c) is or has been made known or disclosed to such Investor by a third party without a breach of any obligation of confidentiality such third party may have to the Company; *provided, however*, that an Investor may disclose confidential information (i) to its attorneys, accountants, consultants, and other professionals to the extent necessary to obtain their services in connection with monitoring its investment in the Company; (ii) to any prospective purchaser of any Registrable Securities from such Investor, if such prospective purchaser agrees to be bound by the provisions of this Subsection 3.5; (iii) to any Affiliate, partner, member, stockholder, or wholly owned subsidiary of such Investor in the ordinary course of business, *provided that* such Investor informs such Person that such information is confidential and directs such Person to maintain the confidentiality of such information; (iv) to the extent required in connection with any routine or periodic examination or similar process by any regulatory or self-regulatory body or authority not specifically directed at the Company or the confidential information obtained from the Company pursuant to the terms of this Agreement, including, without limitation, quarterly or annual reports; or (v) as may otherwise be required by law, regulation, rule, court order or subpoena, *provided that*, with respect to this clause (v), such Investor promptly notifies the Company of such disclosure and takes reasonable steps to minimize the extent of any such required disclosure. The Company understands and acknowledges that in the regular course of Surveyor's business, Surveyor and its Affiliates will invest in companies that have issued securities that are publicly traded (each, a "**Public Company**"). Accordingly, the Company covenants and agrees that it shall not provide any material non-public information about a Public Company to Surveyor or any representative of Surveyor, except in connection with any required consent of stockholders in which case the Company covenants and agrees that before delivering any required consent of stockholders containing material non-public information about a Public Company to Surveyor or its representative, the Company will provide prior written notice to Surveyor Compliance at SCComplianceAppvl@citadel.com describing such information in reasonable detail. In addition, the Company acknowledges and agrees that in no event shall Surveyor's confidentiality and non-use obligations hereunder in any manner be deemed or construed as limiting Surveyor or its representatives' (or any of their respective Affiliates) ability to trade any security of a Public Company.

4. Rights to Future Stock Issuances.

4.1 Right of First Offer. Subject to the terms and conditions of this Subsection 4.1 and applicable securities laws, if the Company proposes to offer or sell any New Securities, the Company shall first offer such New Securities to each Major Investor. A Major Investor shall be entitled to apportion the right of first offer hereby granted to it in such proportions as it deems appropriate, among (i) itself and (ii) its Affiliates; *provided that* each such Affiliate (x) is not a Competitor, unless such party's purchase of New Securities is otherwise consented to by the Board of Directors, and (y) agrees to enter into this Agreement and each of the Second Amended and Restated Voting Agreement and Second Amended and Restated Right of First Refusal and Co-Sale Agreement of even date herewith among the Company, the Investors and the other parties named therein, as an "**Investor**" under each such agreement (*provided that* any Competitor shall not be entitled to any rights as a Major Investor under Subsections 3.1, 3.2 and 4.1 hereof.

(a) The Company shall give notice (the "**Offer Notice**") to each Major Investor, stating (i) its bona fide intention to offer such New Securities, (ii) the number of such New Securities to be offered, and (iii) the price and terms, if any, upon which it proposes to offer such New Securities.

(b) By notification to the Company within twenty (20) days after the Offer Notice is given, each Major Investor may elect to purchase or otherwise acquire, at the price and on the terms specified in the Offer Notice, up to that portion of such New Securities which equals the proportion that the Common Stock then held by such Major Investor (including all shares of Common Stock then issuable (directly or indirectly) upon conversion and/or exercise, as applicable, of the Preferred Stock and any other Derivative Securities then held by such Major Investor) bears to the total Common Stock of the Company then outstanding (assuming full conversion and/or exercise, as applicable, of all Preferred Stock and any other Derivative Securities then outstanding). At the expiration of such twenty (20) day period, the Company shall promptly notify each Major Investor that elects to purchase or acquire all the shares available to it (each, a "**Fully Exercising Investor**") of any other Major Investor's failure to do likewise. During the ten (10) day period commencing after the Company has given such notice, each Fully Exercising Investor may, by giving notice to the Company, elect to purchase or acquire, in addition to the number of shares specified above, up to that portion of the New Securities for which Major Investors were entitled to subscribe but that were not subscribed for by the Major Investors which is equal to the proportion that the Common Stock issued and held, or issuable (directly or indirectly) upon conversion and/or exercise, as applicable, of Preferred Stock and any other Derivative Securities then held, by such Fully Exercising Investor bears to the Common Stock issued and held, or issuable (directly or indirectly) upon conversion and/or exercise, as applicable, of the Preferred Stock and any other Derivative Securities then held, by all Fully Exercising Investors who wish to purchase such unsubscribed shares. The closing of any sale pursuant to this Subsection 4.1(b) shall occur within the later of ninety (90) days of the date that the Offer Notice is given and the date of initial sale of New Securities pursuant to Subsection 4.1(c).

(c) If all New Securities referred to in the Offer Notice are not elected to be purchased or acquired as provided in Subsection 4.1(b), the Company may, during the ninety (90) day period following the expiration of the periods provided in Subsection 4.1(b), offer and sell the remaining unsubscribed portion of such New Securities to any Person or Persons at a price not less than, and upon terms no more favorable to the offeree than, those specified in the Offer Notice. If the Company does not enter into an agreement for the sale of the New Securities within such period, or if such agreement is not consummated within thirty (30) days of the execution thereof, the right provided hereunder shall be deemed to be revived and such New Securities shall not be offered unless first reoffered to the Major Investors in accordance with this Subsection 4.1.

(d) The right of first offer in this Subsection 4.1 shall not be applicable to (i) Exempted Securities (as defined in the Certificate of Incorporation); and (ii) shares of Common Stock issued in the IPO.

4.2 Termination. The covenants set forth in Subsection 4.1 shall terminate and be of no further force or effect (a) immediately before the consummation of the IPO, (b) when the Company first becomes subject to the periodic reporting requirements of Section 12(g) or 15(d) of the Exchange Act, or (c) upon the closing of a Deemed Liquidation Event, as such term is defined in the Certificate of Incorporation, whichever event occurs first.

5. Additional Covenants.

5.1 Insurance. The Company shall (i) maintain, from financially sound and reputable insurers, Directors and Officers liability insurance in an amount and on terms and conditions satisfactory to the Board of Directors including each of the Preferred Directors, until such time as the Board of Directors determines that such insurance should be discontinued and (ii) promptly add as additional insureds under such liability insurance each VC Fund, as defined in those certain Indemnification Agreements by and between the Company and the parties thereto, dated August 7, 2018 and March 19, 2018, respectively.

5.2 Employee Agreements. The Company will cause (a) each Person now or hereafter employed by it or by any subsidiary (or engaged by the Company or any subsidiary as a consultant/independent contractor) with access to confidential information and/or trade secrets to enter into a nondisclosure and proprietary rights assignment agreement; and (b) each Key Employee to enter into a one (1) year nonsolicitation agreement, as permitted by applicable law, substantially in the form approved by the Board of Directors. In addition, the Company shall not amend, modify, terminate, waive, or otherwise alter, in whole or in part, any of the above-referenced agreements or any restricted stock agreement between the Company and any employee, without the consent of the Board of Directors.

5.3 Employee Stock. Unless otherwise approved by the Board of Directors, all future employees and consultants of the Company who purchase, receive options to purchase, or receive awards of shares of the Company's capital stock after the date hereof shall be required to execute restricted stock or option agreements, as applicable, providing for (a) vesting of shares over a four (4) year period, with the first twenty-five percent (25%) of such shares vesting following twelve (12) months of continued employment or service, and the remaining shares vesting in equal monthly installments over the following thirty-six (36) months, and (b) a market stand-off provision substantially similar to that in Subsection 2.11. Without the prior approval by the Board of Directors, the Company shall not amend, modify, terminate, waive or otherwise alter, in whole or in part, any stock purchase, stock restriction or option agreement with any existing employee or service provider if such amendment would cause it to be inconsistent with this Subsection 5.3. In addition, unless otherwise approved by the Board of Directors, the Company shall retain (and not waive) a "right of first refusal" on employee transfers until the Company's IPO and shall have the right to repurchase unvested shares at cost upon termination of employment of a holder of restricted stock.

5.4 Matters Requiring Investor Director Approval. So long as the holders of Preferred Stock are entitled to elect a Preferred Director, the Company hereby covenants and agrees with each of the Investors that it shall not, without approval of the Board of Directors, which approval must include a majority of the Preferred Directors, enter into any corporate strategic relationship, license, collaboration or similar transaction or series of related transactions involving the payment, contribution, or assignment by the Company of money or assets greater than $3,000,000 or the issuance of shares of capital stock of the Company representing at the time of the proposed transaction greater than or equal to 3.5% of the issued and outstanding capital stock of the Company.

5.5 Board Matters. Unless otherwise determined by the vote of a majority of the directors then in office, the Board of Directors shall meet at least quarterly in accordance with an agreed-upon schedule. The Company shall reimburse the directors for all reasonable out-of-pocket travel expenses incurred (consistent with the Company's travel policy) in connection with attending meetings of the Board of Directors.

5.6 Successor Indemnification. If the Company or any of its successors or assignees consolidates with or merges into any other Person and is not the continuing or surviving corporation or entity of such consolidation or merger, then to the extent necessary, proper provision shall be made so that the successors and assignees of the Company assume the obligations of the Company with respect to indemnification of members of the Board of Directors as in effect immediately before such transaction, whether such obligations are contained in the Company's Bylaws, the Certificate of Incorporation, or elsewhere, as the case may be.

5.7 Qualified Small Business Stock. The Company shall use commercially reasonable efforts to cause the shares of Series A Preferred Stock and Series A-2 Preferred Stock, as well as any shares into which such shares are converted, within the meaning of Section 1202(f) of the Internal Revenue Code (the "**Code**"), to constitute "qualified small business stock" as defined in Section 1202(c) of the Code; *provided*, *however*, that such requirement shall not be applicable if the Board of Directors of the Company determines, in its good-faith business judgment, that such qualification is inconsistent with the best interests of the Company. The Company shall submit to its stockholders (including the Investors) and to the Internal Revenue Service any reports that may be required under Section 1202(d)(1)(C) of the Code and the regulations promulgated thereunder. In addition, within twenty (20) business days after any Investor's written request therefor, the Company shall, at its option, either (i) deliver to such Investor a written statement indicating whether (and what portion of) such Investor's interest in the Company constitutes "qualified small business stock" as defined in Section 1202(c) of the Code or (ii) deliver to such Investor such factual information in the Company's possession as is reasonably necessary to enable such Investor to determine whether (and what portion of) such Investor's interest in the Company constitutes "qualified small business stock" as defined in Section 1202(c) of the Code.

5.8 Indemnification Matters. The Company hereby acknowledges that one (1) or more of the directors nominated to serve on the Board of Directors by the Investors (each an "**Investor Director**") may have certain rights to indemnification, advancement of expenses and/or insurance provided by one or more of the Investors and certain of their Affiliates (collectively, the "**Investor Indemnitors**"). The Company hereby agrees (a) that it is the indemnitor of first resort (*i.e.*, its obligations to any such Investor Director are primary and any obligation of the Investor Indemnitors to advance expenses or to provide indemnification for the same expenses or liabilities incurred by such Investor Director are secondary), (b) that it shall be required to advance the full amount of expenses incurred by such Investor Director and shall be liable for the full amount of all expenses, judgments, penalties, fines and amounts paid in settlement by or on behalf of any such Investor Director to the extent legally permitted and as required by the Company's Certificate of Incorporation or Bylaws of the Company (or any agreement between the Company and such Investor Director), without regard to any rights such Investor Director may have against the Investor Indemnitors, and, (c) that it irrevocably waives, relinquishes and releases the Investor Indemnitors from any and all claims against the Investor Indemnitors for contribution, subrogation or any other recovery of any kind in respect thereof. The Company further agrees that no advancement or payment by the Investor Indemnitors on behalf of any such Investor Director with respect to any claim for which such Investor Director has sought indemnification from the Company shall affect the foregoing and the Investor Indemnitors shall have a right of contribution and/or be subrogated to the extent of such advancement or payment to all of the rights of recovery of such Investor Director against the Company. The Investor Directors and the Investor Indemnitors are intended third-party beneficiaries of this Subsection 5.8 and shall have the right, power and authority to enforce the provisions of this Subsection 5.8 as though they were a party to this Agreement.

5.9 Right to Conduct Activities. The Company hereby agrees and acknowledges that each of GV, Arch, F-Prime, Biomatics, the Wellington Investors, Rock Springs, Four Pines, Surveyor, Novo, Redmile, RA Capital, Casdin, the Janus Investors and Baker Brothers (together with their respective Affiliates) is a professional investment organization, and as such reviews the business plans and related proprietary information of many enterprises, some of which may compete directly or indirectly with the Company's business (as currently conducted or as currently propose to be conducted). Nothing in this Agreement shall preclude or in any way restrict the Investors from evaluating or purchasing securities, including publicly traded securities, of a particular enterprise, or investing or participating in any particular enterprise whether or not such enterprise has products or services which compete with those of the Company; and the Company hereby agrees that, to the extent permitted under applicable law, each of GV, Arch, F-Prime, Biomatics, the Wellington Investors, Rock Springs, Four Pines, Surveyor, Novo, Redmile, RA Capital, Casdin, the Janus Investors and Baker Brothers (and their respective Affiliates) shall not be liable to the Company for any claim arising out of, or based upon, (i) the investment by any of GV, Arch, F-Prime, Biomatics, the Wellington Investors, Rock Springs, Four Pines, Surveyor, Novo, Redmile, RA Capital, Casdin, the Janus Investors or Baker Brothers or any of their respective Affiliates in any entity competitive with the Company, or (ii) actions taken by any partner, officer, employee or other representative of any of GV, Arch, F-Prime, Biomatics, the Wellington Investors, Rock Springs, Four Pines, Surveyor, Novo, Redmile, RA Capital, Casdin, the Janus Investors or Baker Brothers or any of their respective Affiliates to assist any such competitive company, whether or not such action was taken as a member of the board of directors of such competitive company or otherwise, and whether or not such action has a detrimental effect on the Company; *provided, however*, that the foregoing shall not relieve (x) any of the Investors from liability associated with the unauthorized disclosure of the Company's confidential information obtained pursuant to this Agreement, or (y) any director or officer of the Company from any liability associated with his or her fiduciary duties to the Company.

5.10 Tax Reporting. The Company will comply with any obligation imposed on the Company to make any filing (including any filing on Internal Revenue Service Form 5471) as a result of any interest that the Company holds in a non-U.S. Person or any activities that the Company conducts outside of the United States and shall include in such filing any information necessary to obviate (to the extent possible) any similar obligation to which any stockholder would otherwise be subject with respect to such interest or such activity. The Company shall promptly provide each Investor with a copy of any such filing.

5.11 CFIUS.

(a) The Company shall not provide to any foreign person, as defined in the Defense Production Act of 1950, as amended, including all implementing regulations thereof (the "**DPA**"), ownership, control, or rights that would constitute a "covered transaction" within the meaning of the DPA, unless explicitly approved by the Board of Directors, including the Preferred Directors.

(b) Each Investor other than the Wellington Investors and their Affiliates covenants that it shall not permit any foreign person affiliated with such Investor, whether affiliated as a limited partner or otherwise, to obtain through such Investor any of the following with respect to the Company: (i) control (as defined in 31 C.F.R. § 800.204) of the Company, including the power to determine, direct or decide any important matters for the Company; (ii) access to any material nonpublic technical information (as defined in 31 C.F.R. § 801.208) in the possession of the Company (which shall not include financial information about the Company), including access to any information not already in the public domain that is necessary to design, fabricate, develop, test, produce, or manufacture Company products, including processes, techniques, or methods; (iii) membership or observer rights on the Board of Directors of the Company or the right to nominate or designate an individual to a position on the Board of Directors of the Company; or (iv) any involvement (other than through voting of shares) in substantive decision-making of the Company regarding the use, development, acquisition, or release of any of the Company's critical technologies (as defined in 31 C.F.R. § 801.204), if any.

5.12 Cybersecurity. The Company has (a) identified its sensitive data and information, and restricted access (through physical and electronic controls) to those individuals who have a need to access it and (b) implemented cybersecurity solution(s) ("**Cybersecurity Solutions**") designed to protect its technology and systems (including servers, laptops, desktops, cloud, containers, virtual environments and data centers) and all data contained in such systems. The Company shall use commercially reasonable efforts to ensure that the Cybersecurity Solutions (x) are up-to-date and include industry-standard protections (e.g., antivirus, endpoint detection and response and threat hunting), (y) to the extent determined necessary by the Company or its Board of Directors, are backed by a breach prevention warranty from the vendor certifying the effectiveness of such solutions, and (z) require the vendors to notify the Company of any security incidents posing a risk to the Company's information (regardless of whether information was actually compromised). The Company shall evaluate on a regular basis whether the Cybersecurity

Solutions should be updated to ensure continued effectiveness and industry-standard protections. The Company shall also educate its employees about the proper use and storage of sensitive information, including regular training as determined reasonably necessary by the Company or its Board of Directors.

5.13 Termination of Covenants. The covenants set forth in this Section 5, except for Subsections 5.6, 5.8 and 5.9, shall terminate and be of no further force or effect (a) immediately before the consummation of the IPO, (b) when the Company first becomes subject to the periodic reporting requirements of Section 12(g) or 15(d) of the Exchange Act, or (c) upon a Deemed Liquidation Event, as such term is defined in the Certificate of Incorporation, whichever event occurs first.

6. Miscellaneous.

6.1 Successors and Assigns. The rights under this Agreement may be assigned (but only with all related obligations) by a Holder to a transferee of Registrable Securities that (a) is an Affiliate of a Holder; (b) is a Holder's Immediate Family Member or trust for the benefit of an individual Holder or one or more of such Holder's Immediate Family Members; or (c) after such transfer, holds at least 501,672 shares of Registrable Securities (subject to appropriate adjustment for stock splits, stock dividends, combinations, and other recapitalizations); *provided, however*, that (x) the Company is, within a reasonable time after such transfer, furnished with written notice of the name and address of such transferee and the Registrable Securities with respect to which such rights are being transferred; and (y) such transferee agrees in a written instrument delivered to the Company to be bound by and subject to the terms and conditions of this Agreement, including the provisions of Subsection 2.11. For the purposes of determining the number of shares of Registrable Securities held by a transferee, the holdings of a transferee (i) that is an Affiliate or stockholder of a Holder; (ii) who is a Holder's Immediate Family Member; or (iii) that is a trust for the benefit of an individual Holder or such Holder's Immediate Family Member shall be aggregated together and with those of the transferring Holder; *provided further that* all transferees who would not qualify individually for assignment of rights shall, as a condition to the applicable transfer, establish a single attorney-in-fact for the purpose of exercising any rights, receiving notices, or taking any action under this Agreement. The terms and conditions of this Agreement inure to the benefit of and are binding upon the respective successors and permitted assignees of the parties. Nothing in this Agreement, express or implied, is intended to confer upon any party other than the parties hereto or their respective successors and permitted assignees any rights, remedies, obligations or liabilities under or by reason of this Agreement, except as expressly provided herein.

6.2 Governing Law. This Agreement shall be governed by the internal law of the State of Delaware, without regard to conflict of law principles that would result in the application of any law other than the law of the State of Delaware.

6.3 Counterparts. This Agreement may be executed in two (2) or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. Counterparts may be delivered via facsimile, electronic mail (including pdf or any electronic signature complying with the U.S. federal ESIGN Act of 2000, *e.g.*, www.docusign.com) or other transmission method and any counterpart so delivered shall be deemed to have been duly and validly delivered and be valid and effective for all purposes.

6.4 Titles and Subtitles. The titles and subtitles used in this Agreement are for convenience only and are not to be considered in construing or interpreting this Agreement.

6.5 Notices.

(a) All notices and other communications given or made pursuant to this Agreement shall be in writing and shall be deemed effectively given upon the earlier of actual receipt or (i) personal delivery to the party to be notified; (ii) when sent, if sent by electronic mail or facsimile during the recipient's normal business hours, and if not sent during normal business hours, then on the recipient's next business day; (iii) five (5) days after having been sent by registered or certified mail, return receipt requested, postage prepaid; or (iv) one (1) business day after the business day of deposit with a nationally recognized overnight courier, freight prepaid, specifying next-day delivery, with written verification of receipt. All communications shall be sent to the respective parties at their addresses as set forth on Schedule A hereto, or to the principal office of the Company and to the attention of the Chief Executive Officer, in the case of the Company, or to such email address, facsimile number, or address as subsequently modified by written notice given in accordance with this Subsection 6.5. If notice is given to the Company, a copy (which copy shall not constitute notice) shall also be sent to Wilmer Cutler Pickering Hale and Dorr LLP, 60 State Street, Boston, MA 02109, Attention: Lia Der Marderosian.

(b) Consent to Electronic Notice. Each Investor consents to the delivery of any stockholder notice pursuant to the Delaware General Corporation Law (the "**DGCL**"), as amended or superseded from time to time, by electronic transmission pursuant to Section 232 of the DGCL (or any successor thereto) at the electronic mail address or the facsimile number as on the books of the Company. Each Investor agrees to promptly notify the Company of any change in such stockholder's electronic mail address, and that failure to do so shall not affect the foregoing.

6.6 Amendments and Waivers. Any term of this Agreement may be amended, modified or terminated and the observance of any term of this Agreement may be waived (either generally or in a particular instance, and either retroactively or prospectively) only with the written consent of the Company and the holders of a majority of the Registrable Securities then outstanding; *provided that* the Company may in its sole discretion waive compliance with Subsection 2.12(c) (and the Company's failure to object promptly in writing after notification of a proposed assignment allegedly in violation of Subsection 2.12(c) shall be deemed to be a waiver); and *provided further that* any provision hereof may be waived by any waiving party on such party's own behalf, without the consent of any other party. Notwithstanding the foregoing, (a) this Agreement may not be amended, modified or terminated and the observance of any term hereof may not be waived with respect to any Investor without the written consent of such Investor, unless such amendment, modification, termination, or waiver applies to all Investors in the same fashion (it being agreed that a waiver of the provisions of Section 4 with respect to a particular transaction shall be deemed to apply to all Investors in the same fashion if such waiver does so by its terms, notwithstanding the fact that certain Investors may nonetheless, by agreement with the Company, purchase securities in such transaction), (b) Subsections 3.1 and 3.2, Section 4 and any other

section of this Agreement applicable to the Major Investors (including this clause (b) of this Subsection 6.6) may not be amended, modified, terminated or waived without the written consent of the holders of a majority of the Registrable Securities then outstanding and held by the Major Investors, (c) the respective rights granted to Biometrics and F-Prime in Subsection 3.3 may not be modified or amended without the consent of Biometrics or F-Prime, as applicable, (d) Sections 1.6, 5.9, 5.11(b) and this Subsection 6.6(d) may not be modified, amended or waived in a manner adverse to the Wellington Investors without the written consent of the Wellington Investors, (e) Sections 1.6, 5.9 and this Subsection 6.6(e) may not be modified, amended or waived in a manner adverse to GV without the written consent of GV, (f) Subsections 5.9 and this Subsection 6.6(f) may not be modified, amended or waived in a manner adverse to Surveyor without the written consent of Surveyor, (g) Sections 1.6, 5.9 and this Subsection 6.6(g) may not be modified, amended or waived in a manner adverse to Redmile without the written consent of Redmile, (h) Sections 1.1 (as it pertains to the Janus Investors), 1.6 (as it pertains to the Janus Investors), 1.17, 5.9 (as it pertains to the Janus Investors) and this Subsection 6.6(h) may not be modified, amended or waived without the written consent of the Janus Investors, (i) Sections 1.6, 5.9 and this Subsection 6.6(i) may not be modified, amended or waived in a manner adverse to Rock Springs or Four Pines without the written consent of Rock Springs or Four Pines and (j) Sections 1.6, 5.9 and this Subsection 6.6(j) may not be modified, amended or waived in a manner adverse to Novo without the written consent of Novo. Notwithstanding the foregoing, Schedule A hereto may be amended by the Company from time to time to add transferees of any Registrable Securities in compliance with the terms of this Agreement without the consent of the other parties; and Schedule A hereto may also be amended by the Company after the date of this Agreement without the consent of the other parties to add information regarding any additional Investor who becomes a party to this Agreement in accordance with Subsection 6.9. The Company shall give prompt notice of any amendment, modification or termination hereof or waiver hereunder to any party hereto that did not consent in writing to such amendment, modification, termination, or waiver. Any amendment, modification, termination, or waiver effected in accordance with this Subsection 6.6 shall be binding on all parties hereto, regardless of whether any such party has consented thereto. No waivers of or exceptions to any term, condition, or provision of this Agreement, in any one or more instances, shall be deemed to be or construed as a further or continuing waiver of any such term, condition, or provision.

6.7 Severability. In case any one or more of the provisions contained in this Agreement is for any reason held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality, or unenforceability shall not affect any other provision of this Agreement, and such invalid, illegal, or unenforceable provision shall be reformed and construed so that it will be valid, legal, and enforceable to the maximum extent permitted by law.

6.8 Aggregation of Stock. All shares of Registrable Securities held or acquired by Affiliates shall be aggregated together for the purpose of determining the availability of any rights under this Agreement and such Affiliated persons may apportion such rights as among themselves in any manner they deem appropriate.

6.9 Additional Investors. Notwithstanding anything to the contrary contained herein, if the Company issues additional shares of Series B Preferred Stock after the date hereof, any purchaser of such shares of Series B Preferred Stock may become a party to this Agreement

by executing and delivering an additional counterpart signature page to this Agreement, and thereafter shall be deemed an "Investor" for all purposes hereunder. No action or consent by the Investors shall be required for such joinder to this Agreement by such additional Investor, so long as such additional Investor has agreed in writing to be bound by all of the obligations as an "Investor" hereunder.

6.10 Entire Agreement. This Agreement (including any Schedules hereto) constitutes the full and entire understanding and agreement among the parties with respect to the subject matter hereof, and any other written or oral agreement relating to the subject matter hereof existing between the parties is expressly canceled. Upon the effectiveness of this Agreement, the Prior Agreement shall be deemed amended and restated and superseded and replaced in its entirety by this Agreement, and shall be of no further force or effect.

6.11 Dispute Resolution. The parties (a) hereby irrevocably and unconditionally submit to the jurisdiction of the state courts of Massachusetts and to the jurisdiction of the United States District Court for the District of Massachusetts for the purpose of any suit, action or other proceeding arising out of or based upon this Agreement, (b) agree not to commence any suit, action or other proceeding arising out of or based upon this Agreement except in the state courts of Massachusetts or the United States District Court for the District of Massachusetts, and (c) hereby waive, and agree not to assert, by way of motion, as a defense, or otherwise, in any such suit, action or proceeding, any claim that it is not subject personally to the jurisdiction of the above-named courts, that its property is exempt or immune from attachment or execution, that the suit, action or proceeding is brought in an inconvenient forum, that the venue of the suit, action or proceeding is improper or that this Agreement or the subject matter hereof may not be enforced in or by such court.

WAIVER OF JURY TRIAL: EACH PARTY HEREBY WAIVES ITS RIGHTS TO A JURY TRIAL OF ANY CLAIM OR CAUSE OF ACTION BASED UPON OR ARISING OUT OF THIS AGREEMENT, THE OTHER TRANSACTION DOCUMENTS, THE SECURITIES OR THE SUBJECT MATTER HEREOF OR THEREOF. THE SCOPE OF THIS WAIVER IS INTENDED TO BE ALL-ENCOMPASSING OF ANY AND ALL DISPUTES THAT MAY BE FILED IN ANY COURT AND THAT RELATE TO THE SUBJECT MATTER OF THIS TRANSACTION, INCLUDING, WITHOUT LIMITATION, CONTRACT CLAIMS, TORT CLAIMS (INCLUDING NEGLIGENCE), BREACH OF DUTY CLAIMS, AND ALL OTHER COMMON LAW AND STATUTORY CLAIMS. THIS SECTION HAS BEEN FULLY DISCUSSED BY EACH OF THE PARTIES HERETO AND THESE PROVISIONS WILL NOT BE SUBJECT TO ANY EXCEPTIONS. EACH PARTY HERETO HEREBY FURTHER WARRANTS AND REPRESENTS THAT SUCH PARTY HAS REVIEWED THIS WAIVER WITH ITS LEGAL COUNSEL, AND THAT SUCH PARTY KNOWINGLY AND VOLUNTARILY WAIVES ITS JURY TRIAL RIGHTS FOLLOWING CONSULTATION WITH LEGAL COUNSEL

6.12 Delays or Omissions. No delay or omission to exercise any right, power, or remedy accruing to any party under this Agreement, upon any breach or default of any other party under this Agreement, shall impair any such right, power, or remedy of such nonbreaching or nondefaulting party, nor shall it be construed to be a waiver of or acquiescence to any such breach or default, or to any similar breach or default thereafter occurring, nor shall any waiver of any single breach or default be deemed a waiver of any other breach or default theretofore or thereafter occurring. All remedies, whether under this Agreement or by law or otherwise afforded to any party, shall be cumulative and not alternative.

[Remainder of Page Intentionally Left Blank]

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

VERVE THERAPEUTICS, INC.

By: /s/ Sekar Kathiresan
Sekar Kathiresan
Chief Executive Officer

SIGNATURE PAGE TO SECOND AMENDED AND RESTATED INVESTORS' RIGHTS AGREEMENT

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

GV 2017, L.P.
By: GV 2017 GP, L.P., its General Partner
By: GV 2017 GP, L.L.C., its General Partner

By: /s/ Daphne M. Chang
Name: Daphne M. Chang
Title: Authorized Signatory

GV 2019, L.P.
By: GV 2019 GP, L.P., its General Partner
By: GV 2019 GP, L.L.C., its General Partner

By: /s/ Daphne M. Chang
Name: Daphne M. Chang
Title: Authorized Signatory

Attn: GV Legal Department
1600 Amphitheatre Parkway
Mountain View, CA 94043

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

BEAM THERAPEUTICS, INC.

By: /s/ John Evans
Name: John Evans
Title: Chief Executive Officer
325 Vassar Street
Cambridge, MA 02139
Attn: John Evans

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

BIOMATICS CAPITAL PARTNERS, L.P.

By: Biomatics Capital Management, L.L.C., its General Partner

By: /s/ Julie Sunderland
Name: Julie Sunderland
Title: Managing Member

188 E Blaine St, Suite 126
Seattle, WA 98102
Attn: Leslie Hepner

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

CASDIN PARTNERS MASTER FUND, L.P.

By: Casdin Partners, GP, LLC, its General Partner

By: /s/ Kevin O'Brien
Name: Kevin O'Brien
Title: General Counsel

CASDIN PRIVATE GROWTH EQUITY FUND, L.P.
By: Casdin Partners Private Growth Equity Fund GP, LLC
its General Partner

By: /s/ Kevin O'Brien
Name: Kevin O'Brien
Title: General Counsel

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

WELLINGTON BIOMEDICAL INNOVATION MASTER INVESTORS (CAYMAN) I L.P.

By: Wellington Management Company LLP, as investment adviser

By: /s/ Peter McIsaac
Name: Peter McIsaac
Title: Managing Director and Counsel

c/o Wellington Management Company LLP
Legal and Compliance 280 Congress Street
Boston, MA 02210
Attn: Peter N. McIsaac

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

CORMORANT GLOBAL HEALTHCARE MASTER FUND, LP
By: Cormorant Global Healthcare GP, LLC

By: /s/ Bihua Chen
Name: Bihua Chen
Title: Managing Member

CORMORANT PRIVATE HEALTHCARE FUND III, LP
By: Cormorant Private Healthcare GP III, LLC

By: /s/ Bihua Chen
Name: Bihua Chen
Title: Managing Member

CRMA SVP, L.P.
By: Cormorant Asset Management, LP

By: /s/ Bihua Chen
Name: Bihua Chen
Title: Attorney-in-fact

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

LOGOS OPPORTUNITIES FUND II, L.P.
By: Logos Opportunities GP, LLC, its General Partner

By: /s/ Graham Walmsley
Name: Graham Walmsley
Title: Managing Member

Address: 1 Letterman Drive
Building D, Suite D3-700
San Francisco, CA 94129

By: /s/ Arsani William
Name: Arsani William
Title: Managing Partner

Address: 1 Letterman Drive
Building D, Suite D3-700
San Francisco, CA 94129

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

667, L.P.
By: **BAKER BROS. ADVISORS LP**, management company and investment adviser to **667, L.P.**, pursuant to authority granted to it by Baker Biotech Capital, L.P., general partner to 667, L.P., and not as the general partner.

By: /s/ Scott Lessing
Name: Scott Lessing
Title: President

BAKER BROTHERS LIFE SCIENCES, L.P.
By: **BAKER BROS. ADVISORS LP**, management company and investment adviser to **Baker Brothers Life Sciences, L.P.**, pursuant to authority granted to it by Baker Brothers Life Sciences Capital, L.P., general partner to Baker Brothers Life Sciences, L.P., and not as the general partner.

By: /s/ Scott Lessing
Name: Scott Lessing
Title: President

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

ROCK SPRINGS CAPITAL MASTER FUND LP
By: Rock Springs General Partner LLC, its general partner

By: /s/ Kris Jenner
Name: Kris Jenner
Title: Member

FOUR PINES MASTER FUND LP
By: Four Pines General Partner LLC, its general partner

By: /s/ Kris Jenner
Name: Kris Jenner
Title: Member

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

NOVO HOLDINGS A/S

By: /s/ Scott Beardsley
Name: Scott Beardsley, under specific power of attorney
Title: Managing Partner

Novo Holdings A/S
Tuborg Havnevej 19
DK 2900 Hellerup
Denmark
Attention: Heather Ludvigsen

With a copy (which shall not constitute notice) to:
Novo Ventures (US), Inc.
501 2nd Street, Suite 300
San Francisco, CA 94107
Attention: Junie Lim, General Counsel

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

JANUS HENDERSON GLOBAL LIFE SCIENCES FUND
By: Janus Capital Management LLC, its investment advisor

By: /s/ Andrew Acker
Name: Andrew Acker
Title: Authorized Signatory

JANUS HENDERSON CAPITAL FUNDS PLC ON BEHALF OF ITS SERIES JANUS HENDERSON GLOBAL LIFE SCIENCES FUND
By: Janus Capital Management LLC, its investment advisor

By: /s/ Andrew Acker
Name: Andrew Acker
Title: Authorized Signatory

JANUS HENDERSON HORIZON FUND-BIOTECHNOLOGY FUND
By: Janus Capital Management LLC, its investment advisor

By: /s/ Andrew Acker
Name: Andrew Acker
Title: Authorized Signatory

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

JANUS HENDERSON BIOTECH INNOVATION MASTER FUND LIMITED
By: Janus Capital Management LLC, its investment advisor

By: /s/ Andrew Acker
Name: Andrew Acker
Title: Authorized Signatory

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

RA CAPITAL HEALTHCARE FUND, L.P.
By: RA Capital Healthcare Fund GP, LLC
Its: General Partner

By: /s/ Rajeev Shah
Name: Rajeev Shah
Title: Manager

Address: RA Capital Management, L.P.
200 Berkeley Street 18th Floor
Boston, MA 02116
Attn: General Counsel

RA CAPITAL NEXUS FUND II, L.P.
By: RA Capital Nexus Fund II GP, LLC
Its: General Partner

By: /s/ Rajeev Shah
Name: Rajeev Shah
Title: Manager

Address: RA Capital Management, L.P.
200 Berkeley Street 18th Floor
Boston, MA 02116
Attn: General Counsel

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

REDMILE BIOPHARMA INVESTMENTS II, L.P.
By: Redmile Biopharma Investments II (GP), LLC, its general partner

By: /s/ Joshua Garcia
Name: Joshua Garcia
Title: Authorized Signatory

SIGNATURE PAGE TO SECOND AMENDED AND RESTATED INVESTORS' RIGHTS AGREEMENT

IN WITNESS WHEREOF, the parties have executed this Agreement as of the date first written above.

INVESTORS:

CITADEL MULTI-STRATEGY EQUITIES MASTER FUND LTD.
By: Citadel Advisors LLC, its portfolio manager

By: /s/ Shellane Mulcahy
Name: Shellane Mulcahy
Title: Authorized Signatory

SCHEDULE A

Investors

Name	Address

Exhibit 10.2

ENDCADIA, INC.

2018 EQUITY INCENTIVE PLAN

1. Purposes of the Plan. The purposes of this Plan are:

- to attract and retain the best available personnel for positions of substantial responsibility,
- to provide additional incentive to Employees, Directors and Consultants, and
- to promote the success of the Company's business.

The Plan permits the grant of Incentive Stock Options, Nonstatutory Stock Options, Stock Appreciation Rights, Restricted Stock and Restricted Stock Units.

2. Definitions. As used herein, the following definitions will apply:

(a) "Administrator" means the Board or any of its Committees as will be administering the Plan, in accordance with Section 4 of the Plan.

(b) "Applicable Laws" means the legal and regulatory requirements relating to the administration of equity-based awards, including but not limited to, under U.S. state corporate laws, U.S. federal and state securities laws, the Code, any stock exchange or quotation system on which the Common Stock is listed or quoted and the applicable laws of any foreign country or jurisdiction where Awards are, or will be, granted under the Plan.

(c) "Award" means, individually or collectively, a grant under the Plan of Options, Stock Appreciation Rights, Restricted Stock, or Restricted Stock Units.

(d) "Award Agreement" means the written or electronic agreement setting forth the terms and provisions applicable to each Award granted under the Plan. The Award Agreement is subject to the terms and conditions of the Plan.

(e) "Board" means the Board of Directors of the Company.

(f) "Change in Control" means the occurrence of any of the following events:

(i) Change in Ownership of the Company. A change in the ownership of the Company which occurs on the date that any one person, or more than one person acting as a group ("Person"), acquires ownership of the stock of the Company that, together with the stock held by such Person, constitutes more than fifty percent (50%) of the total voting power of the stock of the Company; provided, however, that for purposes of this subsection, the acquisition of additional stock by any one Person, who is considered to own more than fifty percent (50%) of the total voting power of the stock of the Company will not be considered a Change in Control; provided, further, that any change in the ownership of the stock of the Company as a result of a private financing of the

Company that is approved by the Board also will not be considered a Change in Control. Further, if the stockholders of the Company immediately before such change in ownership continue to retain immediately after the change in ownership, in substantially the same proportions as their ownership of shares of the Company's voting stock immediately prior to the change in ownership, direct or indirect beneficial ownership of fifty percent (50%) or more of the total voting power of the stock of the Company or of the ultimate parent entity of the Company, such event shall not be considered a Change in Control under this subsection (i). For this purpose, indirect beneficial ownership shall include, without limitation, an interest resulting from ownership of the voting securities of one or more corporations or other business entities which own the Company, as the case may be, either directly or through one or more subsidiary corporations or other business entities; or

(ii) Change in Effective Control of the Company. If the Company has a class of securities registered pursuant to Section 12 of the Exchange Act, a change in the effective control of the Company which occurs on the date that a majority of members of the Board is replaced during any twelve (12) month period by Directors whose appointment or election is not endorsed by a majority of the members of the Board prior to the date of the appointment or election. For purposes of this subsection (ii), if any Person is considered to be in effective control of the Company, the acquisition of additional control of the Company by the same Person will not be considered a Change in Control; or

(iii) Change in Ownership of a Substantial Portion of the Company's Assets. A change in the ownership of a substantial portion of the Company's assets which occurs on the date that any Person acquires (or has acquired during the twelve (12) month period ending on the date of the most recent acquisition by such person or persons) assets from the Company that have a total gross fair market value equal to or more than fifty percent (50%) of the total gross fair market value of all of the assets of the Company immediately prior to such acquisition or acquisitions; provided, however, that for purposes of this subsection (iii), the following will not constitute a change in the ownership of a substantial portion of the Company's assets: (A) a transfer to an entity that is controlled by the Company's stockholders immediately after the transfer, or (B) a transfer of assets by the Company to: (1) a stockholder of the Company (immediately before the asset transfer) in exchange for or with respect to the Company's stock, (2) an entity, fifty percent (50%) or more of the total value or voting power of which is owned, directly or indirectly, by the Company, (3) a Person, that owns, directly or indirectly, fifty percent (50%) or more of the total value or voting power of all the outstanding stock of the Company, or (4) an entity, at least fifty percent (50%) of the total value or voting power of which is owned, directly or indirectly, by a Person described in this subsection (iii)(B)(3). For purposes of this subsection (iii), gross fair market value means the value of the assets of the Company, or the value of the assets being disposed of, determined without regard to any liabilities associated with such assets.

For purposes of this Section 2(f), persons will be considered to be acting as a group if they are owners of a corporation that enters into a merger, consolidation, purchase or acquisition of stock, or similar business transaction with the Company.

Notwithstanding the foregoing, a transaction will not be deemed a Change in Control unless the transaction qualifies as a change in control event within the meaning of Code Section 409A, as it has been and may be amended from time to time, and any proposed or final Treasury Regulations and Internal Revenue Service guidance that has been promulgated or may be promulgated thereunder from time to time.

Further and for the avoidance of doubt, a transaction will not constitute a Change in Control if: (i) its sole purpose is to change the jurisdiction of the Company's incorporation, or (ii) its sole purpose is to create a holding company that will be owned in substantially the same proportions by the persons who held the Company's securities immediately before such transaction.

(g) "Code" means the Internal Revenue Code of 1986, as amended. Reference to a specific section of the Code or regulation thereunder shall include such section or regulation, any valid regulation promulgated under such section, and any comparable provision of any future legislation or regulation amending, supplementing or superseding such section or regulation.

(h) "Committee" means a committee of Directors or of other individuals satisfying Applicable Laws appointed by the Board, or by a duly authorized compensation committee of the Board, in accordance with Section 4 hereof.

(i) "Common Stock" means the common stock of the Company.

(j) "Company" means Endcadia, Inc., a Delaware corporation, or any successor thereto.

(k) "Consultant" means any natural person, including an advisor, engaged by the Company or a Parent or Subsidiary to render bona fide services to such entity, provided the services (i) are not in connection with the offer or sale of securities in a capital-raising transaction, and (ii) do not directly promote or maintain a market for the Company's securities, in each case, within the meaning of Form S-8 promulgated under the Securities Act, and provided further, that a Consultant will include only those persons to whom the issuance of Shares may be registered under Form S-8 promulgated under the Securities Act.

(l) "Director" means a member of the Board.

(m) "Disability" means total and permanent disability as defined in Code Section 22(e)(3), provided that in the case of Awards other than Incentive Stock Options, the Administrator in its discretion may determine whether a permanent and total disability exists in accordance with uniform and non-discriminatory standards adopted by the Administrator from time to time.

(n) "Employee" means any person, including officers and Directors, employed by the Company or any Parent or Subsidiary of the Company. Neither service as a Director nor payment of a director's fee by the Company will be sufficient to constitute "employment" by the Company.

(o) "Exchange Act" means the Securities Exchange Act of 1934, as amended.

(p) "Exchange Program" means a program under which (i) outstanding Awards are surrendered or cancelled in exchange for Awards of the same type (which may have higher or lower exercise prices and different terms), Awards of a different type, and/or cash, (ii) Participants would have the opportunity to transfer any outstanding Awards to a financial institution or other person or entity selected by the Administrator, and/or (iii) the exercise price of an outstanding Award is reduced or increased. The Administrator will determine the terms and conditions of any Exchange Program in its sole discretion.

(q) "Fair Market Value" means, as of any date, the value of Common Stock determined as follows:

(i) If the Common Stock is listed on any established stock exchange or a national market system, including without limitation the Nasdaq Global Select Market, the Nasdaq Global Market or the Nasdaq Capital Market of The Nasdaq Stock Market, its Fair Market Value will be the closing sales price for such stock (or the closing bid, if no sales were reported) as quoted on such exchange or system on the day of determination, as reported in *The Wall Street Journal* or such other source as the Administrator deems reliable;

(ii) If the Common Stock is regularly quoted by a recognized securities dealer but selling prices are not reported, the Fair Market Value of a Share will be the mean between the high bid and low asked prices for the Common Stock on the day of determination (or, if no bids and asks were reported on that date, as applicable, on the last trading date such bids and asks were reported), as reported in *The Wall Street Journal* or such other source as the Administrator deems reliable; or

(iii) In the absence of an established market for the Common Stock, the Fair Market Value will be determined in good faith by the Administrator.

(r) "Incentive Stock Option" means an Option that by its terms qualifies and is otherwise intended to qualify as an incentive stock option within the meaning of Code Section 422 and the regulations promulgated thereunder.

(s) "Nonstatutory Stock Option" means an Option that by its terms does not qualify or is not intended to qualify as an Incentive Stock Option.

(t) "Option" means a stock option granted pursuant to the Plan.

(u) "Parent" means a "parent corporation," whether now or hereafter existing, as defined in Code Section 424(e).

(v) "Participant" means the holder of an outstanding Award.

(w) "Period of Restriction" means the period during which the transfer of Shares of Restricted Stock are subject to restrictions and therefore, the Shares are subject to a substantial risk of forfeiture. Such restrictions may be based on the passage of time, the achievement of target levels of performance, or the occurrence of other events as determined by the Administrator.

(x) "Plan" means this 2018 Equity Incentive Plan.

(y) "Restricted Stock" means Shares issued pursuant to an Award of Restricted Stock under Section 8 of the Plan, or issued pursuant to the early exercise of an Option.

(z) "Restricted Stock Unit" means a bookkeeping entry representing an amount equal to the Fair Market Value of one Share, granted pursuant to Section 9. Each Restricted Stock Unit represents an unfunded and unsecured obligation of the Company.

(aa) "Securities Act" means the Securities Act of 1933, as amended.

(bb) "Service Provider" means an Employee, Director or Consultant.

(cc) "Share" means a share of the Common Stock, as adjusted in accordance with Section 13 of the Plan.

(dd) "Stock Appreciation Right" means an Award, granted alone or in connection with an Option, that pursuant to Section 7 is designated as a Stock Appreciation Right.

(ee) "Subsidiary" means a "subsidiary corporation," whether now or hereafter existing, as defined in Code Section 424(f).

3. Stock Subject to the Plan.

(a) Stock Subject to the Plan. Subject to the provisions of Section 13 of the Plan, the maximum aggregate number of Shares that may be subject to Awards and sold under the Plan is 28,447,003 Shares. The Shares may be authorized but unissued, or reacquired Common Stock.

(b) Lapsed Awards. If an Award expires or becomes unexercisable without having been exercised in full, is surrendered pursuant to an Exchange Program, or, with respect to Restricted Stock or Restricted Stock Units, is forfeited to or repurchased by the Company due to the failure to vest, the unpurchased Shares (or for Awards other than Options or Stock Appreciation Rights the forfeited or repurchased Shares) which were subject thereto will become available for future grant or sale under the Plan (unless the Plan has terminated). With respect to Stock Appreciation Rights, only Shares actually issued pursuant to a Stock Appreciation Right will cease to be available under the Plan; all remaining Shares under Stock Appreciation Rights will remain available for future grant or sale under the Plan (unless the Plan has terminated). Shares that have actually been issued under the Plan under any Award will not be returned to the Plan and will not become available for future distribution under the Plan; provided, however, that if Shares issued pursuant to Awards of Restricted Stock or Restricted Stock Units are repurchased by the Company or are forfeited to the Company due to the failure to vest, such Shares will become available for future grant under the Plan. Shares used to pay the exercise price of an Award or to satisfy the tax withholding obligations related to an Award will become available for future grant or sale under the Plan. To the extent an Award under the Plan is paid out in cash rather than Shares, such cash payment will not result in reducing the number of Shares available for issuance under the Plan. Notwithstanding the foregoing and, subject to adjustment as provided in Section 13, the maximum number of Shares that may be issued upon the exercise of Incentive Stock Options will equal the aggregate Share number stated in Section 3(a), plus, to the extent allowable under Code Section 422 and the Treasury Regulations promulgated thereunder, any Shares that become available for issuance under the Plan pursuant to Section 3(b).

(c) Share Reserve. The Company, during the term of this Plan, will at all times reserve and keep available such number of Shares as will be sufficient to satisfy the requirements of the Plan.

4. Administration of the Plan.

(a) Procedure.

(i) Multiple Administrative Bodies. Different Committees with respect to different groups of Service Providers may administer the Plan.

(ii) Other Administration. Other than as provided above, the Plan will be administered by (A) the Board or (B) a Committee, which Committee will be constituted to satisfy Applicable Laws.

(b) Powers of the Administrator. Subject to the provisions of the Plan, and in the case of a Committee, subject to the specific duties delegated by the Board to such Committee, the Administrator will have the authority, in its discretion:

(i) to determine the Fair Market Value;

(ii) to select the Service Providers to whom Awards may be granted hereunder;

(iii) to determine the number of Shares to be covered by each Award granted hereunder;

(iv) to approve forms of Award Agreements for use under the Plan;

(v) to determine the terms and conditions, not inconsistent with the terms of the Plan, of any Award granted hereunder. Such terms and conditions include, but are not limited to, the exercise price, the time or times when Awards may be exercised (which may be based on performance criteria), any vesting acceleration or waiver of forfeiture restrictions, and any restriction or limitation regarding any Award or the Shares relating thereto, based in each case on such factors as the Administrator will determine;

(vi) to institute and determine the terms and conditions of an Exchange Program;

(vii) to construe and interpret the terms of the Plan and Awards granted pursuant to the Plan;

(viii) to prescribe, amend and rescind rules and regulations relating to the Plan, including rules and regulations relating to sub-plans established for the purpose of satisfying applicable foreign laws or for qualifying for favorable tax treatment under applicable foreign laws;

(ix) to modify or amend each Award (subject to Section 18(c) of the Plan), including but not limited to the discretionary authority to extend the post-termination exercisability period of Awards and to extend the maximum term of an Option (subject to Section 6(d));

(x) to allow Participants to satisfy withholding tax obligations in a manner prescribed in Section 14;

(xi) to authorize any person to execute on behalf of the Company any instrument required to effect the grant of an Award previously granted by the Administrator;

(xii) to allow a Participant to defer the receipt of the payment of cash or the delivery of Shares that otherwise would be due to such Participant under an Award; and

(xiii) to make all other determinations deemed necessary or advisable for administering the Plan.

(c) Effect of Administrator's Decision. The Administrator's decisions, determinations and interpretations will be final and binding on all Participants and any other holders of Awards.

5. Eligibility. Nonstatutory Stock Options, Stock Appreciation Rights, Restricted Stock, and Restricted Stock Units may be granted to Service Providers. Incentive Stock Options may be granted only to Employees.

6. Stock Options.

(a) Grant of Options. Subject to the terms and provisions of the Plan, the Administrator, at any time and from time to time, may grant Options in such amounts as the Administrator, in its sole discretion, will determine.

(b) Option Agreement. Each Award of an Option will be evidenced by an Award Agreement that will specify the exercise price, the term of the Option, the number of Shares subject to the Option, the exercise restrictions, if any, applicable to the Option, and such other terms and conditions as the Administrator, in its sole discretion, will determine.

(c) Limitations. Each Option will be designated in the Award Agreement as either an Incentive Stock Option or a Nonstatutory Stock Option. Notwithstanding such designation, however, to the extent that the aggregate Fair Market Value of the Shares with respect to which Incentive Stock Options are exercisable for the first time by the Participant during any calendar year (under all plans of the Company and any Parent or Subsidiary) exceeds one hundred thousand dollars ($100,000), such Options will be treated as Nonstatutory Stock Options. For purposes of this Section 6(c), Incentive Stock Options will be taken into account in the order in which they were granted, the Fair Market Value of the Shares will be determined as of the time the Option with respect to such Shares is granted, and calculation will be performed in accordance with Code Section 422 and Treasury Regulations promulgated thereunder.

(d) Term of Option. The term of each Option will be stated in the Award Agreement; provided, however, that the term will be no more than ten (10) years from the date of grant thereof. In the case of an Incentive Stock Option granted to a Participant who, at the time the Incentive Stock Option is granted, owns stock representing more than ten percent (10%) of the total combined voting power of all classes of stock of the Company or any Parent or Subsidiary, the term of the Incentive Stock Option will be five (5) years from the date of grant or such shorter term as may be provided in the Award Agreement.

(e) Option Exercise Price and Consideration.

(i) Exercise Price. The per Share exercise price for the Shares to be issued pursuant to the exercise of an Option will be determined by the Administrator, but will be no less than one hundred percent (100%) of the Fair Market Value per Share on the date of grant. In addition, in the case of an Incentive Stock Option granted to an Employee who owns stock representing more than ten percent (10%) of the voting power of all classes of stock of the Company or any Parent or Subsidiary, the per Share exercise price will be no less than one hundred ten percent (110%) of the Fair Market Value per Share on the date of grant. Notwithstanding the foregoing provisions of this Section 6(e)(i), Options may be granted with a per Share exercise price of less than one hundred percent (100%) of the Fair Market Value per Share on the date of grant pursuant to a transaction described in, and in a manner consistent with, Code Section 424(a).

(ii) Waiting Period and Exercise Dates. At the time an Option is granted, the Administrator will fix the period within which the Option may be exercised and will determine any conditions that must be satisfied before the Option may be exercised.

(iii) Form of Consideration. The Administrator will determine the acceptable form of consideration for exercising an Option, including the method of payment. In the case of an Incentive Stock Option, the Administrator will determine the acceptable form of consideration at the time of grant. Such consideration may consist entirely of: (1) cash; (2) check; (3) promissory note, to the extent permitted by Applicable Laws, (4) other Shares, provided that such Shares have a Fair Market Value on the date of surrender equal to the aggregate exercise price of the Shares as to which such Option will be exercised and provided further that accepting such Shares will not result in any adverse accounting consequences to the Company, as the Administrator determines in its sole discretion; (5) consideration received by the Company under cashless exercise program (whether through a broker or otherwise) implemented by the Company in connection with the Plan; (6) by net exercise, (7) such other consideration and method of payment for the issuance of Shares to the extent permitted by Applicable Laws, or (8) any combination of the foregoing methods of payment. In making its determination as to the type of consideration to accept, the Administrator will consider if acceptance of such consideration may be reasonably expected to benefit the Company.

(f) Exercise of Option.

(i) Procedure for Exercise; Rights as a Stockholder. Any Option granted hereunder will be exercisable according to the terms of the Plan and at such times and under such conditions as determined by the Administrator and set forth in the Award Agreement. An Option may not be exercised for a fraction of a Share.

An Option will be deemed exercised when the Company receives: (i) notice of exercise (in such form as the Administrator may specify from time to time) from the person entitled to exercise the Option, and (ii) full payment for the Shares with respect to which the Option is exercised (together with applicable tax withholding). Full payment may consist of any consideration and method of payment authorized by the Administrator and permitted by the Award Agreement and the Plan. Shares issued upon exercise of an Option will be issued in the name of the Participant or, if requested by the Participant, in the name of the Participant and his or her spouse. Until the Shares are issued (as evidenced by the appropriate entry on the books of the Company or of a duly authorized transfer agent of the Company), no right to vote or receive dividends or any other rights as a stockholder will exist with respect to the Shares subject to an Option, notwithstanding the exercise of the Option. The Company will issue (or cause to be issued) such Shares promptly after the Option is exercised. No adjustment will be made for a dividend or other right for which the record date is prior to the date the Shares are issued, except as provided in Section 13 of the Plan.

Exercising an Option in any manner will decrease the number of Shares thereafter available, both for purposes of the Plan and for sale under the Option, by the number of Shares as to which the Option is exercised.

(ii) Termination of Relationship as a Service Provider. If a Participant ceases to be a Service Provider, other than upon the Participant's termination as the result of the Participant's death or Disability, the Participant may exercise his or her Option within thirty (30) days of termination, or such longer period of time as is specified in the Award Agreement (but in no event later than the expiration of the term of such Option as set forth in the Award Agreement) to the extent that the Option is vested on the date of termination. Unless otherwise provided by the Administrator, if on the date of termination the Participant is not vested as to his or her entire Option, the Shares covered by the unvested portion of the Option will revert to the Plan. If after termination the Participant does not exercise his or her Option within the time specified by the Administrator, the Option will terminate, and the Shares covered by such Option will revert to the Plan.

(iii) Disability of Participant. If a Participant ceases to be a Service Provider as a result of the Participant's Disability, the Participant may exercise his or her Option within six (6) months of termination, or such longer period of time as is specified in the Award Agreement (but in no event later than the expiration of the term of such Option as set forth in the Award Agreement) to the extent the Option is vested on the date of termination. Unless otherwise provided by the Administrator, if on the date of termination the Participant is not vested as to his or her entire Option, the Shares covered by the unvested portion of the Option will revert to the Plan. If after termination the Participant does not exercise his or her Option within the time specified herein, the Option will terminate, and the Shares covered by such Option will revert to the Plan.

(iv) Death of Participant. If a Participant dies while a Service Provider, the Option may be exercised within six (6) months following the Participant's death, or within such longer period of time as is specified in the Award Agreement (but in no event later than the expiration of the term of such Option as set forth in the Award Agreement) to the extent that the Option is vested on the date of death, by the Participant's designated beneficiary, provided such beneficiary has been designated prior to the Participant's death in a form acceptable to the Administrator. If no such beneficiary has been designated by the Participant, then such Option may

be exercised by the personal representative of the Participant's estate or by the person(s) to whom the Option is transferred pursuant to the Participant's will or in accordance with the laws of descent and distribution. Unless otherwise provided by the Administrator, if at the time of death Participant is not vested as to his or her entire Option, the Shares covered by the unvested portion of the Option will immediately revert to the Plan. If the Option is not so exercised within the time specified herein, the Option will terminate, and the Shares covered by such Option will revert to the Plan.

7. Stock Appreciation Rights.

(a) Grant of Stock Appreciation Rights. Subject to the terms and conditions of the Plan, a Stock Appreciation Right may be granted to Service Providers at any time and from time to time as will be determined by the Administrator, in its sole discretion.

(b) Number of Shares. The Administrator will have complete discretion to determine the number of Shares subject to any Award of Stock Appreciation Rights.

(c) Exercise Price and Other Terms. The per Share exercise price for the Shares that will determine the amount of the payment to be received upon exercise of a Stock Appreciation Right as set forth in Section 7(f) will be determined by the Administrator and will be no less than one hundred percent (100%) of the Fair Market Value per Share on the date of grant. Otherwise, the Administrator, subject to the provisions of the Plan, will have complete discretion to determine the terms and conditions of Stock Appreciation Rights granted under the Plan.

(d) Stock Appreciation Right Agreement. Each Stock Appreciation Right grant will be evidenced by an Award Agreement that will specify the exercise price, the term of the Stock Appreciation Right, the conditions of exercise, and such other terms and conditions as the Administrator, in its sole discretion, will determine.

(e) Expiration of Stock Appreciation Rights. A Stock Appreciation Right granted under the Plan will expire upon the date determined by the Administrator, in its sole discretion, and set forth in the Award Agreement. Notwithstanding the foregoing, the rules of Section 6(d) relating to the maximum term and Section 6(f) relating to exercise also will apply to Stock Appreciation Rights.

(f) Payment of Stock Appreciation Right Amount. Upon exercise of a Stock Appreciation Right, a Participant will be entitled to receive payment from the Company in an amount determined by multiplying:

(i) The difference between the Fair Market Value of a Share on the date of exercise over the exercise price; times

(ii) The number of Shares with respect to which the Stock Appreciation Right is exercised.

At the discretion of the Administrator, the payment upon Stock Appreciation Right exercise may be in cash, in Shares of equivalent value, or in some combination thereof.

8. Restricted Stock.

(a) Grant of Restricted Stock. Subject to the terms and provisions of the Plan, the Administrator, at any time and from time to time, may grant Shares of Restricted Stock to Service Providers in such amounts as the Administrator, in its sole discretion, will determine.

(b) Restricted Stock Agreement. Each Award of Restricted Stock will be evidenced by an Award Agreement that will specify the Period of Restriction, the number of Shares granted, and such other terms and conditions as the Administrator, in its sole discretion, will determine. Unless the Administrator determines otherwise, the Company as escrow agent will hold Shares of Restricted Stock until the restrictions on such Shares have lapsed.

(c) Transferability. Except as provided in this Section 8 or as the Administrator determines, Shares of Restricted Stock may not be sold, transferred, pledged, assigned, or otherwise alienated or hypothecated until the end of the applicable Period of Restriction.

(d) Other Restrictions. The Administrator, in its sole discretion, may impose such other restrictions on Shares of Restricted Stock as it may deem advisable or appropriate.

(e) Removal of Restrictions. Except as otherwise provided in this Section 8, Shares of Restricted Stock covered by each Restricted Stock grant made under the Plan will be released from escrow as soon as practicable after the last day of the Period of Restriction or at such other time as the Administrator may determine. The Administrator, in its discretion, may accelerate the time at which any restrictions will lapse or be removed.

(f) Voting Rights. During the Period of Restriction, Service Providers holding Shares of Restricted Stock granted hereunder may exercise full voting rights with respect to those Shares, unless the Administrator determines otherwise.

(g) Dividends and Other Distributions. During the Period of Restriction, Service Providers holding Shares of Restricted Stock will be entitled to receive all dividends and other distributions paid with respect to such Shares, unless the Administrator provides otherwise. If any such dividends or distributions are paid in Shares, the Shares will be subject to the same restrictions on transferability and forfeitability as the Shares of Restricted Stock with respect to which they were paid.

(h) Return of Restricted Stock to Company. On the date set forth in the Award Agreement, the Restricted Stock for which restrictions have not lapsed will revert to the Company and again will become available for grant under the Plan.

9. Restricted Stock Units.

(a) Grant. Restricted Stock Units may be granted at any time and from time to time as determined by the Administrator. After the Administrator determines that it will grant Restricted Stock Units, it will advise the Participant in an Award Agreement of the terms, conditions, and restrictions related to the grant, including the number of Restricted Stock Units.

(b) Vesting Criteria and Other Terms. The Administrator will set vesting criteria in its discretion, which, depending on the extent to which the criteria are met, will determine the number of Restricted Stock Units that will be paid out to the Participant. The Administrator may set vesting criteria based upon the achievement of Company-wide, business unit, or individual goals (including, but not limited to, continued employment or service), or any other basis determined by the Administrator in its discretion.

(c) Earning Restricted Stock Units. Upon meeting the applicable vesting criteria, the Participant will be entitled to receive a payout as determined by the Administrator. Notwithstanding the foregoing, at any time after the grant of Restricted Stock Units, the Administrator, in its sole discretion, may reduce or waive any vesting criteria that must be met to receive a payout.

(d) Form and Timing of Payment. Payment of earned Restricted Stock Units will be made as soon as practicable after the date(s) determined by the Administrator and set forth in the Award Agreement. The Administrator, in its sole discretion, may settle earned Restricted Stock Units in cash, Shares, or a combination of both.

(e) Cancellation. On the date set forth in the Award Agreement, all unearned Restricted Stock Units will be forfeited to the Company.

10. Compliance With Code Section 409A. Awards will be designed and operated in such a manner that they are either exempt from the application of, or comply with, the requirements of Code Section 409A such that the grant, payment, settlement or deferral will not be subject to the additional tax or interest applicable under Code Section 409A, except as otherwise determined in the sole discretion of the Administrator. The Plan and each Award Agreement under the Plan is intended to meet the requirements of Code Section 409A and will be construed and interpreted in accordance with such intent, except as otherwise determined in the sole discretion of the Administrator. To the extent that an Award or payment, or the settlement or deferral thereof, is subject to Code Section 409A the Award will be granted, paid, settled or deferred in a manner that will meet the requirements of Code Section 409A, such that the grant, payment, settlement or deferral will not be subject to the additional tax or interest applicable under Code Section 409A. In no event will the Company have any obligation under the terms of this Plan to reimburse a Participant for any taxes or other costs that may be imposed on Participant as a result of Section 409A.

11. Leaves of Absence/Transfer Between Locations. Unless the Administrator provides otherwise, vesting of Awards granted hereunder will be suspended during any unpaid leave of absence. A Participant will not cease to be an Employee in the case of (i) any leave of absence approved by the Company or (ii) transfers between locations of the Company or between the Company, its Parent, or any Subsidiary. For purposes of Incentive Stock Options, no such leave may exceed three (3) months, unless reemployment upon expiration of such leave is guaranteed by statute or contract. If reemployment upon expiration of a leave of absence approved by the Company is not so guaranteed, then six (6) months following the first (1st) day of such leave, any Incentive Stock Option held by the Participant will cease to be treated as an Incentive Stock Option and will be treated for tax purposes as a Nonstatutory Stock Option.

12. Limited Transferability of Awards.

(a) Unless determined otherwise by the Administrator, Awards may not be sold, pledged, assigned, hypothecated, or otherwise transferred in any manner other than by will or by the laws of descent and distribution, and may be exercised, during the lifetime of the Participant, only by the Participant. If the Administrator makes an Award transferable, such Award may only be transferred (i) by will, (ii) by the laws of descent and distribution, or (iii) as permitted by Rule 701 of the Securities Act.

(b) Further, until the Company becomes subject to the reporting requirements of Section 13 or 15(d) of the Exchange Act, or after the Administrator determines that it is, will, or may no longer be relying upon the exemption from registration under the Exchange Act as set forth in Rule 12h-1(f) promulgated under the Exchange Act (the "Rule 12h 1(f) Exemption"), an Option, or prior to exercise, the Shares subject to the Option, may not be pledged, hypothecated or otherwise transferred or disposed of, in any manner, including by entering into any short position, any "put equivalent position" or any "call equivalent position" (as defined in Rule 16a-1(h) and Rule 16a-1(b) of the Exchange Act, respectively), other than to (i) persons who are "family members" (as defined in Rule 701(c)(3) of the Securities Act) through gifts or domestic relations orders, or (ii) to an executor or guardian of the Participant upon the death or disability of the Participant, in each case, to the extent required for continued reliance on the Rule 12h 1(f) Exemption. Notwithstanding the foregoing sentence, the Administrator, in its sole discretion, may determine to permit transfers to the Company or in connection with a Change in Control or other acquisition transactions involving the Company to the extent permitted by Rule 12h-1(f), or, if the Company is not relying on the Rule 12h 1(f) Exemption, to the extent permitted by the Plan.

13. Adjustments; Dissolution or Liquidation; Merger or Change in Control.

(a) Adjustments. In the event that any dividend or other distribution (whether in the form of cash, Shares, other securities, or other property), recapitalization, stock split, reverse stock split, reorganization, merger, consolidation, split-up, spin-off, combination, repurchase, or exchange of Shares or other securities of the Company, or other change in the corporate structure of the Company affecting the Shares occurs, the Administrator, in order to prevent diminution or enlargement of the benefits or potential benefits intended to be made available under the Plan, will adjust the number and class of shares of stock that may be delivered under the Plan and/or the number, class, and price of shares of stock covered by each outstanding Award; provided, however, that the Administrator will make such adjustments to an Award required by Section 25102(o) of the California Corporations Code to the extent the Company is relying upon the exemption afforded thereby with respect to the Award.

(b) Dissolution or Liquidation. In the event of the proposed dissolution or liquidation of the Company, the Administrator will notify each Participant as soon as practicable prior to the effective date of such proposed transaction. To the extent it has not been previously exercised, an Award will terminate immediately prior to the consummation of such proposed action.

(c) Merger or Change in Control. In the event of a merger of the Company with or into another corporation or other entity or a Change in Control, each outstanding Award will be treated as the Administrator determines (subject to the provisions of the following paragraph) without a Participant's consent, including, without limitation, that (i) Awards will be assumed, or substantially equivalent Awards will be substituted, by the acquiring or succeeding corporation (or an affiliate thereof) with appropriate adjustments as to the number and kind of shares and prices; (ii) upon written notice to a Participant, that the Participant's Awards will terminate upon or immediately prior to the consummation of such merger or Change in Control; (iii) outstanding Awards will vest and become exercisable, realizable, or payable, or restrictions applicable to an Award will lapse, in whole or in part prior to or upon consummation of such merger or Change in Control, and, to the extent the Administrator determines, terminate upon or immediately prior to the effectiveness of such merger or Change in Control; (iv) (A) the termination of an Award in exchange for an amount of cash and/or property, if any, equal to the amount that would have been attained upon the exercise of such Award or realization of the Participant's rights as of the date of the occurrence of the transaction (and, for the avoidance of doubt, if as of the date of the occurrence of the transaction the Administrator determines in good faith that no amount would have been attained upon the exercise of such Award or realization of the Participant's rights, then such Award may be terminated by the Company without payment), or (B) the replacement of such Award with other rights or property selected by the Administrator in its sole discretion; or (v) any combination of the foregoing. In taking any of the actions permitted under this subsection 13(c), the Administrator will not be obligated to treat all Awards, all Awards held by a Participant, or all Awards of the same type, similarly.

Notwithstanding anything in this Section 13(c) to the contrary, if a payment under an Award Agreement is subject to Code Section 409A and if the change in control definition contained in the Award Agreement does not comply with the definition of "change of control" for purposes of a distribution under Code Section 409A, then any payment of an amount that is otherwise accelerated under this Section will be delayed until the earliest time that such payment would be permissible under Code Section 409A without triggering any penalties applicable under Code Section 409A.

14. Tax Withholding.

(a) Withholding Requirements. Prior to the delivery of any Shares or cash pursuant to an Award (or exercise thereof), the Company will have the power and the right to deduct or withhold, or require a Participant to remit to the Company, an amount sufficient to satisfy federal, state, local, foreign or other taxes (including the Participant's FICA obligation) required to be withheld with respect to such Award (or exercise thereof).

(b) Withholding Arrangements. The Administrator, in its sole discretion and pursuant to such procedures as it may specify from time to time, may permit a Participant to satisfy such tax withholding obligation, in whole or in part by such methods as the Administrator shall determine, including, without limitation, (i) paying cash, (ii) electing to have the Company withhold otherwise deliverable Shares having a fair market value equal to the minimum statutory amount required to be withheld or such greater amount as the Administrator may determine if such amount would not have adverse accounting consequences, as the Administrator determines in its sole discretion, (iii) delivering to the Company already-owned Shares having a fair market value equal to the statutory amount required to be withheld or such greater amount as the Administrator may determine, in each case, provided the delivery of such Shares will not result in any adverse accounting consequences, as the Administrator determines in its sole discretion, (iv) selling a

sufficient number of Shares otherwise deliverable to the Participant through such means as the Administrator may determine in its sole discretion (whether through a broker or otherwise) equal to the amount required to be withheld, or (v) any combination of the foregoing methods of payment. The amount of the withholding requirement will be deemed to include any amount which the Administrator agrees may be withheld at the time the election is made, not to exceed the amount determined by using the maximum federal, state or local marginal income tax rates applicable to the Participant with respect to the Award on the date that the amount of tax to be withheld is to be determined. The fair market value of the Shares to be withheld or delivered will be determined as of the date that the taxes are required to be withheld.

15. No Effect on Employment or Service. Neither the Plan nor any Award will confer upon a Participant any right with respect to continuing the Participant's relationship as a Service Provider with the Company or its Subsidiaries or Parents, as applicable, nor will they interfere in any way with the Participant's right or the right of the Company and its Subsidiaries or Parents, as applicable to terminate such relationship at any time, with or without cause, to the extent permitted by Applicable Laws.

16. Date of Grant. The date of grant of an Award will be, for all purposes, the date on which the Administrator makes the determination granting such Award, or such other later date as is determined by the Administrator. Notice of the determination will be provided to each Participant within a reasonable time after the date of such grant.

17. Term of Plan. Subject to Section 21 of the Plan, the Plan will become effective upon its adoption by the Board. Unless sooner terminated under Section 18, it will continue in effect for a term of ten (10) years from the later of (a) the effective date of the Plan, or (b) the earlier of the most recent Board or stockholder approval of an increase in the number of Shares reserved for issuance under the Plan.

18. Amendment and Termination of the Plan.

(a) Amendment and Termination. The Board may at any time amend, alter, suspend or terminate the Plan.

(b) Stockholder Approval. The Company will obtain stockholder approval of any Plan amendment to the extent necessary and desirable to comply with Applicable Laws.

(c) Effect of Amendment or Termination. No amendment, alteration, suspension or termination of the Plan will impair the rights of any Participant, unless mutually agreed otherwise between the Participant and the Administrator, which agreement must be in writing and signed by the Participant and the Company. Termination of the Plan will not affect the Administrator's ability to exercise the powers granted to it hereunder with respect to Awards granted under the Plan prior to the date of such termination.

19. Conditions Upon Issuance of Shares.

(a) Legal Compliance. Shares will not be issued pursuant to the exercise of an Award unless the exercise of such Award and the issuance and delivery of such Shares will comply with Applicable Laws and will be further subject to the approval of counsel for the Company with respect to such compliance.

(b) Investment Representations. As a condition to the exercise of an Award, the Company may require the person exercising such Award to represent and warrant at the time of any such exercise that the Shares are being purchased only for investment and without any present intention to sell or distribute such Shares if, in the opinion of counsel for the Company, such a representation is required.

20. Inability to Obtain Authority. The inability of the Company to obtain authority from any regulatory body having jurisdiction or to complete or comply with the requirements of any registration or other qualification of the Shares under any state, federal or foreign law or under the rules and regulations of the Securities and Exchange Commission, the stock exchange on which Shares of the same class are then listed, or any other governmental or regulatory body, which authority, registration, qualification or rule compliance is deemed by the Company's counsel to be necessary or advisable for the issuance and sale of any Shares hereunder, will relieve the Company of any liability in respect of the failure to issue or sell such Shares as to which such requisite authority, registration, qualification or rule compliance will not have been obtained.

21. Stockholder Approval. The Plan will be subject to approval by the stockholders of the Company within twelve (12) months after the date the Plan is adopted by the Board. Such stockholder approval will be obtained in the manner and to the degree required under Applicable Laws.

22. Information to Participants. Beginning on the earlier of (i) the date that the aggregate number of Participants under this Plan is five hundred (500) or more and the Company is relying on the exemption provided by Rule 12h-1(f)(1) under the Exchange Act and (ii) the date that the Company is required to deliver information to Participants pursuant to Rule 701 under the Securities Act, and until such time as the Company (a) becomes subject to the reporting requirements of Section 13 or 15(d) of the Exchange Act, (b) is no longer relying on the exemption provided by Rule 12h-1(f)(1) under the Exchange Act or (c) is no longer required to deliver information to Participants pursuant to Rule 701 under the Securities Act, the Company shall provide to each Participant the information described in paragraphs (e)(3), (4), and (5) of Rule 701 under the Securities Act not less frequently than every six (6) months with the financial statements being not more than 180 days old and with such information provided either by physical or electronic delivery to the Participants or by written notice to the Participants of the availability of the information on an Internet site that may be password-protected and of any password needed to access the information. The Company may request that Participants agree to keep the information to be provided pursuant to this section confidential. If a Participant does not agree to keep the information to be provided pursuant to this section confidential, then the Company will not be required to provide the information unless otherwise required pursuant to Rule 12h-1(f)(1) under the Exchange Act (if the Company is relying on the Rule 12h-1(f) Exemption) or Rule 701 of the Securities Act (if the Company is relying on the exemption pursuant to Rule 701 of the Securities Act).

23. Forfeiture Events. The Administrator may specify in an Award Agreement that the Participant's rights, payments, and benefits with respect to an Award will be subject to the reduction, cancellation, forfeiture, or recoupment upon the occurrence of certain specified events, in addition to any otherwise applicable vesting or performance conditions of an Award. Notwithstanding any provisions to the contrary under this Plan, an Award shall be subject to the Company's clawback policy as may be established and/or amended from time to time (the "Clawback Policy"). The Administrator may require a Participant to forfeit, return or reimburse the Company all or a portion of the Award and any amounts paid thereunder pursuant to the terms of the Clawback Policy or as necessary or appropriate to comply with Applicable Laws.

Exhibit 10.3

ENDCADIA, INC. (the "*Company*")

2018 EQUITY INCENTIVE PLAN

STOCK OPTION AGREEMENT

Unless otherwise defined herein, the terms defined in the 2018 Equity Incentive Plan (the "***Plan***") shall have the same defined meanings in this Stock Option Agreement (the "***Option Agreement***").

I. NOTICE OF STOCK OPTION GRANT

Name:

Address:

The undersigned Participant has been granted an Option to purchase Common Stock of the Company, subject to the terms and conditions of the Plan and this Option Agreement, as follows:

Date of Grant:	_____
Vesting Commencement Date:	_____
Exercise Price per Share:	$ _____
Total Number of Shares Granted:	_____
Total Exercise Price :	$ _____
Type of Option:	_ Incentive Stock Option
	_ Nonstatutory Stock Option
Term/Expiration Date:	_____

Vesting Schedule:

This Option shall be exercisable, in whole or in part, according to the following vesting schedule:

[Twenty-five percent (25%) of the Shares subject to the Option shall vest on the one (1) year anniversary of the Vesting Commencement Date, and one thirty-sixth (1/36th) of the remaining Shares subject to the Option shall vest each month thereafter on the same day of the month as the Vesting Commencement Date (and if there is no corresponding day, on the last day of the month), subject to Participant continuing to be a Service Provider through each such date.]

Termination Period:

This Option shall be exercisable for three (3) months after Participant ceases to be a Service Provider, unless such termination is due to Participant's death or Disability, in which case this Option shall be exercisable for twelve (12) months after Participant ceases to be a Service Provider. Notwithstanding the foregoing sentence, in no event may this Option be exercised after the Term/Expiration Date as provided above and this Option may be subject to earlier termination as provided in the Plan.

II. AGREEMENT

1. Grant of Option. The Administrator of the Company hereby grants to the Participant named in the Notice of Stock Option Grant in Part I of this Agreement ("***Participant***"), an option (the "***Option***") to purchase the number of Shares set forth in the Notice of Stock Option Grant, at the exercise price per Share set forth in the Notice of Stock Option Grant (the "***Exercise Price***"), and subject to the terms and conditions of the Plan, which is incorporated herein by reference. Subject to the Plan, in the event of a conflict between the terms and conditions of the Plan and this Option Agreement, the terms and conditions of the Plan shall prevail.

If designated in the Notice of Stock Option Grant as an Incentive Stock Option ("***ISO***"), this Option is intended to qualify as an Incentive Stock Option as defined in Section 422 of the Code. Nevertheless, to the extent that it exceeds the $100,000 rule of Code Section 422(d), this Option shall be treated as a Nonstatutory Stock Option ("***NSO***"). Further, if for any reason this Option (or portion thereof) shall not qualify as an ISO, then, to the extent of such nonqualification, such Option (or portion thereof) shall be regarded as a NSO granted under the Plan. In no event shall the Administrator, the Company or any Parent or Subsidiary or any of their respective employees or directors have any liability to Participant (or any other person) due to the failure of the Option to qualify for any reason as an ISO.

2. Exercise of Option.

(a) Right to Exercise. This Option shall be exercisable during its term in accordance with the Vesting Schedule set out in the Notice of Stock Option Grant and with the applicable provisions of the Plan and this Option Agreement.

(b) Method of Exercise. This Option shall be exercisable by delivery of an exercise notice in the form attached as Exhibit A (the "***Exercise Notice***") or in a manner and pursuant to such procedures as the Administrator may determine, which shall state the election to exercise the Option, the number of Shares with respect to which the Option is being exercised (the "***Exercised Shares***"), and such other representations and agreements as may be required by the Company. The Exercise Notice shall be accompanied by payment of the aggregate Exercise Price as to all Exercised Shares, together with any applicable tax withholding. This Option shall be deemed to be exercised upon receipt by the Company of such fully executed Exercise Notice accompanied by the aggregate Exercise Price, together with any applicable tax withholding.

No Shares shall be issued pursuant to the exercise of an Option unless such issuance and such exercise comply with Applicable Laws. Assuming such compliance, for income tax purposes the Shares shall be considered transferred to Participant on the date on which the Option is exercised with respect to such Shares.

3. Participant's Representations. In the event the Shares have not been registered under the Securities Act of 1933, as amended (the "***Securities Act***"), at the time this Option is exercised, Participant shall, if required by the Company, concurrently with the exercise of all or any portion of this Option, deliver to the Company his or her Investment Representation Statement in the form attached hereto as Exhibit B.

4. Lock-Up Period. Participant hereby agrees that Participant shall not offer, pledge, sell, contract to sell, sell any option or contract to purchase, purchase any option or contract to sell, grant any option, right or warrant to purchase, lend, or otherwise transfer or dispose of, directly or indirectly, any Common Stock (or other securities) of the Company or enter into any swap, hedging or other arrangement that transfers to

another, in whole or in part, any of the economic consequences of ownership of any Common Stock (or other securities) of the Company held by Participant (other than those included in the registration) for a period specified by the representative of the underwriters of Common Stock (or other securities) of the Company not to exceed one hundred and eighty (180) days following the effective date of any registration statement of the Company filed under the Securities Act (or such other period as may be requested by the Company or the underwriters to accommodate regulatory restrictions on (i) the publication or other distribution of research reports and (ii) analyst recommendations and opinions, including, but not limited to, the restrictions contained in NYSE Rule 472(f)(4), or any successor provisions or amendments thereto).

Participant agrees to execute and deliver such other agreements as may be reasonably requested by the Company or the underwriter which are consistent with the foregoing or which are necessary to give further effect thereto. In addition, if requested by the Company or the representative of the underwriters of Common Stock (or other securities) of the Company, Participant shall provide, within ten (10) days of such request, such information as may be required by the Company or such representative in connection with the completion of any public offering of the Company's securities pursuant to a registration statement filed under the Securities Act. The obligations described in this Section 4 shall not apply to a registration relating solely to employee benefit plans on Form S-1 or Form S-8 or similar forms that may be promulgated in the future, or a registration relating solely to a Commission Rule 145 transaction on Form S-4 or similar forms that may be promulgated in the future. The Company may impose stop-transfer instructions with respect to the shares of Common Stock (or other securities) subject to the foregoing restriction until the end of said one hundred and eighty (180) day (or other) period. Participant agrees that any transferee of the Option or shares acquired pursuant to the Option shall be bound by this Section 4.

5. Method of Payment. Payment of the aggregate Exercise Price shall be by any of the following, or a combination thereof, at the election of the Participant:

(a) cash;

(b) check;

(c) consideration received by the Company under a formal cashless exercise program adopted by the Company in connection with the Plan; or

(d) surrender of other Shares which (i) shall be valued at its Fair Market Value on the date of exercise, and (ii) must be owned free and clear of any liens, claims, encumbrances or security interests, if accepting such Shares, in the sole discretion of the Administrator, shall not result in any adverse accounting consequences to the Company.

6. Restrictions on Exercise. This Option may not be exercised until such time as the Plan has been approved by the stockholders of the Company, or if the issuance of such Shares upon such exercise or the method of payment of consideration for such shares would constitute a violation of any Applicable Law.

7. Non-Transferability of Option.

(a) This Option may not be transferred in any manner otherwise than by will or by the laws of descent or distribution and may be exercised during the lifetime of Participant only by Participant. The terms of the Plan and this Option Agreement shall be binding upon the executors, administrators, heirs, successors and assigns of Participant.

(b) Further, until the Company becomes subject to the reporting requirements of Section 13 or 15(d) of the Exchange Act, or after the Administrator determines that it is, will, or may no longer be relying upon the exemption from registration of Options under the Exchange Act as set forth in Rule 12h-1(f) promulgated under the Exchange Act (the "***Reliance End Date***"), Participant shall not transfer this Option or, prior to exercise, the Shares subject to this Option, in any manner other than (i) to persons who are "family members" (as defined in Rule 701(c)(3) of the Securities Act) through gifts or domestic relations orders, or (ii) to an executor or guardian of Participant upon the death or disability of Participant. Until the Reliance End Date, the Options and, prior to exercise, the Shares subject to this Option, may not be pledged, hypothecated or otherwise transferred or disposed of, including by entering into any short position, any "put equivalent position" or any "call equivalent position" (as defined in Rule 16a-1(h) and Rule 16a-1(b) of the Exchange Act, respectively), other than as permitted in clauses (i) and (ii) of this paragraph.

8. Term of Option. This Option may be exercised only within the term set out in the Notice of Stock Option Grant, and may be exercised during such term only in accordance with the Plan and the terms of this Option Agreement.

9. Tax Obligations.

(a) Tax Withholding. Participant agrees to make appropriate arrangements with the Company (or the Parent or Subsidiary employing or retaining Participant) for the satisfaction of all Federal, state, local and foreign income and employment tax withholding requirements applicable to the Option exercise. Participant acknowledges and agrees that the Company may refuse to honor the exercise and refuse to deliver the Shares if such withholding amounts are not delivered at the time of exercise.

(b) Notice of Disqualifying Disposition of ISO Shares. If the Option granted to Participant herein is an ISO, and if Participant sells or otherwise disposes of any of the Shares acquired pursuant to the ISO on or before the later of (i) the date two (2) years after the Date of Grant, or (ii) the date one (1) year after the date of exercise, Participant shall immediately notify the Company in writing of such disposition. Participant agrees that Participant may be subject to income tax withholding by the Company on the compensation income recognized by Participant.

(c) Code Section 409A. Under Code Section 409A, an Option that vests after December 31, 2004 (or that vested on or prior to such date but which was materially modified after October 3, 2004) that was granted with a per Share exercise price that is determined by the Internal Revenue Service (the "***IRS***") to be less than the Fair Market Value of a Share on the date of grant (a "***discount option***") may be considered "deferred compensation." An Option that is a "discount option" may result in (i) income recognition by Participant prior to the exercise of the Option, (ii) an additional twenty percent (20%) federal income tax, and (iii) potential penalty and interest charges. The "discount option" may also result in additional state income, penalty and interest tax to the Participant. Participant acknowledges that the Company cannot and has not guaranteed that the IRS will agree that the per Share exercise price of this Option equals or exceeds the Fair Market Value of a Share on the date of grant in a later examination. Participant agrees that if the IRS determines that the Option was granted with a per Share exercise price that was less than the Fair Market Value of a Share on the date of grant, Participant shall be solely responsible for Participant's costs related to such a determination.

10. Covenant to Become a Party to Agreements. By executing this Agreement, the Participant agrees upon request to execute any further documents or instruments necessary or reasonably desirable in the view of the Company to carry out the purposes or intent of this Agreement, including (but not limited to) the applicable exhibits and attachments to this Agreement.

11. Drag-Along. In the event that (i) the requisite holders of the outstanding Common Stock (voting on an as-converted basis) and the Board approve of a Change in Control transaction and (ii) the Board has determined that a drag-along provision shall apply to such transaction, then Participant (and all permitted transferees) agrees to and shall, upon the request of the Board: (a) vote all shares of common stock or preferred stock held by such Participant in favor of such transaction, (b) sell, transfer or exchange, or cause to be sold, transferred or exchanged, all convertible securities then held by such Participant pursuant to the terms and conditions of such Change in Control, (c) refrain from exercising any dissenters' rights or rights of appraisal under applicable law at any time with respect to such transaction, and (d) execute and deliver all related documentation and take such other action in support of such transaction as shall reasonably be requested by the Company.

12. Entire Agreement; Governing Law. The Plan is incorporated herein by reference. The Plan, this and this Option Agreement constitute the entire agreement of the parties with respect to the subject matter thereof and supersede in their entirety all prior undertakings and agreements of the Company and Participant with respect to the subject matter hereof, and may not be modified adversely to the Participant's interest except by means of a writing signed by the Company and Participant. This Option Agreement is governed by the internal substantive laws but not the choice of law rules of Delaware.

13. No Guarantee of Continued Service. PARTICIPANT ACKNOWLEDGES AND AGREES THAT THE VESTING OF SHARES PURSUANT TO THE VESTING SCHEDULE HEREOF IS EARNED ONLY BY CONTINUING AS A SERVICE PROVIDER AT THE WILL OF THE COMPANY (OR THE PARENT OR SUBSIDIARY EMPLOYING OR RETAINING PARTICIPANT) AND NOT THROUGH THE ACT OF BEING HIRED, BEING GRANTED THIS OPTION OR ACQUIRING SHARES HEREUNDER. PARTICIPANT FURTHER ACKNOWLEDGES AND AGREES THAT THIS AGREEMENT, THE TRANSACTIONS CONTEMPLATED HEREUNDER AND THE VESTING SCHEDULE SET FORTH HEREIN DO NOT CONSTITUTE AN EXPRESS OR IMPLIED PROMISE OF CONTINUED ENGAGEMENT AS A SERVICE PROVIDER FOR THE VESTING PERIOD, FOR ANY PERIOD, OR AT ALL, AND SHALL NOT INTERFERE IN ANY WAY WITH PARTICIPANT'S RIGHT OR THE RIGHT OF THE COMPANY (OR THE PARENT OR SUBSIDIARY EMPLOYING OR RETAINING PARTICIPANT) TO TERMINATE PARTICIPANT'S RELATIONSHIP AS A SERVICE PROVIDER AT ANY TIME, WITH OR WITHOUT CAUSE.

Participant acknowledges receipt of a copy of the Plan and represents that he or she is familiar with the terms and provisions thereof, and hereby accepts this Option subject to all of the terms and provisions thereof. Participant has reviewed the Plan and this Option in their entirety, has had an opportunity to obtain the advice of counsel prior to executing this Option and fully understands all provisions of the Option. Participant hereby agrees to accept as binding, conclusive and final all decisions or interpretations of the Administrator upon any questions arising under the Plan or this Option. Participant further agrees to notify the Company upon any change in the residence address indicated below.

PARTICIPANT	ENDCADIA, INC.
_____	_____
Signature	By
_____	_____
Print Name	Print Name
_____	_____
	Title
_____	
Residence Address	

EXHIBIT A

2018 EQUITY INCENTIVE PLAN

EXERCISE NOTICE

ENDCADIA, INC.
[**]

1. Exercise of Option. Effective as of today, _____, ____, the undersigned ("***Participant***") hereby elects to exercise Participant's option (the "***Option***") to purchase _____ shares of the Common Stock (the "***Shares***") of Endcadia, Inc. (the "***Company***") under and pursuant to the 2018 Equity Incentive Plan (the "***Plan***") and the Stock Option Agreement dated _____, _____ (the "***Option Agreement***").

2. Delivery of Payment. Participant herewith delivers to the Company the full purchase price of the Shares, as set forth in the Option Agreement, and any and all withholding taxes due in connection with the exercise of the Option.

3. Representations of Participant. Participant acknowledges that Participant has received, read and understood the Plan and the Option Agreement and agrees to abide by and be bound by their terms and conditions.

4. Rights as Stockholder. Until the issuance of the Shares (as evidenced by the appropriate entry on the books of the Company or of a duly authorized transfer agent of the Company), no right to vote or receive dividends or any other rights as a stockholder shall exist with respect to the Common Stock subject to an Award, notwithstanding the exercise of the Option. The Shares shall be issued to Participant as soon as practicable after the Option is exercised in accordance with the Option Agreement. No adjustment shall be made for a dividend or other right for which the record date is prior to the date of issuance except as provided in the Plan.

5. Company's Right of First Refusal. Before any Shares held by Participant or any transferee (either being sometimes referred to herein as the "***Holder***") may be sold or otherwise transferred (including transfer by gift or operation of law), the Company or its assignee(s) shall have a right of first refusal to purchase the Shares on the terms and conditions set forth in this Section 5 (the "***Right of First Refusal***").

(a) Notice of Proposed Transfer. The Holder of the Shares shall deliver to the Company a written notice (the "***Notice***") stating: (i) the Holder's bona fide intention to sell or otherwise transfer such Shares; (ii) the name of each proposed purchaser or other transferee ("***Proposed Transferee***"); (iii) the number of Shares to be transferred to each Proposed Transferee; and (iv) the bona fide cash price or other consideration for which the Holder proposes to transfer the Shares (the "***Offered Price***"), and the Holder shall offer the Shares at the Offered Price to the Company or its assignee(s).

(b) Exercise of Right of First Refusal. At any time within thirty (30) days after receipt of the Notice, the Company and/or its assignee(s) may, by giving written notice to the Holder, elect to purchase all, but not less than all, of the Shares proposed to be transferred to any one or more of the Proposed Transferees, at the purchase price determined in accordance with subsection (c) below.

(c) Purchase Price. The purchase price ("***Purchase Price***") for the Shares purchased by the Company or its assignee(s) under this Section 5 shall be the Offered Price. If the Offered Price includes consideration other than cash, the cash equivalent value of the non-cash consideration shall be determined by the Board of Directors of the Company in good faith.

(d) Payment. Payment of the Purchase Price shall be made, at the option of the Company or its assignee(s), in cash (by check), by cancellation of all or a portion of any outstanding indebtedness of the Holder to the Company (or, in the case of repurchase by an assignee, to the assignee), or by any combination thereof within thirty (30) days after receipt of the Notice or in the manner and at the times set forth in the Notice.

(e) Holder's Right to Transfer. If all of the Shares proposed in the Notice to be transferred to a given Proposed Transferee are not purchased by the Company and/or its assignee(s) as provided in this Section 5, then the Holder may sell or otherwise transfer such Shares to that Proposed Transferee at the Offered Price or at a higher price, *provided* that such sale or other transfer is consummated within one hundred and twenty (120) days after the date of the Notice, that any such sale or other transfer is effected in accordance with any applicable securities laws and that the Proposed Transferee agrees in writing that the provisions of this Section 5 shall continue to apply to the Shares in the hands of such Proposed Transferee. If the Shares described in the Notice are not transferred to the Proposed Transferee within such period, a new Notice shall be given to the Company, and the Company and/or its assignees shall again be offered the Right of First Refusal before any Shares held by the Holder may be sold or otherwise transferred.

(f) Exception for Certain Family Transfers. Anything to the contrary contained in this Section 5 notwithstanding, the transfer of any or all of the Shares during the Participant's lifetime or on the Participant's death by will or intestacy to the Participant's immediate family or a trust for the benefit of the Participant's immediate family shall be exempt from the provisions of this Section 5. "Immediate Family" as used herein shall mean spouse, lineal descendant or antecedent, father, mother, brother or sister. In such case, the transferee or other recipient shall receive and hold the Shares so transferred subject to the provisions of this Section 5, and there shall be no further transfer of such Shares except in accordance with the terms of this Section 5.

(g) Termination of Right of First Refusal. The Right of First Refusal shall terminate as to any Shares upon the earlier of (i) the first sale of Common Stock of the Company to the general public, or (ii) a Change in Control in which the successor corporation has equity securities that are publicly traded.

6. Tax Consultation. Participant understands that Participant may suffer adverse tax consequences as a result of Participant's purchase or disposition of the Shares. Participant represents that Participant has consulted with any tax consultants Participant deems advisable in connection with the purchase or disposition of the Shares and that Participant is not relying on the Company for any tax advice.

7. Restrictive Legends and Stop-Transfer Orders.

(a) Legends. Participant understands and agrees that the Company shall cause the legends set forth below or legends substantially equivalent thereto, to be placed upon any certificate(s) evidencing ownership of the Shares together with any other legends that may be required by the Company or by state or federal securities laws:

> THE SECURITIES REPRESENTED HEREBY HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933 (THE "***ACT***") AND MAY NOT BE OFFERED, SOLD OR OTHERWISE TRANSFERRED, PLEDGED OR HYPOTHECATED UNLESS AND UNTIL REGISTERED UNDER THE ACT OR, IN THE OPINION OF COUNSEL SATISFACTORY TO THE ISSUER OF THESE SECURITIES, SUCH OFFER, SALE OR TRANSFER, PLEDGE OR HYPOTHECATION IS IN COMPLIANCE THEREWITH.

THE SHARES REPRESENTED BY THIS CERTIFICATE ARE SUBJECT TO CERTAIN RESTRICTIONS ON TRANSFER AND A RIGHT OF FIRST REFUSAL HELD BY THE ISSUER OR ITS ASSIGNEE(S) AS SET FORTH IN THE EXERCISE NOTICE BETWEEN THE ISSUER AND THE ORIGINAL HOLDER OF THESE SHARES, A COPY OF WHICH MAY BE OBTAINED AT THE PRINCIPAL OFFICE OF THE ISSUER. SUCH TRANSFER RESTRICTIONS AND RIGHT OF FIRST REFUSAL ARE BINDING ON TRANSFEREES OF THESE SHARES.

THE SHARES REPRESENTED BY THIS CERTIFICATE ARE SUBJECT TO RESTRICTIONS ON TRANSFER FOR A PERIOD OF TIME FOLLOWING THE EFFECTIVE DATE OF THE UNDERWRITTEN PUBLIC OFFERING OF THE COMPANY'S SECURITIES SET FORTH IN AN AGREEMENT BETWEEN THE ISSUER AND THE ORIGINAL HOLDER OF THESE SHARES AND MAY NOT BE SOLD OR OTHERWISE DISPOSED OF BY THE HOLDER PRIOR TO THE EXPIRATION OF SUCH PERIOD WITHOUT THE CONSENT OF THE COMPANY OR THE MANAGING UNDERWRITER.

(b) Stop-Transfer Notices. Participant agrees that, in order to ensure compliance with the restrictions referred to herein, the Company may issue appropriate "stop transfer" instructions to its transfer agent, if any, and that, if the Company transfers its own securities, it may make appropriate notations to the same effect in its own records.

(c) Refusal to Transfer. The Company shall not be required (i) to transfer on its books any Shares that have been sold or otherwise transferred in violation of any of the provisions of this Exercise Notice or (ii) to treat as owner of such Shares or to accord the right to vote or pay dividends to any purchaser or other transferee to whom such Shares shall have been so transferred.

8. Covenant to Become a Party to Agreements. By executing this Agreement, the Participant agrees upon request to execute any further documents or instruments necessary or reasonably desirable in the view of the Company to carry out the purposes or intent of this Agreement, including (but not limited to) the applicable exhibits and attachments to this Agreement.

9. Drag-Along. In the event that (i) the requisite holders of the outstanding Common Stock (voting on an as-converted basis) and the Board approve of a Change in Control transaction and (ii) the Board has determined that a drag-along provision shall apply to such transaction, then Participant (and all permitted transferees) agrees to and shall, upon the request of the Board: (a) vote all shares of common stock or preferred stock held by such Participant in favor of such transaction, (b) sell, transfer or exchange, or cause to be sold, transferred or exchanged, all convertible securities then held by such Participant pursuant to the terms and conditions of such Change in Control, (c) refrain from exercising any dissenters' rights or rights of appraisal under applicable law at any time with respect to such transaction, and (d) execute and deliver all related documentation and take such other action in support of such transaction as shall reasonably be requested by the Company.

10. Successors and Assigns. The Company may assign any of its rights under this Exercise Notice to single or multiple assignees, and this Exercise Notice shall inure to the benefit of the successors and assigns of the Company. Subject to the restrictions on transfer herein set forth, this Exercise Notice shall be binding upon Participant and his or her heirs, executors, administrators, successors and assigns.

11. Interpretation. Any dispute regarding the interpretation of this Exercise Notice shall be submitted by Participant or by the Company forthwith to the Administrator, which shall review such dispute at its next regular meeting. The resolution of such a dispute by the Administrator shall be final and binding on all parties.

12. Governing Law; Severability. This Exercise Notice is governed by the internal substantive laws, but not the choice of law rules, of Delaware. In the event that any provision hereof becomes or is declared by a court of competent jurisdiction to be illegal, unenforceable or void, this Exercise Notice shall continue in full force and effect.

13. Entire Agreement. The Plan and Option Agreement are incorporated herein by reference. This Exercise Notice, the Plan, the Option Agreement and the Investment Representation Statement constitute the entire agreement of the parties with respect to the subject matter thereof and supersede in their entirety all prior undertakings and agreements of the Company and Participant with respect to the subject matter hereof, and may not be modified adversely to the Participant's interest except by means of a writing signed by the Company and Participant.

Submitted by: PARTICIPANT	Accepted by: ENDCADIA, INC.
_____	_____
Signature	By
_____	_____
Print Name	Print Name
	_____
	Title
Address:	Address:
_____	_____
_____	_____
	_____
	Date Received

EXHIBIT B

INVESTMENT REPRESENTATION STATEMENT

PARTICIPANT :

COMPANY : ENDCADIA, INC.

SECURITY : COMMON STOCK

AMOUNT :

DATE :

In connection with the purchase of the above-listed Securities, the undersigned Participant represents to the Company the following:

(a) Participant is aware of the Company's business affairs and financial condition and has acquired sufficient information about the Company to reach an informed and knowledgeable decision to acquire the Securities. Participant is acquiring these Securities for investment for Participant's own account only and not with a view to, or for resale in connection with, any "distribution" thereof within the meaning of the Securities Act of 1933, as amended (the "***Securities Act***").

(b) Participant acknowledges and understands that the Securities constitute "restricted securities" under the Securities Act and have not been registered under the Securities Act in reliance upon a specific exemption therefrom, which exemption depends upon, among other things, the bona fide nature of Participant's investment intent as expressed herein. In this connection, Participant understands that, in the view of the Securities and Exchange Commission, the statutory basis for such exemption may be unavailable if Participant's representation was predicated solely upon a present intention to hold these Securities for the minimum capital gains period specified under tax statutes, for a deferred sale, for or until an increase or decrease in the market price of the Securities, or for a period of one (1) year or any other fixed period in the future. Participant further understands that the Securities must be held indefinitely unless they are subsequently registered under the Securities Act or an exemption from such registration is available. Participant further acknowledges and understands that the Company is under no obligation to register the Securities. Participant understands that the certificate evidencing the Securities shall be imprinted with any legend required under applicable state securities laws.

(c) Participant is familiar with the provisions of Rule 701 and Rule 144, each promulgated under the Securities Act, which, in substance, permit limited public resale of "restricted securities" acquired, directly or indirectly from the issuer thereof, in a non-public offering subject to the satisfaction of certain conditions. Rule 701 provides that if the issuer qualifies under Rule 701 at the time of the grant of the Option to Participant, the exercise shall be exempt from registration under the Securities Act. In the event the Company becomes subject to the reporting requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, ninety (90) days thereafter (or such longer period as any market stand-off agreement may require) the Securities exempt under Rule 701 may be resold, subject to the satisfaction of the applicable conditions specified by Rule 144, including in the case of affiliates (1) the availability of certain public information about the Company, (2) the amount of Securities being sold during any three (3) month period not exceeding specified limitations, (3) the resale being made in an unsolicited "broker's transaction", transactions directly with a "market maker" or "riskless principal transactions" (as those terms are defined under the Securities Exchange Act of 1934) and (4) the timely filing of a Form 144, if applicable.

In the event that the Company does not qualify under Rule 701 at the time of grant of the Option, then the Securities may be resold in certain limited circumstances subject to the provisions of Rule 144, which may require (i) the availability of current public information about the Company; (ii) the resale to occur more than a specified period after the purchase and full payment (within the meaning of Rule 144) for the Securities; and (iii) in the case of the sale of Securities by an affiliate, the satisfaction of the conditions set forth in sections (2), (3) and (4) of the paragraph immediately above.

(d) Participant further understands that in the event all of the applicable requirements of Rule 701 or 144 are not satisfied, registration under the Securities Act, compliance with Regulation A, or some other registration exemption shall be required; and that, notwithstanding the fact that Rules 144 and 701 are not exclusive, the Staff of the Securities and Exchange Commission has expressed its opinion that persons proposing to sell private placement securities other than in a registered offering and otherwise than pursuant to Rules 144 or 701 shall have a substantial burden of proof in establishing that an exemption from registration is available for such offers or sales, and that such persons and their respective brokers who participate in such transactions do so at their own risk. Participant understands that no assurances can be given that any such other registration exemption shall be available in such event.

PARTICIPANT

_____

Signature

_____

Print Name

_____

Date

Exhibit 10.10

Execution Version
CONFIDENTIAL

Certain identified information has been excluded from the exhibit because it is both (i) not material and (ii) is the type of information that the registrant treats as private or confidential. Double asterisks denote omissions.

COLLABORATION AND LICENSE AGREEMENT

by and between

VERVE THERAPEUTICS, INC.

and

BEAM THERAPEUTICS INC.

April 3, 2019

TABLE OF CONTENTS

SCHEDULES

COLLABORATION AND LICENSE AGREEMENT

This Collaboration and License Agreement (this "**Agreement**") is effective as of April 3, 2019 (the "**Effective Date**") and is entered into by and between Verve Therapeutics, Inc., a corporation organized and existing under the laws of the State of Delaware ("**Verve**") and Beam Therapeutics Inc., a corporation organized and existing under the laws of the State of Delaware ("**Beam**", collectively with Verve, the "**Parties**" and each, a "**Party**").

RECITALS:

WHEREAS, Verve or its Affiliates owns or controls certain technology related to gene editing and certain technology related to the Licensed Targets (as hereinafter defined);

WHEREAS, Beam or its Affiliates owns or controls certain technology related to DNA base editing and RNA base editing platforms, including technology with respect to guide RNAs;

WHEREAS, Verve and Beam desire to enter into a collaboration to develop and commercialize Products (as hereinafter defined) upon the terms and conditions set forth herein;

WHEREAS, for purposes of such collaboration, Verve desires to obtain a license under certain intellectual property, including the Beam Base Editor Technology, upon the terms and conditions set forth herein, and Beam desires to grant such a license; and

WHEREAS, each Party may desire to, pursuant to the terms of this Agreement, grant the other Party rights to certain delivery technology that comes under such grantor Party's control during the Term (as hereinafter defined) for use in base editing or gene editing products, as the case may be;

NOW, THEREFORE, in consideration of the foregoing premises and the mutual covenants herein contained, the receipt and sufficiency of which are hereby acknowledged, Verve and Beam hereby agree as follows:

Article 1 DEFINITIONS

Unless specifically set forth to the contrary in this Agreement, the following terms, whether used in the singular or plural, shall have the respective meanings set forth below or, if not listed below, the meaning designated in this Agreement.

1.1 "**AAA**" shall have the meaning given to such term in Section 16.8.

1.2 [**].

1.3 "**Act**" shall mean, as applicable, the United States Federal Food, Drug and Cosmetic Act, 21 U.S.C. §§ 301 et seq., or the Public Health Research Act, 42 U.S.C. §§ 262 et seq., as such may be amended from time to time.

1.4 "**Action**" shall mean (a) any claim, cause of action or suit (whether in contract or tort or otherwise), litigation (whether at law or in equity, whether civil or criminal), or arbitration brought against a Party by any Third Party and (b) any claim, action, cause of action or suit (whether in contract or tort or otherwise), litigation (whether at law or in equity, whether civil or criminal), controversy, assessment, arbitration, investigation, hearing, charge, complaint, demand, notice or proceeding of, to, from, by or before any Governmental Authority with respect to a Party.

1.5 "**Affiliate**" shall, with respect to a Person, mean any entity directly or indirectly controlled by, controlling, or under common control with, such Person, but only for so long as such control shall continue. For purposes of this definition, "control" (including, with correlative meanings, "controlled by", "controlling" and "under common control with") means (a) possession, direct or indirect, of the power to direct or cause direction of the management or policies of an entity (whether through ownership of securities or other ownership interests, by contract or otherwise), or (b) beneficial ownership of at least fifty percent (50%) (or the maximum ownership interest permitted by Applicable Law) of the voting securities or other ownership or general partnership interest (whether directly or pursuant to any option, warrant or other similar arrangement) or other comparable equity interests in an entity. Notwithstanding anything to the contrary in this Agreement, GV 2017, L.P. and any *bona fide* investment fund or management company controlled by, controlling, or under common control with GV 2017, L.P. shall not be deemed an Affiliate of Verve for purposes of this Agreement.

1.6 "**Agreement**" shall have the meaning given to such term in the preamble to this agreement.

1.7 "**Alliance Manager**" shall have the meaning given to such term in Section 3.8.1.

1.8 [**].

1.9 "**Applicable Law**" means the applicable laws, rules and regulations, including any rules, regulations, guidelines or other requirements of the Regulatory Authorities, that may be in effect from time to time in the Territory.

1.10 "**Base Editor**" shall mean [**].

1.11 "**Base Editor Product**" shall mean [**].

1.12 "**Beam**" shall have the meaning given to such term in the preamble to this Agreement.

1.13 "**Beam Base Editor Know-How**" shall mean, subject to Section 2.4.3, all Know-How, patentable or otherwise, which (a) is Controlled by Beam or its Affiliates as of the Effective Date or during the Term, (b) [**] and (c) [**].

1.14 "**Beam Base Editor Patent Rights**" shall mean, subject to Section 2.4.3, Patent Rights which (a) as of the Effective Date or during the Term are Controlled by Beam or its Affiliates and (b) claim Beam Base Editor Know-How. Beam Base Editor Patent Rights includes those Patent Rights listed on Schedule 1.14.

1.15 "**Beam Base Editor Technology**" shall mean Beam Base Editor Know-How and Beam Base Editor Patent Rights.

1.16 "**Beam C2C1 Know-How**" shall mean, subject to Section 2.4.3, all Know-How, patentable or otherwise, which (a) is Controlled by Beam or its Affiliates as of the Effective Date or during the Term, (b) [**] and (c) [**].

1.17 "**Beam C2C1 Patent Rights**" shall mean Patent Rights which, as of the Effective Date or during the Term, are Controlled by Beam or its Affiliates and claim Beam C2C1 Know-How. Beam C2C1 Patent Rights includes those Patent Rights listed on Schedule 1.17.

1.18 "**Beam C2C1 Technology**" shall mean the Beam C2C1 Know-How and Beam C2C1 Patent Rights.

1.19 "**Beam Collaboration Know-How**" shall mean (a) all Know-How, patentable or otherwise, conceived, developed, generated or reduced to practice during the Term solely by Beam or its Affiliates or other persons acting on behalf of Beam through the Development, Commercialization or Manufacture of Licensed Products or otherwise arising out of Beam's performance of its obligations under this Agreement and (b) all Know-How, patentable or otherwise, that is [**] during the Term (i) solely by either Party, their respective Affiliates or other persons acting on behalf of a Party or (ii) jointly by, on one hand, Beam, its Affiliates or persons acting on behalf of Beam and, on the other hand, Verve, its Affiliates or persons acting on behalf of Verve, in each case of clauses (b)(i) and (ii), through the Development, Commercialization or Manufacture of Products or otherwise arising out of a Party's performance of its obligations under this Agreement.

1.20 "**Beam Collaboration Patent Rights**" shall mean Patent Rights which (a) as of the Effective Date or during the Term are Controlled by Beam or its Affiliates and (b) claim Beam Collaboration Know-How.

1.21 "**Beam Collaboration Technology**" shall mean Beam Collaboration Know-How and Beam Collaboration Patent Rights.

1.22 "**Beam Delivery Technology**" shall mean, [**].

1.23 "**Beam Delivery Technology Product**" shall [**].

1.24 "**Beam Indemnified Parties**" shall have the meaning given to such term in Section 14.2.

1.25 "**Beam IP Competitive Infringement**" shall have the meaning given to such term in Section 13.3.1.

1.26 "**Beam Manufacturing Know-How"** shall have the meaning given to such term in Section 8.3.

1.27 "**Beam Manufacturing Technology"** shall have the meaning given to such term in Section 8.3.

1.28 "**Beam Opt-In Option**" shall have the meaning given to such term in Section 5.1.

1.29 "**Beam Opt-Out Date**" shall have the meaning given to such term in Section 5.3.

1.30 "**Beam Opt-Out Option**" shall have the meaning given to such term in Section 5.3.

1.31 "**Beam Third Party Agreement**" shall have the meaning given to such term in Section 12.3.5.

1.32 "**Beam-[**] Agreement**" shall mean the License Agreement by and between [**], a wholly-owned subsidiary of Beam, dated as of [**], as such agreement may be amended from time to time in accordance with its terms.

1.33 "**Beam-[**] Agreement**" shall mean the License Agreement by and between [**] and Beam dated as of [**], as such agreement may be amended from time to time in accordance with its terms.

1.34 "**Beam-[**] Agreement**" shall mean the License Agreement by and between [**] and Beam, dated as of [**], as such agreement may be amended from time to time in accordance with its terms.

1.35 "**[**]**" shall have the meaning given to such term in Section 1.31.

1.36 "**Business Day**" means a day other than a Saturday, Sunday, or a bank or other public holiday in New York, New York, United States.

1.37 "**C2C1"** shall mean [**].

1.38 "**Calendar Quarter**" shall mean the respective periods of three (3) consecutive calendar months ending on March 31, June 30, September 30 and December 31; provided that the first Calendar Quarter of the Term shall begin on the Effective Date and end on the last day of the then current Calendar Quarter and the last Calendar Quarter of the Term shall begin on the first day of such Calendar Quarter and end on the last day of the Term.

1.39 "**Calendar Year**" shall mean each successive period of twelve (12) months commencing on January 1 and ending on December 31; provided that the first Calendar Year of the Term shall begin on the Effective Date and end on December 31 of the then current Calendar Year and the last Calendar Year of the Term shall begin on the first day of such Calendar Year and end on the last day of the Term.

1.40 "**Challenged Patent Right**" shall have the meaning given to such term in Section 1.128.

1.41 "**Change of Control**" means, with respect to a Person, any of the following: (a) the sale or disposition of all or substantially all of the assets of such Person to a non-Affiliate of such Person, (b) the acquisition by a non-Affiliate of such Person, directly or indirectly, other than by an employee benefit plan (or related trust) sponsored or maintained by such Person or any of its Affiliates, of more than fifty percent (50%) of such Person's outstanding shares of voting capital stock or similar equity (e.g., capital stock entitled to vote generally for the election of directors), (c) the merger or consolidation of such Person with or into another corporation or entity, or (d) a liquidation or dissolution of such Person or any direct or indirect parent of such Person, excluding, in the case of (b) or (c) above, an acquisition or a merger or consolidation of a Person in which holders of shares of such Person's voting

capital stock or similar equity immediately prior to the acquisition, merger or consolidation have more than fifty percent (50%) of the ownership of voting capital stock or similar equity of the acquiring non-Affiliate or the surviving corporation or entity in such merger or consolidation, as the case may be, immediately after the merger or consolidation. Notwithstanding the foregoing, a Change of Control will not be deemed to occur on account of a sale of assets, merger or other transaction effected exclusively for the purpose of changing the corporate domicile or legal form of such Person.

1.42 [**].

1.43 "**Clinical Trial**" shall mean a Phase I Clinical Trial, Phase II Clinical Trial, Phase III Clinical Trial, or Phase IV Clinical Trial.

1.44 "**Clinical Trial Data**" shall mean, with respect to a Product that is a Licensed Product or Collaboration Product, (a) all pharmacokinetic, clinical, safety and other similar data that relate to the Development of such Product, including all data and information related to any Clinical Trials of such Product (including all final reports and case report forms) and (b) all clinical test designs and operating records related to any Clinical Trial for such Product.

1.45 "**Code**" shall have the meaning given to such term in Section 15.5.3.

1.46 "**Collaboration Marks**" shall have the meaning given to such term in Section 13.6.1.

1.47 "**Collaboration Product**" shall mean an Opt-In Product for which (a) Beam has elected the Beam Opt-In Option in accordance with Section 5.1, (b) Beam has not elected the Beam Opt-Out Option and (c) Verve has not elected the Verve Opt-Out Option.

1.48 "**Collaboration Technology**" shall mean the Beam Collaboration Technology, the Verve Collaboration Technology and the Joint Collaboration Technology.

1.49 "**Collaboration Territory**" shall mean the United States, its territories and possessions.

1.50 "**Collaboration Territory Revenue**" shall mean, for any given time period, [**]. Collaboration Territory Revenue in any given time period shall be determined on an accrual basis from the Parties' books and records maintained in accordance with GAAP.

1.51 "**Commercial Operations**" means, with respect to any Person and a country, the promotion, marketing or selling of any pharmaceutical or biologic product in such country by such Person or its Affiliates, either itself or jointly with a Third Party.

1.52 "**Commercialization Budget**" shall mean, with respect to a Collaboration Product in the Collaboration Territory, the budget for Shared Commercialization Costs included in the US Commercialization Plan for such Collaboration Product.

1.53 "**Commercialization Senior Officer**" shall mean, with respect to a Party, any officer designated under Section 3.3.3 (or such officer's designee) that has the requisite decision-making authority and expertise within such Party to make decisions related to Commercialization under this Agreement.

1.54 "**Commercialize**" shall mean to promote, market, distribute, sell and provide product support for a Product, and "**Commercializing**" and "**Commercialization**" shall have correlative meanings.

1.55 "**Commercially Reasonable Efforts**" shall mean, with respect to the efforts and resources to be expended by a Party with respect to any objective, the efforts and resources [**]. It is anticipated that the level of effort to be expended in the use of Commercially Reasonable Efforts will change over time, including to reflect changes in the status of the Product and the countries (or markets) involved. For the avoidance of doubt, where a Party has an obligation to use Commercially Reasonable Efforts, the efforts of such Party and its Affiliates and sublicensees shall be considered in determining whether such Party has satisfied such obligation.

1.56 "**Committee**" shall mean the JSC and any Subcommittee.

1.57 "**Competitor**" means:

1.57.1 with respect to Beam, [**]. An entity that is a Competitor under the foregoing clause (b) shall only be deemed a Competitor for so long as such control exists. [**]. After Beam has added such [**] additional entities, Beam may propose that [**] or more additional entities that meet the requirements set forth in the foregoing (i) and (ii) be added to Schedule 1.57.1, and such entity(ies) shall only be added to Schedule 1.57.1 by mutual written agreement of the Parties.

1.57.2 and with respect to Verve, a Third Party that is, or has an Affiliate that is, (i) developing or commercializing a Verve Competitive Product or (ii) engaged in a Verve Competitive Program.

1.58 "**Confidential Information**" shall have the meaning given to such term in Section 11.1.

1.59 "**Control**", "**Controls**" or "**Controlled by**" shall mean, with respect to any product, Patent Right or other tangible or intangible intellectual property right, the possession (whether by ownership or license, other than licenses granted pursuant to this Agreement) by a Party or its Affiliate of the ability to grant to the other Party access to, ownership of, or a license or sublicense under, such product, Patent Right, or other intellectual property without violating the terms of any agreement or other arrangement with any Third Party; provided, however, that any product, Patent Right or other tangible or intangible intellectual property right Controlled by (a) a Future Acquirer of a Party or (b) a Third Party that becomes an Affiliate of a Party due to a Change of Control of such Party following the Effective Date will not be treated as "Controlled" by such Party or its Affiliate for purposes of this Agreement.

1.60 "**Co-Promote**" shall mean the joint promotion of a Product by Verve and Beam through their respective sales forces under a single trademark in the Collaboration Territory, but shall not include any Manufacturing activities or Development activities or any other actions undertaken with Regulatory Authorities in order to obtain or maintain Marketing Authorizations. "**Co-Promotion**" and "**Co-Promoting**" shall have a correlative meaning.

1.61 "**Co-Promotion Agreement**" shall have the meaning given to such term in Section 7.6.

1.62 "**Cost of Goods Manufactured**" shall mean, with respect to a Product, [**].

1.63 "**Cost Report**" shall have the meaning given to such term in Section 10.5.2(a).

1.64 "**Covered**" shall mean, with respect to a given product, process, method or service, that a Valid Claim would (absent a license thereunder or ownership thereof) be infringed (whether directly infringed or indirectly by induced or contributory infringement) by the making, using, selling, offering for sale, importation or other exploitation of such product, process, method or service. With respect to a claim of a pending patent application, "infringed" refers to activity that would infringe or be covered by such Valid Claim if it were contained in an issued patent. Cognates of the word "Covered" shall have correlative meanings.

1.65 "**CPI**" shall mean, with respect to personnel located in the U.S., the Consumer Price Index – All Urban Consumers published by the United States Department of Labor, Bureau of Statistics (or its successor equivalent index), and with respect to personnel located outside the U.S., (a) an equivalent index in a foreign country applicable to FTEs in such country, accounting if possible for the area in such country where the personnel are located, or (b) other inflation measure or rate agreed to by the Parties.

1.66 [**].

1.67 "**Delivery Technology**" shall mean, (a) with respect to Beam, the Beam Delivery Technology and (b) with respect to Verve, the Verve Delivery Technology.

1.68 "**Delivery Technology Product**" shall mean, [**].

1.69 "**Detail**" means, with respect to a Collaboration Product in the Collaboration Territory, a face-to-face contact between a sales representative and a physician or other medical professional licensed to prescribe drugs, during which a primary position detail (as defined in the Co-Promotion Agreement) or a secondary position detail (as defined in the Co-Promotion Agreement) is made to such person, in each case as measured by each Party's internal recording of such activity in accordance with the Co-Promotion Agreement; provided that such meeting is consistent with and in accordance with the requirements of Applicable Law and this Agreement. When used as a verb, "Detail" means to engage in a Detail.

1.70 "**Develop**" shall mean to research, develop, analyze, test and conduct preclinical, clinical and all other regulatory trials for a Product, as well as any and all activities pertaining to manufacturing development, formulation development and lifecycle management, including new formulations and all other activities related to securing and maintaining Marketing Authorization for a Product. "**Developing**" and "**Development**" shall have correlative meanings.

1.71 "**Development Budget**" shall mean, with respect to a Subsequent Development Plan for a Collaboration Product, the budget for Development activities for such Collaboration Product in the Territory under such Development Plan in the Major Markets, as may be amended from time to time by the JSC. Each Development Budget shall be itemized by general Development activity and the Party expected to incur such expense.

1.72 "**Development Cost Report**" shall have the meaning given to such term in Section 10.5.2(a).

1.73 "**Development Plan**" shall mean, on a Product-by-Product basis, the Initial Development Plan and the Subsequent Development Plan for such Product.

1.74 **"Development Senior Officer**" shall mean, with respect to a Party, any officer designated under Section 3.3.3 (or such officer's designee) that has the requisite decision-making authority and expertise within such Party to make decisions related to Development under this Agreement.

1.75 "**Disclosing Party**" shall have the meaning given to such term in Section 11.1.

1.76 "**Dispute**" shall have the meaning given to such term in Section 16.7.

1.77 "**EMA**" shall mean the European Medicines Agency and any successor Regulatory Authority having substantially the same function.

1.78 "**European Union**" means the organization of member states of the European Union, as it may be constituted from time to time during the Term.

1.79 "**Existing Confidentiality Agreement**" shall have the meaning given to such term in Section 11.6.

1.80 "**FDA**" shall mean the United States Food and Drug Administration and any successor Regulatory Authority having substantially the same function.

1.81 "**Field**" shall mean the prevention or treatment of human diseases.

1.82 "**First Commercial Sale**" shall mean, with respect to a Product in a country, [**].

1.83 "**FTE**" shall mean [**] hours of work devoted to or in support of Development or Commercialization activities under this Agreement that is carried out by one or more qualified employees, contract personnel or consultants of a Party, measured in accordance with such Party's normal time allocation practices.

1.84 "**FTE Cost**" shall mean, for any period, the FTE Rate multiplied by the number of FTEs in such period.

1.85 "**FTE Rate**" shall mean, (a) for the period during the Term through the end of the first full Calendar Year, a rate of [**] U.S. Dollars ($[**]) per FTE and [**].

1.86 "**Fully Absorbed Standard Costs**" shall mean, with respect to a Product, [**].

1.87 "**Future Acquirer**" shall mean, with respect to a Party, the non-Affiliate party to any Change of Control of such Party and such non-Affiliate Person's Affiliates immediately prior to the Change of Control.

1.88 "**GAAP**" shall mean United States generally accepted accounting principles, consistently applied.

1.89 "**Governmental Authority**" shall mean any United States federal, state or local, or any foreign, government or political subdivision thereof, or any multinational organization or authority, or any authority, agency or commission entitled to exercise any administrative, executive, judicial, legislative, police, regulatory or taxing authority or power, any court or tribunal (or any department, bureau or division thereof), or any governmental arbitrator or arbitral body.

1.90 "**[**]**" has the meaning set forth in Section 1.34.

1.91 "**IND**" shall mean an investigational new drug application, clinical trial authorization, or similar application or submission for approval to conduct human clinical investigations filed with or submitted to a Regulatory Authority in conformance with the requirements of such Regulatory Authority.

1.92 "**Indemnified Party**" shall have the meaning given to such term in Section 14.4.1.

1.93 "**Indemnifying Party**" shall have the meaning given to such term in Section 14.4.1.

1.94 "**Independent Product**" means any Base Editor Product or Nuclease Product that is not a Licensed Product or a Delivery Technology Product.

1.95 "**Indication**" shall mean [**].

1.96 "**Initial Development Plan**" shall have the meaning given to such term in Section 4.3.1.

1.97 "**Initiate**" or "**Initiation**" shall mean, with respect to a Clinical Trial, the administration of the first dose to a human subject in such Clinical Trial.

1.98 "**Institution**" means each of [**].

1.99 [**].

1.100 "**JMC**" shall have the meaning given to such term in Section 3.5.1.

1.101 "**Joint Collaboration Know-How**" shall mean all Know-How, patentable or otherwise, conceived, developed, generated or reduced to practice during the Term jointly by, on one hand, Beam, its Affiliates or persons acting on behalf of Beam and, on the other hand, Verve, its Affiliates or persons acting on behalf of Verve, in each case through the Development, Commercialization or Manufacture of Products or otherwise arising out of a Party's performance of its obligations under this Agreement; provided that [**].

1.102 "**Joint Collaboration Patent Rights**" shall mean Patent Rights claiming any Joint Collaboration Know-How.

1.103 "**Joint Collaboration Technology**" shall mean the Joint Collaboration Know-How and Joint Collaboration Patent Rights.

1.104 "**JRC**" shall have the meaning given to such term in Section 3.4.1.

1.105 "**JSC**" shall have the meaning given to such term in Section 3.3.

1.106 "**Know-How**" shall mean any invention, discovery, development, data, information, process, method, technique, trade secret, composition of matter, formulation, article of manufacture or other know-how, and any physical embodiments of any of the foregoing.

1.107 [**].

1.108 "**Licensed Base Editor Product**" means, on a country-by-country basis, any Base Editor Product (a) the making, using, selling, offering for sale, importing or exporting of which in the country in question is Covered by at least one Valid Claim of the Beam Base Editor Patent Rights or (b) was made, discovered, developed or determined to have utility through the use of any of the Beam Base Editor Technology. For clarity, a Licensed Base Editor Product can also be Covered by one or more Valid Claims of the Beam C2C1 Patent Rights or have been made, discovered, developed or determined to have utility through the use of the Beam C2C1 Technology.

1.109 "**Licensed C2C1 Product**" means, on a country-by-country basis, any Nuclease Product (a) the making, using, selling, offering for sale, importing or exporting of which in the country in question is Covered by at least one Valid Claim of the Beam C2C1 Patent Rights or (b) was made, discovered, developed or determined to have utility through the use of any of the Beam C2C1 Technology.

1.110 "**Licensed Product**" means Licensed Base Editor Products and Licensed C2C1 Products.

1.111 "**Licensed Targets**" shall mean ANGPTL3, PCSK9, [**].

1.112 "**Licensee**" shall have the meaning given to such term in Section 1.127.

1.113 "**Licensor**" shall have the meaning given to such term in Section 1.127.

1.114 "**Losses**" shall have the meaning given to such term in Section 14.1.

1.115 "**Major Market**" means each of [**].

1.116 "**Manufacture**" or "**Manufacturing**" shall mean, with respect to a Product, including components thereof, the receipt, handling and storage of materials, the manufacturing, processing, packaging and labeling (excluding the development of packaging and labeling components for Marketing Authorization), holding (including storage), quality assurance and quality control testing (including release) of such compound or product (other than quality assurance and quality control related to development of the manufacturing process, which activities shall be considered Development activities) and shipping of such Product (or components thereof).

1.117 "**Marketing Authorization**" shall mean all approvals from the relevant Regulatory Authority necessary to market and sell a product in any country, including Pricing Approval if necessary.

1.118 "**Material Transfer Agreement**" shall have the meaning given to such term in Section 2.6.5.

1.119 "**[**]**" shall mean [**].

1.120 "**NDA**" shall mean a New Drug Application, Biologics License Application, Worldwide Marketing Application, Marketing Authorization Application, filing pursuant to Section 510(k) of the Act, or similar application or submission for Marketing Authorization of a Product filed with a Regulatory Authority to obtain Marketing Authorization for a biological, pharmaceutical or diagnostic product in the applicable jurisdiction.

1.121 "**Net Sales**" shall mean [**].

1.122 "**Nuclease Product**" shall mean [**].

1.123 "**Opt-In Information Package**" shall have the meaning given to such term in Section 5.1.

1.124 "**Opt-In Product**" shall mean [**] (a) Licensed Product, (b) [**] other Nuclease Product or (c) [**] other Base Editor Product [**].

1.125 "**Opt-Out Date**" shall mean the Beam Opt-Out Date or the Verve Opt-Out Date, as applicable.

1.126 "**Party**" or "**Parties**" shall have the meaning given to such term in the preamble to this Agreement.

1.127 "**Party Materials**" shall have the meaning given to such term in Section 2.6.1.

1.128 "**Patent Challenge**" means any direct or indirect dispute or challenge, or any knowing, willful or reckless assistance in the dispute or challenge, of the validity, patentability, scope, priority, construction, non-infringement, inventorship, ownership or enforceability of any Patent Right (a "**Challenged Patent Right**") licensed by a Party (the "**Licensor**") to the other Party (the "**Licensee**") under this Agreement or any claim thereof, or opposition or assistance in the opposition of the grant of any letters patent within the Challenged Patent Rights, in any legal or administrative proceedings, including in a court of law, before the United States Patent and Trademark Office or other agency or tribunal in any jurisdiction, or in arbitration including by reexamination, *inter partes* review,

opposition, interference, post-grant review, nullity proceeding, preissuance submission, third party submission, derivation proceeding or declaratory judgment action; provided, however, that the term Patent Challenge shall not include (a) the Licensee or any of its Affiliates or sublicensees being an essential party in any patent interference proceeding before the United States Patent and Trademark Office, which interference the Licensee or its applicable Affiliate or sublicensee acts in good faith to try to settle or (b) the Licensee or any of its Affiliates or sublicensees, due to its status as an exclusive licensee of patent rights other than the Challenged Patent Rights, being named by the Licensor of such patent rights as a real party in interest in such an interference, so long as the Licensee or its applicable Affiliate or sublicensee either abstains from participation in, or acts in good faith to settle, the interference. For clarity, a Patent Challenge shall not include arguments made by the Licensee that (x) distinguish the inventions claimed in Patent Rights owned or controlled by the Licensee from those claimed in the Challenged Patent Rights but (y) do not disparage the Challenged Patent Rights or raise any issue of Challenged Patent Rights' compliance with or sufficiency under applicable patent laws, regulations or administrative rules, in each case (i) in the ordinary course of ex parte prosecution of the Patent Rights owned or controlled by the Licensee or (ii) in *inter partes* proceedings before the United States Patent and Trademark Office or other agency or tribunal in any jurisdiction (excluding interferences or derivation proceedings), or in arbitration, wherein the Patent Rights owned or controlled by the Licensee have been challenged. For further clarity, unless in conflict with the definition of a "Patent Challenge" that exists as of the Effective Date under a Third Party Agreement applicable to the Challenged Patent Rights, a Patent Challenge shall not include any counterclaim made, filed or maintained by the Licensee or its applicable Affiliate or sublicensee as a defendant in any claim, demand, lawsuit, cause of action or other action made, filed or maintained by the Licensor or its Affiliate or designee asserting infringement of any Patent Right.

1.129 "**Patent Rights**" shall mean (a) all patents and patent applications in any country or supranational jurisdiction in the Territory, (b) any substitutions, divisionals, continuations, continuations-in-part, provisional applications, reissues, renewals, registrations, confirmations, re-examinations, extensions, supplementary protection certificates and the like of any such patents or patent applications, (c) foreign counterparts of any of the foregoing, (d) all applications claiming priority to any of the foregoing, (e) any patents issuing on any patent application identified in clauses (a) through (d), (f) any application to which any of the foregoing claim priority and (g) any application that claims common priority with any of the foregoing.

1.130 "**Permitted Uses**" shall have the meaning given to such term in Section 2.6.2.

1.131 "**Person**" shall mean an individual, Governmental Authority, government official, corporation, partnership, limited liability company, trust, business trust, association, joint stock company, joint venture, pool, syndicate, sole proprietorship, unincorporated organization, or any other form of entity not specifically listed herein.

1.132 "**Pharmacovigilance Agreement**" shall have the meaning given to such term in Section 3.12.

1.133 "**Phase I Clinical Trial**" shall mean a human clinical trial in any country that would satisfy the requirements of 21 CFR 312.21(a).

1.134 "**Phase II Clinical Trial**" shall mean a human clinical trial in any country that would satisfy the requirements of 21 CFR 312.21(b).

1.135 "**Phase III Clinical Trial**" shall mean a human clinical trial in any country that would satisfy the requirements of 21 CFR 312.21(c).

1.136 "**Phase IV Clinical Trial**" shall mean (i) any human clinical trial (other than a Phase I Clinical Trial, Phase II Clinical Trial or Phase III Clinical Trial) in any country which is conducted on a Product for an Indication in the Field after Marketing Authorization of such Product has been obtained from an appropriate Regulatory Authority in such country for such Indication, and includes (a) clinical trials conducted voluntarily after Marketing Authorization for enhancing marketing or scientific knowledge of an approved Indication in the Field or (b) trials conducted after Marketing Authorization due to request or requirement of a Regulatory Authority or as a condition of a previously granted Marketing Authorization or (ii) any REMS/RMP related study of a Product for an Indication in the Field after Marketing Authorization of such Product has been obtained from an appropriate Regulatory Authority in such country for such Indication.

1.137 "**Post-Approval Shared Development Costs**" shall mean, on a Collaboration Product-by-Collaboration Product basis, the sum of [**].

1.138 "**Post-Approval Shared Regulatory Costs**" shall mean, on an Collaboration Product-by-Collaboration Product basis, the sum of [**].

1.139 "**Post-Termination Licensed Technology**" shall have the meaning given to such term in Section 15.5.2(b).

1.140 "**Pricing Approval**" means, with respect to a product in any country where a Governmental Authority authorizes reimbursement for, or approves or determines pricing for, pharmaceutical products, (a) receipt (or, if required to make such authorization, approval or determination effective, publication) of such reimbursement authorization or pricing approval or determination (as the case may be) for such product in such country and (b) the earlier to occur of (i) Verve, its Affiliate or sublicensee indicating agreement with such price(s) in such country or (ii) Verve, its Affiliate or sublicensee commencing Commercialization activities for such Product in such country after Marketing Authorization (other than Pricing Approval).

1.141 "**Product(s)**" shall mean any Base Editor Product, Nuclease Product or Delivery Technology Product, as applicable.

1.142 "**Product-Specific Know-How**" means any Beam Base Editor Know-How, Beam C2C1 Know-How or Beam Collaboration Know-How that [**].

1.143 "**Product-Specific Patent Right**" means any Beam Base Editor Patent Right, Beam C2C1 Patent Right or Beam Collaboration Patent Right that solely claims or discloses any Product-Specific Know-How.

1.144 "**Receiving Party**" shall have the meaning given to such term in Section 11.1.

1.145 "**Reconciliation Report**" shall have the meaning given to such term in Section 10.5.2(d).

1.146 "**Regulatory Authority**" shall mean any applicable Governmental Authority involved in granting approvals for the manufacturing or marketing of a Product (including Marketing Authorizations therefor) in the Territory, including in the United States, the FDA, and in the European Union, the EMA.

1.147 "**Regulatory Documentation**" shall have the meaning given to such term in Section 6.2.

1.148 "**Research Plan**" shall have the meaning given to such term in Section 4.2.

1.149 "**Royalty Term**" shall mean:

1.149.1 on a country-by-country and Licensed Product-by-Licensed Product basis, the period during which royalties shall be paid on the sum of Net Sales of such Licensed Product in such country, from the First Commercial Sale of such Licensed Product until the latest of: (a) the expiration date of the last to expire Valid Claim within the Beam Base Editor Patent Rights, Beam C2C1 Patent Rights, Beam Collaboration Patent Rights, Patent Rights within Beam Delivery Technology or Joint Collaboration Patent Rights Covering the applicable Licensed Product (or if the last such Valid Claim with respect to such Licensed Product in such country is a pending Valid Claim, the date such pending Valid Claim ceases to be a Valid Claim; provided, however, that subsequent issuance of such Valid Claim shall again extend the Royalty Term from the date of such issuance to the expiration date of such Valid Claim); (b) the period of regulatory exclusivity associated with such Licensed Product in such country; or (c) ten (10) years after the First Commercial Sale of such Licensed Product in such country;

1.149.2 on a country-by-country and Beam Delivery Technology Product-by-Beam Delivery Technology Product basis, the period during which royalties shall be paid on the sum of Net Sales of such Beam Delivery Technology Product in such country, from the First Commercial Sale of such Beam Delivery Technology Product until the latest of: (a) the expiration date of the last to expire Valid Claim within the Patent Rights within Verve Delivery Technology Covering the applicable Beam Delivery Technology Product (or if the last such Valid Claim with respect to such Beam Delivery Technology Product in such country is a pending Valid Claim, the date such pending Valid Claim ceases to be a Valid Claim; provided, however, that subsequent issuance of such Valid Claim shall again extend the Royalty Term from the date of such issuance to the expiration date of such Valid Claim); (b) the period of regulatory exclusivity associated with such Beam Delivery Technology Product in such country; or (c) ten (10) years after the First Commercial Sale of such Beam Delivery Technology Product in such country;

1.149.3 on a country-by-country and Verve Delivery Technology Product-by-Verve Delivery Technology Product basis, the period during which royalties shall be paid on the sum of Net Sales of such Verve Delivery Technology Product in such country, from the First Commercial Sale of such Verve Delivery Technology Product until the latest of: (a) the expiration date of the last to expire Valid Claim within the Patent Rights within Beam Delivery Technology Covering the applicable Verve Delivery Technology Product (or if the last such Valid Claim with respect to such Verve Delivery Technology Product in such country is a pending Valid Claim, the date such pending Valid Claim ceases to be a Valid Claim; provided, however, that subsequent issuance of such Valid Claim shall again extend the Royalty Term from the date of such issuance to the expiration date of such Valid Claim); (b) the period of regulatory exclusivity associated with such Verve Delivery Technology Product in such country; or (c) ten (10) years after the First Commercial Sale of such Verve Delivery Technology Product in such country; or

1.149.4 on a country-by-country and Terminated Reversion Product-by-Terminated Reversion Product basis, the period during which royalties shall be paid on the sum of Net Sales of such Terminated Reversion Product in such country, from the First Commercial Sale of such Terminated Reversion Product until the latest of: (a) the expiration date of the last to expire Valid Claim within the Patent Rights within the Post-Termination Licensed Technology Covering the applicable Terminated Reversion Product (or if the last such Valid Claim with respect to such Terminated Reversion Product in such country is a pending Valid Claim, the date such pending Valid Claim ceases to be a Valid Claim; provided, however, that subsequent issuance of such Valid Claim shall again extend the Royalty Term from the date of such issuance to the expiration date of such Valid Claim); (b) the period of regulatory exclusivity associated with such Terminated Reversion Product in such country; or (c) ten (10) years after the First Commercial Sale of such Terminated Reversion Product in such country.

1.150 "**Safety Issue**" shall mean, with respect to a Product, [**].

1.151 "**Sales and Marketing Expenses**" shall mean the sum of [**].

1.152 "**Senior Officers**" shall have the meaning given to such term in Section 3.3.3.

1.153 "**Shared Commercialization Costs**" shall mean, with respect to a Collaboration Product, the sum of the following: [**].

1.154 "**Shared Costs**" shall mean any Shared Commercialization Costs or Shared Development Costs.

1.155 "**Shared Development Costs**" shall mean, with respect to a Collaboration Product, the sum of [**].

1.156 "**Shared Distribution Costs**" shall mean the sum of [**].

1.157 "**Subcommittees**" shall mean the JRC, JDC, JMC, JCC or any other committee or subcommittee (other than the JSC) formed in accordance with this Agreement.

1.158 "**Subsequent Development Plan**" shall have the meaning given to such term in Section 4.3.2(a).

1.159 "**Supply Agreement(s)**" shall mean any and all supply agreements entered into by the Parties (or their respective Affiliates) with respect to Products as of the Effective Date or thereafter.

1.160 "**Surviving Sublicensee**" shall have the meaning given to such term in Section 2.2.4.

1.161 "**Technology Transfer Plan**" shall have the meaning given to such term in Section 2.5.

1.162 "**Term**" shall have the meaning given to such term in Section 15.1.

1.163 "**Terminated Product**" shall have the meaning given to such term in Section 15.5.1.

1.164 "**Terminated Reversion Product**" shall have the meaning given to such term in Section 15.5.2(a).

1.165 "**Territory**" shall mean all of the countries in the world, and their territories and possessions.

1.166 "**Third Party**" shall mean a Person other than Verve, Beam or their respective Affiliates.

1.167 "**Third Party Agreements**" shall mean (a) subject to Section 3.3.3(b)(viii), any agreement entered into after the Effective Date between a Third Party and Verve or its Affiliate pursuant to which Verve or its Affiliate gains rights to use such Third Party's intellectual property in the Development, Manufacture or Commercialization of a Licensed Product or Collaboration Product under this Agreement, (b) with respect to Beam, any agreement set forth on Schedule 1.167(a) and, with respect to Verve, any agreement set forth on Schedule 1.167(b) or (c) any agreement between a Third Party and a Party or its Affiliate that is deemed a "Third Party Agreement" under Section 2.4.3 or 9.2.

1.168 "**Third Party Payments**" shall mean compensation paid to any Third Party by a Party or by both Parties (or their respective Affiliates) under any Third Party Agreement.

1.169 "**US Commercialization Plan**" shall have the meaning given to such term in Section 7.3.1.

1.170 "**Valid Claim**" means, with respect to any Patent Rights, (a) a claim of an issued and unexpired patent within such Patent Rights that has not been (i) held permanently revoked, unenforceable, unpatentable or invalid by a decision of a court or governmental body of competent jurisdiction, unappealable or unappealed within the time allowed for appeal, (ii) rendered unenforceable through disclaimer, or (iii) permanently lost through an interference or opposition proceeding without any right of appeal or review, or not

appealed or put in for review within the applicable statutory or regulatory period; or (b) a pending claim of a pending patent application within such Patent Rights that has not been (i) abandoned or finally rejected without the possibility of appeal or refiling or (ii) pending more than [**] from the date of the first substantive office action on such pending patent application, provided such patent application is not pending more than [**] from its earliest priority date. A pending claim that ceases to be a Valid Claim due to the foregoing time limit shall, if it later issues, qualify again as a Valid Claim, provided that it meets the requirements of clauses (a)(i)-(iii) of the foregoing definition.

1.171 "**Verve**" shall have the meaning given to such term in the preamble to this Agreement.

1.172 "**Verve Collaboration Know-How**" shall mean all Know-How, patentable or otherwise, conceived, developed, generated or reduced to practice during the Term solely by Verve or its Affiliates or other persons acting on behalf of Verve through the Development, Commercialization or Manufacture of Products or otherwise arising out of Verve's performance of its obligations under this Agreement; provided that Verve Collaboration Know-How shall not include any Beam Collaboration Know-How.

1.173 "**Verve Collaboration Patent Rights**" shall mean Patent Rights which (a) as of the Effective Date or during the Term are Controlled by Verve or its Affiliates and (b) claim Verve Collaboration Know-How.

1.174 "**Verve Collaboration Technology**" shall mean Verve Collaboration Know-How and Verve Collaboration Patent Rights.

1.175 "**Verve Competitive Product**" shall have the meaning given to such term in Section 1.176.

1.176 "**Verve Competitive Program**" shall mean any research or development program for which [**], with the goal of discovering or developing (a) a Base Editor Product or (b) a Nuclease Product (such product ((a) or (b)), an "**Verve Competitive Product**"); provided that, the determination as to whether a Third Party is engaged in a Verve Competitive Program shall be conclusively determined based on [**].

1.177 "**Verve Delivery Technology**" shall mean, [**].

1.178 "**Verve Delivery Technology Product**" shall have the meaning given to such term in Section 1.68.

1.179 "**Verve Indemnified Parties**" shall have the meaning given to such term in Section 14.1.

1.180 "**Verve IP Competitive Infringement**" shall have the meaning given to such term in Section 13.4.1.

1.181 "**Verve Opt-Out Date**" shall have the meaning given to such term in Section 5.4.

1.182 "**Verve Opt-Out Option**" shall have the meaning given to such term in Section 5.4.

1.183 "**Verve Third Party Agreement**" shall have the meaning given to such term in Section 12.2.7.

1.184 "**Verve-[**] Agreement**" shall mean the [**] License Agreement by and between [**] and Verve, dated as of [**], as such agreement may be amended from time to time in accordance with its terms.

1.185 "**Verve-[**] Agreement**" shall mean the [**] License Agreement by and between [**] and Verve, dated as of [**], as such agreement may be amended from time to time in accordance with its terms.

Article 2 LICENSES

2.1 **License Grants; Retained Rights**.

2.1.1 Subject to the terms and conditions of this Agreement (including Section 2.4.1), Beam hereby grants, and shall cause its Affiliates to grant, to Verve an exclusive (even as to Beam and its Affiliates, except as set forth in Section 2.1.6) license under the Beam Base Editor Technology, Beam C2C1 Technology and Beam's interest in the Joint Collaboration Technology, with a right to grant and authorize the further grant through multiple tiers of sublicenses in accordance with this Agreement (including Section 2.2), solely to Develop, make, have made, use, offer for sale, sell, have sold, and import Licensed Products in the Field in the Territory.

2.1.2 Subject to the terms and conditions of this Agreement, Verve hereby grants, and Verve shall cause its Affiliates to grant, to Beam a non-exclusive license under the Know-How (patentable or otherwise) and Patent Rights Controlled by Verve or its Affiliates as of the Effective Date or during the Term, and Verve's interest in the Joint Collaboration Technology, with a right to grant and authorize the further grant through multiple tiers of sublicenses in accordance with this Agreement (including Section 2.2), solely to conduct the activities allocated to Beam under a Research Plan or Development Plan (if any).

2.1.3 Subject to the terms and conditions of this Agreement, Verve hereby grants, and shall cause its Affiliates to grant, to Beam an exclusive license (except with respect to Verve, its Affiliates, licensees and sublicensees) under Verve Delivery Technology, with a right to grant and authorize the further grant of sublicenses in accordance with this Agreement (including Section 2.2), solely to Develop, make, have made, use, offer for sale, sell, have sold, and import product candidates and products (except for Base Editor Products) including a [**] in the Territory.

2.1.4 Subject to the terms and conditions of this Agreement (including Section 2.4.1), Beam hereby grants, and shall cause its Affiliates to grant, to Verve an exclusive license (with Beam and its Affiliates) under Beam Delivery Technology, with a right to grant and authorize the further grant of sublicenses in accordance with this Agreement (including Section 2.2), solely to Develop, make, have made, use, offer for sale, sell, have sold, and import Base Editor Products and Nuclease Products in the Field in the Territory.

2.1.5 Subject to the terms and conditions of this Agreement, on a Collaboration Product-by-Collaboration Product basis, effective upon Beam's exercise of the Beam Opt-In Option with respect to a Collaboration Product, Verve hereby grants, and shall cause its Affiliates to grant, to Beam a non-exclusive license under the Know-How (patentable or otherwise) and Patent Rights Controlled by Verve or its Affiliates as of the date of Beam's exercise of the Beam Opt-In Option or thereafter during the Term, and Verve's interest in the Joint Collaboration Technology, with a right to grant and authorize the further grant of sublicenses as permitted under this Agreement (including the US Commercialization Plan) or the Co-Promotion Agreement, to offer for sale, sell, have sold, and import (including Commercialize and Co-Promote) such Collaboration Product in the Field in the Collaboration Territory.

2.1.6 Notwithstanding anything to the contrary in this Agreement, including without limitation the license grant to Verve set forth in Section 2.1.1, Beam and its Affiliates shall retain the right under Beam Base Editor Technology, Beam C2C1 Technology and Beam's interest in the Joint Collaboration Technology to (a) Manufacture Base Editor Products in accordance with Article 8 or any Supply Agreement and (b) otherwise exercise their respective rights and perform their respective obligations under the this Agreement, including without limitation the Development of Collaboration Products in the Territory as set forth in this Agreement (including any Development Plan) and the Commercialization of Collaboration Products in the Collaboration Territory as set forth in this Agreement (including the US Commercialization Plan) or a Co-Promotion Agreement.

2.2 Sublicenses.

2.2.1 In no event shall any sublicense granted pursuant to Section 2.1 diminish, reduce or eliminate any of the obligations of the sublicensing Party under this Agreement. Any sublicense granted pursuant to Section 2.1 shall be subject and subordinate to, and consistent with, the terms and conditions of this Agreement and shall require each such sublicensee to comply with all applicable terms of this Agreement, including the prohibition of further sublicensing by the sublicensee except where such sublicense is in compliance with the provisions of this Agreement.

2.2.2 [**]. The sublicensing Party shall provide the other Party with a fully-executed copy of any agreement (which the sublicensing Party may redact as necessary to protect confidential or commercially sensitive information) reflecting any such sublicense promptly after the execution thereof. If a Party grants a sublicense, the terms and conditions of this Agreement and the Third Party Agreements that are applicable to sublicensees shall apply to such sublicensee to the same extent as they apply to such Party. Further, the sublicensing Party assumes full

responsibility, and shall remain primarily liable, for causing the performance of all obligations of each Affiliate and sublicensee of such sublicensing Party to which it grants a sublicense, and will itself pay and account to the other Party for all payments due under this Agreement by reason of operation of any such sublicense.

2.2.3 [**].

2.2.4 Any sublicensed rights granted by Verve pursuant to Section 2.2.2 with respect to a Terminated Product shall terminate effective upon the termination of this Agreement with respect to such Terminated Product, provided that, subject to and to the extent permitted under the Third Party Agreements, the terms of such sublicensed rights shall not terminate if, as of the effective date of such termination, the relevant sublicensee for such sublicense is not in material breach of its obligations to Verve under its sublicense agreement, and within [**] of such termination, such sublicensee agrees in writing to be bound directly to Beam under a license agreement substantially similar to this Agreement with respect to the rights sublicensed and granted hereunder, substituting such sublicensee (a "**Surviving Sublicensee**") for Verve, and provided further that (a) the scope of the rights granted to the Surviving Sublicensee under such license agreement (with respect to such Terminated Product) shall be equal to (or, upon mutual agreement of the Parties, less than) the scope of the rights that had been sublicensed and granted by Verve to the Surviving Sublicensee pursuant to such sublicense agreement; (b) such license agreement shall obligate the Surviving Sublicensee to pay directly to Beam amounts corresponding to those set forth in Article 10 which are payable based on the activities of such Surviving Sublicensee, its Affiliates and its sublicensees from and after the effective date of such termination; (c) Beam will not be required to undertake obligations in addition to those required by this Agreement; (d) that Beam's rights under such direct license will be consistent with its rights under this Agreement, taking into account the scope of the license granted under such direct license; and (e) such license agreement shall not modify the rights and obligations of the Parties following any termination of this Agreement in whole or in part.

2.2.5 The Parties acknowledge and agree that:

(a) [**] is an intended third party beneficiary of the rights granted to Verve by Beam pursuant to Section 2.1.1 and 2.1.4 under the Beam Base Editor Technology and Beam C2C1 Technology licensed to Beam by [**] under the Beam-[**] Agreement, solely for the purpose of enforcing all patent challenge, intellectual property ownership, indemnification and insurance and compliance with law provisions applicable to such Beam Base Editor Technology and Beam C2C1 Technology licensed to Verve under this Agreement and, with respect to such insurance and indemnification provisions, each applicable Product, and enforcing the right to terminate this Agreement for breach of such patent challenge, indemnification (solely with respect to Verve's obligation to indemnify [**] as set forth in Schedule 2.4.1(a)) and insurance provisions;

(b) Each other Institution is an intended third party beneficiary of the rights granted to Verve by Beam pursuant to Section 2.1.1 and 2.1.4 under the Beam Base Editor Technology and Beam C2C1 Technology licensed to Beam by such other Institution under the applicable Third Party Agreement for the purpose of enforcing such Institution's rights, including indemnification and insurance provisions that relate to such Beam Base Editor Technology and Beam C2C1 Technology licensed to Verve under this Agreement, and each Product relating to such grant of rights;

(c) The rights of [**] or any other Institution may be enforced by any Institution in any court of competent jurisdiction and, without limiting the generality of the foregoing, Verve consents to jurisdiction in Massachusetts courts with respect to any such Institution's enforcement of its rights under this Agreement; and

(d) Notwithstanding the governing law selected under this Agreement, Verve agrees that, in the event of any difference in interpretation or result as between the laws of the jurisdiction of this Agreement and the laws of Massachusetts, the laws of Massachusetts shall control in any action in which [**] or any other Institution is enforcing its rights under this Agreement.

2.3 Other IP.

2.3.1 Subject to the terms and conditions of this Agreement, Beam hereby grants to Verve the non-exclusive right, free of charge, to use the Beam name and logo solely for the purpose of Co-Promoting the Collaboration Products in accordance with the terms of this Agreement and the Co-Promotion Agreement, and Verve hereby grants to Beam the non-exclusive right, free of charge, to use the Verve name and logo in the Collaboration Territory solely for the purpose of Co-Promoting the Collaboration Products in accordance with the terms of this Agreement and the Co-Promotion Agreement, provided that such rights shall be exercised, and all Collaboration Products bearing such names or logos shall be manufactured, in accordance with the quality standards established by the JSC. Beam or its Affiliate shall remain the owner of the Beam name and logo and the trademarks and the goodwill pertaining thereto. Verve or its Affiliate shall remain the owner of the Verve name and logo and the trademarks and the goodwill pertaining thereto. Notwithstanding any provision of this Agreement or any Co-Promotion Agreement to the contrary, the quality standards established by the JSC may not conflict with or otherwise contravene any quality standards or restrictions on use set forth in the Co-Promotion Agreement.

2.3.2 Subject to the terms and conditions of this Agreement, Verve hereby grants to Beam an exclusive (except as to Verve and its Affiliates) license, free of charge, to use the Collaboration Marks solely in connection with Co-Promoting the Collaboration Products in the Collaboration Territory in accordance with the terms of this Agreement and the Co-Promotion Agreement.

2.3.3 Subject to the terms and conditions of this Agreement, each Party hereby grants to the other Party an exclusive (except as to such Party and its Affiliates) license, free of charge, to use the copyrighted material created for use in connection with the marketing of the Collaboration Products in the Collaboration Territory solely for use in connection with Co-Promoting the Collaboration Products in the Collaboration Territory in accordance with the terms of this Agreement and the Co-Promotion Agreement.

2.4 Third Party Agreements.

2.4.1 Notwithstanding anything to the contrary in this Agreement, each Party acknowledges and agrees that the rights, licenses, and sublicenses granted by the other Party to such Party in this Agreement (including any right to sublicense) are subject to the terms of the Third Party Agreements set forth on Schedule 1.167(a) (with respect to rights granted by Beam) and Schedule 1.167(b) (with respect to rights granted by Verve) and the rights granted to Third Parties thereunder, the scope of the licenses granted to such other Party thereunder and the rights retained by such Third Parties and any other Third Parties (including Governmental Authorities) set forth therein, including, with respect to Beam Third Party Agreements, (a) Sections [**] of the Beam-[**] Agreement, (b) Sections [**] of the Beam-[**] Agreement and (c) Sections [**] of the Beam-[**] Agreement; and with respect to Verve Third Party Agreements, (x) [**] of the Verve-[**] Agreement and (y) [**] of the Verve-[**] Agreement. Without limiting the above in any way, at the granting Party's request, the receiving Party shall use Commercially Reasonable Efforts to, and cause its Affiliates and all sublicensees to use Commercially Reasonable Efforts to, take such reasonable actions, as may be required to assist the granting Party in complying with its obligations under Third Party Agreements, solely to the extent applicable to such receiving Party's rights or obligations under this Agreement. Without limiting any of the foregoing, (a) Verve agrees to be bound by the terms and conditions of the provisions set forth in Schedule 2.4.1(a), as applicable, with respect to sublicenses granted by Beam to Verve under Section 2.1 under Third Party Agreements, and (b) Beam agrees to be bound by the terms and conditions of the provisions set forth in Schedule 2.4.1(b), as applicable, with respect to sublicenses granted by Verve to Beam under Section 2.1 under Third Party Agreements.

2.4.2 Verve acknowledges and agrees that, if any of the licenses granted to Beam under the Beam Third Party Agreements are terminated, in whole or in part, then, to the extent that any Patent Rights or Know-How licensed under such terminated license is part of Beam Base Editor Technology or Beam Delivery Technology

hereunder, then Verve's license under such terminated licenses(s) shall automatically terminate, subject to any right of Verve to receive a direct license from the relevant Third Party, including from [**] under Section [**] of the Beam-[**] Agreement, Section [**] of the Beam-[**] Agreement and Section [**] of the Beam-[**] Agreement. Beam acknowledges and agrees that, if any of the licenses granted to Verve under the Verve Third Party Agreements are terminated, in whole or in part, then, to the extent that any Patent Rights or Know-How licensed under such terminated license is part of Verve Delivery Technology hereunder, then Beam's license under such terminated licenses(s) shall automatically terminate, subject to any right of Beam to receive a direct license from the relevant Third Party.

2.4.3 Notwithstanding anything to the contrary in this Agreement, in the event that Beam enters into an agreement or arrangement following the Effective Date under which Beam or its Affiliate is granted rights to any Patent Right or Know-How that would be Beam Base Editor Technology or Beam C2C1 Technology hereunder, such Patent Right or Know-How is hereby [**] a Beam Base Editor Patent Right, Beam Base Editor Know-How, Beam C2C1 Patent Right or Beam C2C1 Know-How hereunder, as applicable, [**], in each case to the extent permitted under any confidentiality obligations related to such arrangement or agreement, (a) [**]. Beam will use commercially reasonable efforts to secure the right to disclose to Verve the information described in the foregoing clauses (i) through (iii). Beam shall be required to provide the notice described in clause (a) of this Section 2.4.3 within [**] of the effective date of an agreement or arrangement under which Beam or its Affiliate is granted rights to any Patent Right or Know-How that would be a Beam Base Editor Patent Right, Beam Base Editor Know-How, Beam C2C1 Patent Right or Beam C2C1 Know-How hereunder if accepted by Verve. If Verve does not provide the notice described in clause (b) of this Section 2.4.3 or indicates in such written notice that it does not wish to obtain a sublicense under the relevant Patent Right or Know-How, such Patent Right or Know-How is hereby deemed not to be a Beam Base Editor Patent Right, Beam Base Editor Know-How, Beam C2C1 Patent Right or Beam C2C1 Know-How hereunder.

2.4.4 Verve shall be responsible for [**]. Any undisputed payment owed by Verve under this Section 2.4.4 shall be made by Verve to Beam within [**] after receipt of invoice from Beam.

2.4.5 Beam shall be responsible for [**]. Any undisputed payment owed by Beam under this Section 2.4.5 shall be made by Beam to Verve within [**] after receipt of invoice from Verve.

2.5 **Exchange of Information**. Promptly after the Effective Date, the Parties shall agree to a plan (including a timeline) in which each Party shall disclose to the other Party on an ongoing basis during the Term in English and in writing or in an electronic format all Beam Base Editor Technology and all Collaboration Technology respectively, to the extent not previously disclosed (as may be amended from time to time in accordance with this Agreement, the "**Technology Transfer Plan**"). The Technology Transfer Plan can be amended from time to time by mutual written agreement by the Parties.

2.6 Transfer of Materials.

2.6.1 **Transfer**. A Party may agree under this Agreement (including the applicable Research Plan or Development Plan) to provide the other Party certain Know-How that are tangible biological materials (the "**Party Materials**"). Except as expressly set forth in this Agreement, the Party Materials are provided by the providing Party on an "as-is" basis without any representation or warranty of any type, express or implied, including any representation or warranty of merchantability, non-infringement, title or fitness for a particular purpose, each of which is hereby expressly disclaimed by the providing Party.

2.6.2 **Permitted Use of Party Materials**. The Party receiving Party Materials from the other Party will use such Party Materials solely as contemplated in a Research Plan, Development Plan, or otherwise within the scope of the licenses granted to such receiving Party under this Agreement (collectively, "**Permitted Uses**"). Without limiting the generality of the foregoing, except for Permitted Uses, the receiving Party of any Party Materials will not (a) make or attempt to make any analogues, progeny or derivatives of, or modifications to, such Party Materials or attempt to reverse engineer, characterize or in any way try to ascertain the identity, chemical structure, sequence, mechanism of action or composition of such Party Materials, or (b) use such Party Materials for such receiving Party's own benefit or for the benefit of any of its Affiliates or any Third Party. Further, the Party receiving Party Materials will not administer any such Party Materials to any human and will comply with all Applicable Laws applicable to the handling and use of such Party Materials.

2.6.3 **Unauthorized Use of Party Materials**. If any Party receives Party Material from the other Party and uses such Party Material in any manner other than Permitted Uses, then any and all results of such unauthorized use, whether patentable or not, will belong solely and exclusively to the providing Party. Without limiting any other remedy that the providing Party of Party Materials may have under this Agreement or Applicable Law, the receiving Party of such Party Materials, on behalf of itself and its Affiliates, hereby assigns and agrees to assign to the providing Party all of the receiving Party's and its Affiliates' right, title and interest in and to all such discoveries and inventions arising from any such unauthorized uses of such Party Materials.

2.6.4 **Title to Party Materials; Return**. All right, title and interest in and to the Party Materials provided by a Party under this Agreement will remain the sole and exclusive property of such providing Party notwithstanding the transfer to and use by the other Party of the same. At the end of the activities under this Agreement that relate to any Party Materials (including any termination of this Agreement in whole or in part), any Party who has received relevant Party Materials will either destroy or return to the providing Party, at such providing Party's sole discretion, all of such Party Materials that are unused.

2.6.5 **Material Transfer Agreement.** This Agreement supersedes and replaces that certain Material Transfer Agreement by and between the Parties dated as of [**], as amended (the "**Material Transfer Agreement**"). All Materials (as such term is defined in the Material Transfer Agreement) delivered to a Party by the other Party under the Material Transfer Agreement shall be deemed Party Materials of the respective providing Party hereunder and shall be so subject to the terms of this Agreement.

2.7 **No Implied Licenses**. Except as expressly set forth in this Agreement, neither Party shall, by virtue of this Agreement, acquire any license or other intellectual property interest, by implication or otherwise, in (a) any information disclosed to it under this Agreement, (b) any patents or patent applications Controlled or owned by the other Party or its Affiliates, (c) any trademarks (whether registered or protected by common law), trademark applications, or any goodwill associated with the foregoing Controlled or owned by the other Party or its Affiliates, or (d) any other intellectual property rights, however denominated, throughout the world, Controlled or owned by the other Party or its Affiliates.

Article 3 MANAGEMENT; EXCHANGE OF INFORMATION

3.1 **Collaboration Overview**. The Parties desire and intend to collaborate with respect to the Development and Commercialization of Products in the Field in the Territory, as and to the extent set forth in this Agreement.

3.2 **Limits on Committee Authority**. Each Party shall retain the rights, powers and discretion granted to it under this Agreement and no such rights, powers, or discretion shall be delegated to or vested in the JSC or any Subcommittee unless such delegation or vesting of rights is expressly provided for in this Agreement or the Parties expressly so agree in writing. Notwithstanding anything to the contrary in this Agreement, in no circumstances shall the JSC or any Subcommittee have any power to amend, modify or waive compliance with this Agreement.

3.3 **Joint Steering Committee**. Within [**] after the Effective Date (or later if mutually agreed by the Parties), the Parties shall establish a joint steering committee (the "**JSC**") to facilitate communications between the Parties and oversee, review and manage the Development and Commercialization of Opt-In Products and Collaboration Products as set forth herein.

3.3.1 **Composition of the JSC**. The JSC shall be comprised of [**] of Verve and [**] of Beam. Each Party may change one or more of its representatives to the JSC from time to time in its sole discretion, effective upon notice to the other Party of such change. Within [**] after the Effective Date, the Parties shall each appoint their initial representative to the JSC unless otherwise agreed by the Parties. These representatives shall have appropriate technical credentials, experience and knowledge, and ongoing familiarity with the Products and shall be duly authorized under their respective company's internal governance procedures to make the decisions or carry out the activities given to them under this Agreement.

3.3.2 **Specific Responsibilities**. In addition to its overall responsibility for monitoring and providing a forum to discuss and coordinate the Parties' activities under this Agreement, the JSC shall, subject to the terms of this Agreement, in particular:

(a) oversee the collaborative activities of the Parties under this Agreement;

(b) oversee the activities of Verve and Beam with respect to each Development Plan for Opt-In Products and Collaboration Products (including the Development Budget in any Development Plan for a Collaboration Product) and the Commercialization of Collaboration Product(s);

(c) review and decide whether to approve any proposed Development Plan for Opt-In Products and Collaboration Products (including the Development Budget in any Development Plan for a Collaboration Product) and any proposed amendments thereto;

(d) oversee activities under the Technology Transfer Plan;

(e) review and decide whether to approve any amendments to the Research Plan submitted by the JRC;

(f) review and decide whether to approve each proposed US Commercialization Plan (including the Commercialization Budget in any US Commercialization Plan) and any proposed amendments thereto;

(g) with respect to Collaboration Products, approve pricing of such Products and supply thereof within the Collaboration Territory;

(h) approve clinical supply plans for Opt-In Products and Collaboration Products and commercial supply plans for Collaboration Products;

(i) review and decide whether to approve the designation of any costs or expenses as Post-Approval Shared Development Costs or Post-Approval Shared Regulatory Costs;

(j) receive and discuss reports from Subcommittees and provide guidance thereto;

(k) attempt to resolve issues presented to it by, and disputes within, any Subcommittee;

(l) approve strategies for obtaining, maintaining, defending and enforcing trademark protection for Collaboration Products within the Collaboration Territory in accordance with the terms and conditions of Section 13.6.1(a);

(m) approve all trademarks selected to be used to identify Collaboration Products and all trademarks, logos, taglines, trade dress, packaging configuration, domain names or indicia of origin for use in connection with the sale or marketing of Collaboration Products, in each case in the Collaboration Territory in accordance with the terms and conditions of Section 13.6.1(a);

(n) review and decide whether to approve any other recommendations and submissions from the JRC, JMC, JDC and JCC;

(o) establish such additional Subcommittees as it deems necessary to achieve the objectives and intent of this Agreement; and

(p) have any other responsibility expressly designated for the JSC under this Agreement.

3.3.3 **Decision-Making**. Decisions of the JSC shall be made [**] by the representatives. In the event that the JSC cannot or does not, after good faith efforts, reach agreement on any issue, such issue shall be referred to the Alliance Managers. The Alliance Managers shall work with the JSC and use good faith commercially reasonable efforts to reach mutually acceptable resolutions on all such disputed matters. If the Alliance Managers are unable to assist the JSC in resolving such dispute within [**] after the dispute is first referred to the Alliance Managers, either Party may elect to submit such issue to the Parties' executive officers as follows: (i) for a Development-related issue, the issue shall be referred for resolution to the Development Senior Officers, or (ii) for a Commercialization-related issue, the issue shall be referred for resolution to the Commercialization Senior Officers. These executives are referred to collectively as the "**Senior Officers**". [**] and [**] shall be designated by each Party by written notice to the other Party within [**] after the Effective Date, and each Senior Officer of a Party may be changed by advance written notice by such Party to the other Party. In the event that the Senior Officers cannot resolve the issue, [**], with the following exceptions, all of which shall require agreement of the representatives of both Parties or the JSC or the agreement of both Senior Officers:

(a) For Opt-In Products:

[**].

(b) For Collaboration Products:

[**].

3.4 Joint Research Committee.

3.4.1 **Composition of the Joint Research Committee**. Within [**] after the Effective Date (or later if by mutually agreed by the Parties), the Parties shall establish a joint research committee to oversee early stage research of Opt-In Products and to coordinate the conduct of the Research Plan with respect to such Opt-In Products (such committee, the "**JRC**"). Unless otherwise expressly provided in this Agreement or agreed by the Parties in writing, the JRC shall serve solely in an advisory capacity and have no independent decision-making authority. Each Party shall initially appoint [**] to the JRC, with each representative having knowledge and expertise in the research of Base Editor products and having sufficient seniority within the applicable Party to make decisions arising within the scope of the JRC's responsibilities and being duly authorized under their respective company's internal governance procedures to make the decisions or carry out the activities given to them under this Agreement. The Parties may agree to increase the number of representatives from each Party on the JRC; provided, however, that the JRC shall at all times be comprised of an equal number of representatives from each Party.

3.4.2 **Specific Responsibilities of the JRC**. In addition to its general responsibilities, the JRC shall, subject to the terms of this Agreement, in particular:

(a) review and discuss the progress of the Research Plan; and discuss, prepare and approve for submission to the JSC any proposed amendments to the Research Plan;

(b) discuss the use of Delivery Technology with respect to Opt-In Products and Collaboration Products under this Agreement;

(c) discuss when the formation of a JDC would be appropriate given the stage of research for the Opt-In Products; and

(d) perform such other functions as may be appropriate to further the purposes of this Agreement, as directed by the JSC or as set forth under this Agreement.

3.4.3 **Decision-Making**. The JRC shall act by [**] consent. The representatives from each Party will have, collectively, [**] on behalf of that Party. If the JRC cannot reach [**] consent on an issue that comes before the JRC and over which the JRC has oversight, then such matter shall be raised to the JSC for resolution in accordance with Section 3.3.3.

3.5 Joint Manufacturing Committee.

3.5.1 **Composition**. Within [**] after JSC approval of an Initial Development Plan for the first Licensed Product (or at such other time as mutually agreed by the Parties), the Parties shall establish a committee to oversee CMC Development activities and manufacturing of supplies of such Licensed Products for research,

preclinical, clinical and commercial use (the "**JMC**") under this Agreement. Unless otherwise expressly provided in this Agreement or agreed by the Parties in writing, the JMC shall serve solely in an advisory capacity and have no independent decision-making authority. Each Party shall initially appoint [**] to the JMC, with each representative having knowledge and expertise in the manufacturing of products similar to the Products, having sufficient seniority within the applicable Party to make decisions arising within the scope of the JMC's responsibilities and being duly authorized under their respective company's internal governance procedures to make the decisions or carry out the activities given to them under this Agreement. The Parties may agree to increase the number of representatives from each Party on the JMC; provided, however, that the JMC shall at all times be comprised of an equal number of representatives from each Party.

3.5.2 **Specific Responsibilities of the JMC**. In addition to its general responsibilities, the JMC shall, subject to the terms of this Agreement, in particular:

(a) coordinate the manufacturing activities of Beam and Verve under any Supply Agreement with respect to applicable Products in the Territory;

(b) for Collaboration Products, coordinate with the JDC to allocate appropriate amounts from the Development Budget to Manufacturing activities;

(c) facilitate the flow of information between the Parties with respect to the Manufacture of Collaboration Products and Opt-In Products;

(d) discuss, coordinate with the JDC and refer to the JSC for approval a clinical supply plan for Opt-In Products and Collaboration Products under Section 8.1;

(e) discuss, coordinate with the JDC and refer to the JSC for approval a commercial supply plan for Collaboration Products under Section 8.2;

(f) discuss and plan for manufacturing technology transfers as may be contemplated by this Agreement or a Supply Agreement, including on termination pursuant to Section 15.5.2(g); and

(g) perform such other functions as appropriate to further the purposes of this Agreement, as directed by the JSC or as specified in this Agreement.

3.5.3 **Decision-Making**. The JMC shall act by [**] consent. The representatives from each Party will have, collectively, [**] on behalf of that Party. If the JMC cannot reach [**] consent on an issue that comes before the JMC and over which the JMC has oversight, then such matter shall be raised to the JSC for resolution in accordance with Section 3.3.3.

3.6 Joint Development Committee.

3.6.1 **Composition of the Joint Development Committee**. Prior to the earlier of: (a) [**] following a decision by the JSC that a joint development committee would be appropriate given the stage of Development of one or more Licensed Products and (b) [**] after the Parties agree on an Initial Development Plan for the first Licensed Product, the Parties shall establish a committee to oversee Development of Products and to coordinate the Development and regulatory activities of the Parties with respect to such Products (the "**JDC**"). Unless otherwise expressly provided in this Agreement or agreed by the Parties in writing, the JDC shall serve solely in an advisory capacity and have no independent decision-making authority. Each Party shall initially appoint [**] to the JDC, with each representative having knowledge and expertise in the development of products or in obtaining and maintaining Marketing Authorizations of products, having sufficient seniority within the applicable Party to make decisions arising within the scope of the JDC's responsibilities and being duly authorized under their respective company's internal governance procedures to make the decisions or carry out the activities given to them under this Agreement. The Parties may agree to increase the number of representatives from each Party on the JDC; provided, however, that the JDC shall at all times be comprised of an equal number of representatives from each Party.

3.6.2 **Specific Responsibilities of the JDC**. In addition to its general responsibilities, the JDC shall, subject to the terms of this Agreement, in particular:

(a) discuss, prepare and approve for submission to the JSC any Development Plan, and any amendments to a Development Plan (including, for Collaboration Products, the Development Budget under a Subsequent Development Plan);

(b) with respect to Collaboration Products, if any, review and update [**] financial forecasts for Development, including regulatory activities, to ensure actual and anticipated expenditure is within the approved Development Budget for the relevant Calendar Year, and make recommendations to the JSC for approval regarding any variances before such additional expenditure is incurred;

(c) create, approve for submission to the JSC, and implement the overall strategy for Development and the design and objectives of all Clinical Trials and non-clinical studies conducted under each Development Plan;

(d) advise the JSC on whether and when to Initiate or discontinue, and the conduct of, any Clinical Trial and any non-clinical study under each Development Plan;

(e) facilitate the flow of information between the Parties with respect to Development and Marketing Authorizations of the Collaboration Products in the Territory;

(f) discuss and approve for submission to the JSC the overall regulatory and filing strategy for obtaining Marketing Authorization for Collaboration Products in the Territory and for maintaining such Marketing Authorization including post-approval commitments and life cycle management;

(g) advise the JSC on the submission of the NDAs for the Collaboration Products;

(h) review, coordinate and approve for submission to the JSC the scientific presentation and publication strategy relating to the Collaboration Products in the Territory; and

(i) perform such other functions as may be appropriate to further the purposes of this Agreement, as directed by the JSC or as specified in this Agreement.

3.6.3 **Decision-Making**. The JDC shall act by [**] consent. The representatives from each Party will have, collectively, [**] on behalf of that Party. If the JDC cannot reach [**] consent on an issue that comes before the JDC and over which the JDC has oversight, then such matter shall be raised to the JSC for resolution in accordance with Section 3.3.3.

3.7 Joint Commercialization Committee.

3.7.1 **Composition**. The Parties shall establish a committee to oversee Commercialization of Collaboration Products (other than commercial manufacture and Product distribution) in the Collaboration Territory (the "**JCC**") at such time as may be determined by the JSC, but in no event later than [**] after the Initiation of the first Phase III Clinical Trial of a Collaboration Product. Unless otherwise expressly provided in this Agreement or agreed by the Parties in writing, the JCC shall serve solely in an advisory capacity and have no independent decision-making authority. Each Party shall initially appoint [**] representatives to the JCC, with each representative having knowledge and expertise in the commercialization of products similar to the Collaboration Products, having sufficient seniority within the applicable Party to make decisions arising within the scope of the JCC's responsibilities and being duly authorized under their respective company's internal governance procedures to make the decisions or carry out the activities given to them under this Agreement. The Parties may agree to change the number of representatives from each Party on the JCC; provided, however, that the JCC shall at all times be comprised of an equal number of representatives from each Party.

3.7.2 **Specific Responsibilities of the JCC**. In addition to its general responsibilities, the JCC shall in particular:

(a) discuss, prepare and approve for submission to the JSC all US Commercialization Plans (including the Commercialization Budget), including any amendments thereto;

(b) review and update revenue forecasts and review the Commercialization Budget for Collaboration Products in the Collaboration Territory at least on a [**] basis to ensure actual and anticipated expenditure is within the approved Commercialization Budget for the relevant Calendar Year, and make recommendations to the JCC for approval regarding any variances before such additional expenditure is incurred;

(c) review and discuss the Commercialization activities (including Co-Promotion) of Beam and Verve with respect to Collaboration Products in the Collaboration Territory;

(d) prepare forecasts of relevant Collaboration Products to be shared with the JMC for planning of inventory levels of such Products;

(e) subject to the terms and conditions of Section 13.6.1, discuss and approve for submission to the JSC the appropriate timing for selection of trademarks, and discuss, review and approve for submission to the JSC all proposed trademarks cleared by the Parties selected to be used to identify Collaboration Products in the Collaboration Territory and all proposed trademarks, logos, taglines, trade dress, packaging configuration, domain names or indicia of origin, in each case, cleared by the Parties for use in connection with the sale or marketing of Collaboration Products in the Collaboration Territory;

(f) review, discuss, coordinate and approve for submission to the JSC, in the Collaboration Territory, the Parties' medical affairs activities with respect to the Collaboration Products; and

(g) perform such other functions as appropriate to further the purposes of this Agreement, as directed by the JSC or as specified in this Agreement.

3.7.3 **Decision-Making**. The JCC shall act by [**] consent. The representatives from each Party will have, collectively, [**] on behalf of that Party. If the JCC cannot reach [**] consent on an issue that comes before the JCC and over which the JCC has oversight, then such matter shall be raised to the JSC for resolution in accordance with Section 3.3.3.

3.8 **Alliance Managers**.

3.8.1 **Appointment**. Each Party shall have the right to appoint an employee who shall oversee interactions between the Parties for all matters related to this Agreement and any related agreements between the Parties or their Affiliates (each an "**Alliance Manager**"). Such persons shall endeavor to assure clear and responsive communication between the Parties and the effective exchange of

information, and may serve as a single point of contact for any matters arising under this Agreement. The Alliance Managers shall have the right to attend all JSC and Subcommittee meetings as non-voting participants and may bring to the attention to the JSC or any Subcommittee any matters or issues either of them reasonably believes should be discussed, and shall have such other responsibilities as the Parties may mutually agree in writing. Each Party may designate different Alliance Managers by notice in writing to the other Party.

3.8.2 **Responsibilities of the Alliance Managers**. Without limiting the generality of the foregoing, each Alliance Manager shall:

(a) identify and bring disputes and issues that may result in disputes (including without limitation any asserted occurrence of a material breach by a Party) to the attention of the JSC in a timely manner, and function as the point of first referral in all matters of conflict resolution;

(b) provide a single point of communication for seeking consensus both internally within the Parties' respective organizations and between the Parties;

(c) plan and coordinate cooperative efforts, internal communications and external communications between the Parties with respect to this Agreement; and

(d) take responsibility for ensuring that meetings and the production of meeting agendas and minutes occur as set forth in this Agreement, and that relevant action items resulting from such meetings are appropriately carried out or otherwise addressed.

3.9 **Committee Size and Composition; Observers**. The JSC and any Subcommittee may change its size from time to time by mutual, [**] consent of its members, provided that the JSC and each Subcommittee shall consist at all times of an equal number of representatives of each of Verve and Beam. Each Party may replace one or more of its JSC or Subcommittee representatives at any time upon written notice to the other Party. The JSC or any Subcommittee may invite non-members (including consultants and advisors of a Party who are under an obligation of confidentiality consistent with this Agreement) to participate in the discussions and meetings of such Committee, provided that such participants are involved in activities related to the business of such Committee and shall have no voting authority at such Committee.

3.10 **Chairpersons**. Each Committee shall be chaired by a representative of [**]. The role of the chairperson shall be to convene and preside at meetings of the Committee, as applicable, to prepare and circulate agendas and to ensure the preparation of minutes, but the chairperson shall have no additional powers or rights beyond those held by the other representatives of the Committee, as applicable.

3.11 **Committee Meetings**. Each Committee shall meet at least [**] at a time mutually agreed by the Parties, spaced at regular intervals unless the Parties mutually agree to a different frequency. Each Committee may meet in person, or at the request of either Party, by videoconference, teleconference or other similar communications equipment. In-person Committee meetings will be held at locations alternately selected (as within a Committee) by Verve and by Beam. Either Party may also call a special meeting of a Committee (by videoconference or teleconference) by at least [**] prior written notice to the other Party in the event such requesting Party reasonably believes that a significant matter must be addressed prior to the next scheduled meeting, and such requesting Party shall provide such Committee no later than [**] prior to the special meeting with materials reasonably adequate to enable an informed decision on the relevant matter; provided that for time sensitive matters, a Party may call a special meeting of such Committee and provide relevant materials with less than [**] notice if the Parties agree that an issue warrants an expedited meeting. No later than [**] prior to any meeting of a Committee (other than a special meeting as described above), the Alliance Managers shall prepare and circulate an agenda for such meeting to all members of such Committee; provided, however, that either Party shall be free to propose additional topics to be included on such agenda, either prior to or, if representatives of each Party are present at a meeting, during the course of such meeting. Each Party will bear the expense of its respective Committee members' participation in Committee meetings. The Alliance Managers shall be responsible for keeping reasonably detailed written minutes of such Committee's meetings that reflect all decisions made at such meetings. The Alliance Managers shall send meeting minutes to each member of such Committee for review and approval within [**] after each meeting of such Committee. Minutes will be deemed approved unless [**] members of the relevant Committee objects to the accuracy of such minutes within [**] of receipt.

3.12 **Safety Reporting**. The Parties shall agree upon a pharmacovigilance agreement (the "**Pharmacovigilance Agreement**") for exchanging adverse event and other safety information relating to a Licensed Product prior to either Party's initiation of any clinical activities implicating pharmacovigilance obligations for such Licensed Product in the Territory. The Pharmacovigilance Agreement shall ensure that adverse event and other safety information is exchanged according to a schedule that will permit each Party to comply with Applicable Laws, including any local regulatory requirements.

3.13 **Records and Reports**.

3.13.1 **Records**. Each Party shall maintain records, in sufficient detail and in good scientific manner appropriate for patent and regulatory purposes under Applicable Law, which shall fully and properly reflect all work done and results achieved by such Party under this Agreement.

3.13.2 **Copies and Inspection of Records**. Each Party shall have the right, during normal business hours and upon reasonable notice, to inspect and copy all records of the other Party referred to in Section 3.13.1. The reviewing Party shall maintain such records and the information disclosed therein in confidence in accordance with Section 11.1. Upon request, the non-reviewing Party shall provide copies of the records described in this Section 3.13.2.

3.14 Compliance with Law and Ethical Business Practices.

3.14.1 In conducting its activities under this Agreement, each Party shall comply in all material respects with Applicable Law and accepted pharmaceutical industry business practices, including, without limitation, the Federal Food, Drug, and Cosmetic Act (21 U.S.C. § 301, et seq.), the Anti-Kickback Statute (42 U.S.C. § 1320a-7b), Civil Monetary Penalty Statute (42 U.S.C. § 1320a-7a), the False Claims Act (31 U.S.C. § 3729 et seq.), comparable state statutes, the regulations promulgated under all such statutes, and the regulations issued by the FDA. Each Party shall promptly notify the other Party in writing of any material deviations from Applicable Law with respect to activities under this Agreement of which it becomes aware.

3.14.2 Each Party hereby certifies that it has not and will not employ or otherwise use in any capacity the services of any person or entity debarred under Section 21 U.S.C. § 335a in performing any activities under this Agreement. Each Party shall notify the other Party, in writing, immediately if any such debarment occurs or comes to its attention, and shall, with respect to any person or entity so debarred, promptly remove such person or entity from performing any further activities under this Agreement.

3.14.3 No Party shall, or shall be required to, undertake any activity under or in connection with this Agreement which violates any Applicable Law.

Article 4 RESEARCH AND DEVELOPMENT

4.1 General Obligations.

4.1.1 Each Party shall use Commercially Reasonable Efforts to conduct the activities for which it is responsible under the Research Plan and any Development Plan. All Development activities of the Parties relating to the Development of Licensed Product(s) in the Territory will be performed in accordance with this Agreement, the Research Plan and the applicable Development Plan. Subject to Section 4.3.2(b) and Section 4.1.2, during the Term, neither Party shall undertake any Development activities with respect to Licensed Products in the Field in the Territory that are not contemplated by the Research Plan or a Development Plan. Verve shall initiate discovery efforts as contemplated under the Research Plan for a Base Editor Product directed towards [**]. In addition, following initiation of activity under the Research Plan, Verve shall use Commercially Reasonable Efforts to Develop and seek Marketing Authorization for [**].

4.1.2 With respect to any Licensed Product for which Beam does not, and can no longer under the terms of this Agreement, exercise the Beam Opt-In Option, Section 4.1.1 shall not apply, except that Verve shall still be subject to the last sentence of Section 4.1.1 which sets forth certain diligence obligations and shall perform, and cause to be performed, all Development activities related to such Licensed Product in the Territory in accordance with this Agreement.

4.1.3 Without limiting any other provision of this Agreement, Verve agrees that, to the extent applicable to its contemplated activities under this Agreement, it shall satisfy the diligence obligations set forth in Schedule 4.1.3 related to Development applicable to sublicensees of Beam Base Editor Technology or Beam Delivery Technology under Third Party Agreements to which Beam or its Affiliate is a party. Schedule 4.1.3 may be amended from time to time by Beam upon written notice to Verve in the event Beam reasonably determines that additional diligence obligations under Third Party Agreements to which Beam or its Affiliate is a party relate to the Development activities of Verve hereunder as a sublicensee of Beam Base Editor Technology and Beam Delivery Technology, subject to compliance with Sections 2.4.3 and 9.2 with respect to any such Third Party Agreements entered into after the Effective Date and provided that any such additional diligence obligations shall only apply following the date of such amendment. Either Party may perform its obligations under this Agreement through Third Party subcontractors; provided that, [**]. Any efforts of Verve or its Affiliates and sublicensees shall be deemed to be the efforts of Verve for purposes of satisfying the diligence requirements of this Agreement.

4.2 **Research Plan**. Within [**] following the Effective Date, the Parties shall agree in writing upon an initial research plan for Licensed Products (as amended from time to time under this Agreement, the "**Research Plan**"). The Research Plan shall include, and each amendment to the Research Plan shall include, [**]. The Research Plan may only be amended as recommended by the JRC and approved by the JSC in accordance with this Agreement. The Research Plan shall be effective from the date in which the Parties first agree upon the initial Research Plan in writing in accordance with this Section 4.2 and shall terminate when all activities under such Research Plan have been completed.

4.3 **Development Plans**.

4.3.1 **Initial Development Plan**. Within [**] prior to the anticipated commencement of IND-enabling studies for a Licensed Product, Verve shall submit to the JDC a proposed initial development plan for [**] (such development plan once recommended for approval by the JDC and approved by the JSC, the "**Initial Development Plan**"). An Initial Development Plan may only be amended as recommended by the JDC and approved by the JSC in accordance with this Agreement, and each such amendment shall [**]. An Initial Development Plan shall be effective from the date on which it is approved by the JSC and shall terminate when all activities under such Initial Development Plan have been completed or, if earlier, as of the date upon which Beam exercises the Beam Opt-In Option with respect to the applicable Opt-In Product pursuant to Section 5.1. For the avoidance of doubt, subject to the exceptions set forth in clauses (a) and (b) of Section 3.3.3, [**].

4.3.2 **Subsequent Development Plan; Subsequent Development Updates**.

(a) Subject to Section 4.3.2(b), with respect to any Collaboration Product, there shall be a "**Subsequent Development Plan**" for such Collaboration Product that includes [**]. Notwithstanding any provision in this Agreement to the contrary, in the event Beam exercises a Beam Opt-In Option upon receipt of an [**] for a Collaboration Product, the Subsequent Development Plan for such Collaboration Product will additionally include [**], such additional activities to be conducted at Verve's sole cost and expense, in accordance with Section 5.1.

(b) For any Opt-In Product for which Beam does not exercise the Beam Opt-In Option, or commencing as of the applicable Opt-Out Date for any Collaboration Product, there shall be no Subsequent Development Plan but Verve shall update Beam every [**] (beginning [**] after Beam's failure to exercise the Beam Opt-In Option for any such Opt-In Product that is a Licensed Product or, with respect to any Collaboration Product for which Beam exercises the Beam Opt-Out Option, [**] after the applicable Beam Opt-Out Date, as the case may be) on the Development of such Licensed Product until the First Commercial Sale of such Licensed Product or until Development activities for such Licensed Product have ended, whichever occurs earlier. Such update shall consist of [**]. Upon request by Beam, the Parties shall meet, either in-person or via videoconference or teleconference, to discuss such status update and Verve shall consider in good faith the implementation of any reasonable comment by Beam with respect to the Development of such Licensed Product.

(c) Notwithstanding anything to the contrary in this Agreement, Verve may not conduct any Development activity with respect to a Licensed Product that is not a Collaboration Product that, [**].

4.3.3 **Amendments to the Development Plan**. On [**] basis, the JDC shall evaluate whether any amendment to the then-current Development Plans, and, subject to this Agreement, the corresponding Development Budget if applicable, are appropriate to reflect [**]. In the event that such amendment is deemed necessary, the JDC shall submit such amendment for approval of the JSC no later than [**] of the preceding Calendar Year. Each such amended Development Plan shall contain [**]. In addition, the JDC may prepare amendments to the Development Plan and any Development Budget (if applicable) for the JSC's approval from time to time during a Calendar Year in order to reflect changes in such plan and budget allocations for such Calendar Year, in each case, in accordance with the foregoing. Once approved by the JSC, the amended [**] Development Plan (including the Development Budget, if any) shall become effective for the applicable period on the date approved by the JSC (or such other date as the JSC shall specify). Any JSC-approved amended Development Plan (including, as applicable, any amended Development Budget) for a Product shall supersede the previous Development Plan and Development Budget for such Product.

4.3.4 **Discontinued Development; Inconsistency**. If the JSC determines to discontinue Developing a Licensed Product or Collaboration Product upon recommendation by the JDC and otherwise in accordance with this Agreement, then any Development Plan (and the associated Development Budget, if applicable) solely related to such Licensed Product or Collaboration Product, as the case may be, shall terminate upon such decision. In the event of any inconsistency between the applicable Development Plan and this Agreement, the terms of this Agreement shall prevail.

4.4 **Development Costs**. Except with respect to Shared Costs for Collaboration Products as described in Section 10.5.1, as between the Parties, [**].

Article 5 BEAM OPT-IN OPTION

5.1 **Opportunity to Opt In**. For any Opt-In Product, Beam will have the option with respect to such Opt-In Product to opt-in to share expenses of the Development of such Opt-In Product in the Territory, jointly Commercialize such Opt-In Product in the Collaboration Territory and share the profits and expenses of Commercializing the Opt-In Product in the Collaboration Territory, in each case on the terms set forth in this Agreement (such option with respect to an Opt-In Product, the "**Beam Opt-In Option**" for such Opt-In Product). On an Opt-In Product-by-Opt-In Product basis, within [**] of the final dosing of the final patient in a Phase I Clinical Trial of such Opt-In Product, Verve will deliver to Beam an information package for such Opt-In Product, such information package to include the following information: [**] (such information package for an Opt-In Product, an "**Opt-In Information Package**"). [**]. During the [**] period following delivery of an Opt-In Information Package for an Opt-In Product, at Beam's request, the Parties will work together in good faith in an effort to reach written agreement on a Subsequent Development Plan for such Opt-In Product, including the related Development Budget. Beam will have [**] from receipt of the complete Opt-In Information Package to determine whether it is interested in participating in future Development and Commercialization of such Opt-In Product on the terms and conditions set forth in this Agreement for Collaboration Products. Beam may exercise the Beam Opt-In Option with respect to an Opt-In Product at any time during such [**] period by written notice to Verve. [**].

5.2 **Subsequent Development Plan; Election Not to Opt-In**.

5.2.1 With respect to any Opt-In Product, in the event that Beam exercises the Beam Opt-In Option for such Opt-In Product pursuant to Section 5.1, (a) the agreed-upon Subsequent Development Plan shall become the Subsequent Development Plan for such Opt-In Product and (b) such Opt-In Product shall become a Collaboration Product under this Agreement.

5.2.2 With respect to any Opt-In Product, in the event that Beam does not exercise the Beam Opt-In Option for such Opt-In Product in the applicable [**] window pursuant to Section 5.1, such Opt-In Product shall not become a Collaboration Product under this Agreement and the Beam Opt-In Option for such Opt-In Product shall thereupon terminate, [**].

5.3 **Beam Opt-Out Option**. With respect to each Collaboration Product, Beam may opt out of payment of Shared Development Costs, Shared Commercialization Costs, sharing of Collaboration Territory Revenue and participation in Commercialization of such Collaboration Product under this Agreement ("**Beam Opt-Out Option**"), upon written notice to Verve. In the event Beam elects the Beam Opt-Out Option for a Collaboration Product, effective as of [**] following the delivery of such written election to Verve (the "**Beam Opt-Out Date**"), (a) such Collaboration Product will no longer be a Collaboration Product under this Agreement, (b) royalties and milestones for such former Collaboration Product under this Agreement, if applicable, including under Sections 10.2 through 10.4, shall become effective and payable by Verve going forward as if Beam had never exercised the Beam Opt-In Option for such Product, (c) Verve shall pay Beam a milestone payment equal [**] times the Shared Costs for such former Collaboration Product that Beam has paid under this Agreement, such milestone payment to be made within [**] after aggregate Net Sales of such former Collaboration Product in a Calendar Year in the Territory first reach [**] Dollars ($[**]), (d) subject to this Section 5.3, Beam shall no longer have any obligation to pay any portion of Shared Costs incurred following the Beam Opt-Out Date for such former Collaboration Product and (e) Beam shall no longer have the right to Commercialize, including Co-Promote, such former Collaboration Product. Notwithstanding anything to the contrary in this Section 5.3, if Beam elects the Beam Opt-Out Option for a Collaboration Product during the conduct of a Clinical Trial for such Collaboration Product, it shall remain responsible for the Shared Costs reasonably incurred in the conduct of such Clinical Trial under this Agreement as if such Collaboration Product remained a Collaboration Product for the duration of such Clinical Trial.

5.4 **Verve Opt-Out Option.** With respect to each Collaboration Product, Verve may opt out of payment of Shared Development Costs, Shared Commercialization Costs, sharing of Collaboration Territory Revenue and participation in Commercialization of such Collaboration Product under this Agreement ("**Verve Opt-Out Option**"), upon written notice to Beam. In the event Verve elects the Verve Opt-Out Option for a Collaboration Product, effective as of [**] following the delivery of such written election to Verve (the "**Verve Opt-Out Date**"), (a) such Collaboration Product will no longer be a Collaboration Product under this Agreement, (b) such former Collaboration Product shall be deemed to be a Terminated Reversion Product (including, for clarity, any such former Collaboration Product that is not a Licensed Product) for purposes of Section 15.5 as if Verve had terminated such Product under clause (b) of Section 15.2; provided, however, that any license granted by Verve pursuant to Section 15.5.2(b) with respect to such Product shall be royalty-free and fully paid up, except with respect to payment of any amounts owed to a Third Party pursuant to an applicable license or other agreement as set forth in Section 15.5.2(b), (c) Beam shall pay Verve a milestone payment equal to the sum of (i) the FTE Costs and out-of-pocket costs (including Third Party Payments) incurred by Verve for the conduct of the Phase I Clinical Trial in accordance with the Initial Development Plan for such Collaboration Product and (ii) [**] times the Shared Costs for such former Collaboration Product that Verve has paid under this Agreement, such milestone payment to be made within [**] after aggregate Net Sales of such former Collaboration Product in a Calendar Year in the Territory first reach [**] Dollars ($[**]), (d) subject to this Section 5.4, Verve shall no longer have any obligation to pay any portion of Shared Costs incurred following the Verve Opt-Out Date for such former Collaboration Product and (e)

Verve shall no longer have the right to Commercialize, including Co-Promote, such former Collaboration Product. Notwithstanding anything to the contrary in this Section 5.4, if Verve elects the Verve Opt-Out Option for a Collaboration Product during the conduct of a Clinical Trial for such Collaboration Product, it shall remain responsible for the Shared Costs reasonably incurred in the conduct of such Clinical Trial under this Agreement as if such Collaboration Product remained a Collaboration Product for the duration of such Clinical Trial.

5.5 **Discussion of Proposal**. [**].

Article 6 REGULATORY RESPONSIBILITY

6.1 **General**. Verve or its designee shall have sole responsibility and discretion in formulating the regulatory strategy for any Nuclease Product or Base Editor Product that, in each case, is not either a Collaboration Product or Opt-In Product. Verve shall keep Beam informed as to material developments related to interactions by it, its Affiliates or sublicensees with Regulatory Authorities with respect to Collaboration Products and Opt-In Products under this Agreement. Verve shall promptly notify (but in any event within [**]) Beam upon becoming aware of any actual or potential Safety Issue or serious adverse event with respect to one or more Collaboration Products, Opt-In Products, Licensed Products or Verve Delivery Technology Products.

6.2 **Opt-In Products and Collaboration Products**. The regulatory strategy for each Collaboration Product and Opt-In Product shall be formulated by the JSC. In any exercise of its final decision-making authority at the JSC under this Agreement, Verve shall consider and determine whether to incorporate in good faith Beam's reasonable comments to such regulatory strategy for an Opt-In Product or Collaboration Product. Verve shall be responsible for taking the lead with the request and conduct of all interactions with Regulatory Authorities (meetings, telephone calls, etc.) in the Territory. Beam shall be entitled to have a non-participating representative present at such scheduled interactions, with respect to all Opt-In Products and Collaboration Products, with Regulatory Authorities in the Territory. As between the Parties, Verve shall be responsible for preparing all submissions, documents or other correspondence submitted to applicable Regulatory Authorities for such Products in the Territory (collectively, the "**Regulatory Documentation**"), and Verve or its designee(s) shall own all Regulatory Documentation, INDs, NDAs and Marketing Authorizations with respect to Products. Beam shall have the right to review and comment on all Regulatory Documentation for Collaboration Products, and Verve shall reasonably consider and [**] implement any comments provided by Beam with respect to such Regulatory Documentation. Verve or its designee(s) shall also be responsible for all maintenance of all INDs and all NDAs related to Products, provided that, with respect to Collaboration Products, the FTE Costs and out-of-pocket costs that are incurred by Verve or its Affiliates in connection with such maintenance in the Major Markets shall be Shared Development Costs.

6.3 **Clinical Trial Data License to Beam**. Notwithstanding any other provision of this Agreement, Verve hereby grants to, and shall cause its Affiliates to grant to, Beam the right to use, and shall have the right to sublicense to its Affiliates and Third Party collaborators, the right to use, all Clinical Trial Data generated by Verve or a Third Party performing services on behalf of Verve, solely for internal research purposes; provided that Beam shall have the right to disclose such Clinical Trial Data that has been anonymized for the purposes of concealing any personally identifiable information to potential and actual partners, collaborators, investors and acquirers under customary obligations of confidentiality and restricted use.

Article 7 COMMERCIALIZATION

7.1 **Commercialization Efforts**. Each Party shall conduct the activities for which it is responsible under the applicable US Commercialization Plan. Verve shall use Commercially Reasonable Efforts to Commercialize Licensed Products, and Verve and Beam shall use Commercially Reasonable Efforts to Commercialize Collaboration Products, in each case in the Field in the Major Markets in which Marketing Authorization has been obtained, as further described in this Article 7.

7.2 **Commercialization of Product(s)**. All Commercialization activities of the Parties with respect to Collaboration Products in the Collaboration Territory will be performed under the direction of the JCC and the JSC in accordance with the then-current applicable US Commercialization Plan. In the event of any inconsistency between a US Commercialization Plan or a Commercialization Budget and this Agreement, the terms of this Agreement shall prevail unless otherwise expressly set forth in the relevant US Commercialization Plan or Commercialization Budget. Verve will keep the JCC informed of Commercialization activities of Verve with respect to Licensed Products and Collaboration Products outside the Collaboration Territory, and Verve will deliver to Beam on a [**] basis a written report summarizing its material Commercialization activities with respect to Licensed Products that are not Collaboration Products and with respect to Collaboration Products outside the Collaboration Territory, such reports to be sufficient in content to allow Beam to evaluate whether Verve has satisfied its diligence obligations with respect to such Collaboration Products in accordance with Section 7.1. Verve shall ensure that any Third Party, including a sublicensee, that undertakes Commercialization activities with respect to a Licensed Product or Collaboration Product permits disclosure of all relevant information to Beam in the reports described in this Section 7.2.

7.3 **US Commercialization Plan**.

7.3.1 Within [**] after the Initiation of a Phase III Clinical Trial of a Collaboration Product in the Field in the Territory, the JCC shall develop an initial high-level Commercialization plan for the Collaboration Products in the Field in the Collaboration Territory (such plan, if and when approved by the JSC and as may be amended from time to time in accordance with this Agreement, the "**US Commercialization Plan**").

7.3.2 Each US Commercialization Plan shall contain, as applicable: [**].

7.4 **Commercialization Reports**. Each Party shall keep the JCC fully informed regarding the progress and results of Commercialization activities for Collaboration Products in the Collaboration Territory conducted by such Party, including a [**] review of activities undertaken versus the US Commercialization Plan for such Collaboration Products.

7.5 **Commercialization Costs**. Subject to Section 10.5.1(b), as between the Parties, Verve shall be solely responsible for all costs and expenses incurred (including both internal FTE-based costs and payments owed to Third Parties) in the conduct of activities under any US Commercialization Plan.

7.6 **Co-Promotion**. With respect to each Collaboration Product, the Parties shall enter into an agreement that sets forth the terms of the Parties' Co-Promotion of such Collaboration Products in the Collaboration Territory no later than [**] prior to the anticipated First Commercial Sale of such Collaboration Product in the Collaboration Territory, such terms to be consistent with the high-level terms and principles set forth in this Section 7.6 (each such agreement, a "**Co-Promotion Agreement**"). The Parties shall Co-Promote the Collaboration Products in the Collaboration Territory pursuant to the terms and conditions of this Agreement and the applicable Co-Promotion Agreement, provided that Verve shall book all sales of Collaboration Products in the Collaboration Territory. Any Co-Promotion Agreement entered into by the Parties pursuant to this Section 7.6 will set forth the terms under which Beam will engage in the Co-Promotion of such Collaboration Product with Verve to primary care physicians, specialists, and other agreed target customers or stakeholders in the Collaboration Territory. Each Party will provide fifty percent (50%) of the promotional effort required to promote the Collaboration Product in the Collaboration Territory at launch and throughout Commercialization in this Agreement and the allocation of the promotional effort between the Parties will be made on an equitable basis as to both the quality and quantity of the activities to be undertaken, including the identity of target prescribers and the nature of the Details. Costs incurred by the Parties for Co-Promotion activities under the Co-Promotion Agreement shall be Shared Commercialization Costs unless otherwise mutually agreed by the Parties and expressly set forth in the Co-Promotion Agreement. For clarity, the applicable Co-Promotion Agreement shall automatically be terminated on the applicable Opt-Out Date in the event Beam exercises a Beam Opt-Out Option or Verve exercises a Verve Opt-Out Option with respect to a particular Collaboration Product.

Article 8 MANUFACTURING

8.1 **Clinical Supply Plan**. The Parties, via the JMC, will discuss and formulate a clinical supply plan for the Manufacture of each Opt-In Product and Collaboration Product required for the conduct of Development activities under this Agreement and shall submit such plan to the JSC for approval. In formulating such clinical supply plan, the Parties will discuss, in good faith, [**]. To the extent that Beam is not Manufacturing a Licensed Base Editor Product, the Parties shall meet and decide upon a technology transfer plan regarding the transfer of technology related to the Manufacture of such Licensed Base Editor Product (to the extent otherwise contemplated by this Agreement) by Beam to Verve or its designee, and each Party shall perform its obligations under such technology transfer plan without additional consideration.

8.2 **Commercial Supply**. The Parties, via the JMC, will discuss and formulate a commercial supply plan for each Collaboration Product required for the conduct of Commercialization activities under this Agreement and shall submit such plan to the JSC for approval. If Beam has Manufactured clinical supplies of a Licensed Base Editor Product, the Parties will discuss, [**]. To the extent that Beam is not Manufacturing commercial supply of a Licensed Base Editor Product and Manufacturing technology transfer from Beam to Verve for such Licensed Base Editor Product has not already occurred pursuant to Section 8.1, the Parties shall meet and decide upon a technology transfer plan regarding the transfer of technology related to the Manufacture of such Licensed Base Editor Product (to the extent otherwise contemplated by this Agreement) by Beam to Verve or its designee, and each Party shall perform its obligations under such technology transfer plan without additional consideration.

8.3 **Manufacturing Intellectual Property**. Beam shall own all right, title and interest in any Know-How conceived, developed, generated or reduced to practice during the Term by Verve, its Affiliates, its sublicensees or other persons acting on behalf of Verve, its Affiliates or its sublicensees (including any contract manufacturer) to the extent specifically directed to methods of manufacturing (a) Licensed Base Editor Products to the extent such Know-How relates to Base Editors or C2C1 or (b) Licensed C2C1 Products to the extent such Know-How relates to C2C1 (such Know-How collectively, the "**Beam Manufacturing Know-How**") and any Patent Rights to the extent such Patent Rights claim Beam Manufacturing Know-How (such Patent Rights, collectively with the Beam Manufacturing Know-How, the "**Beam Manufacturing Technology**"). Verve shall, and hereby does (and shall cause its Affiliates, its sublicensees or other persons acting on behalf of Verve, its Affiliates or its sublicensees to) sell, assign, transfer, convey and deliver to Beam, all of its right, title and interest in, to and under any Beam Manufacturing Technology; provided that any contractual obligation put in place by Verve, its Affiliate or its sublicensee that requires another Person (e.g. a contract manufacturer) to assign Beam Manufacturing Technology to Verve, its Affiliate or its sublicensee so that it can directly assign such Beam Manufacturing Technology to Beam in accordance with this Section 8.3 will satisfy this obligation as long as such assignment by such other Person is required to be immediate upon such Person's ownership of Beam Manufacturing Technology. Verve will and shall cause its Affiliates, its sublicensees (or other persons acting on behalf of Verve, its Affiliates or its sublicensees to) promptly execute an assignment of Beam Manufacturing Technology, including assignments of Patent Rights in forms registrable or recordable in the United States Patent and Trademark Office or applicable foreign offices in the Territory to the extent necessary to assign the Beam Manufacturing Technology, all in forms reasonably acceptable to Beam. Beam Manufacturing Technology assigned under this Section 8.3 shall be deemed Beam Collaboration Technology under this Agreement.

8.4 **General**. Except as expressly provided in Section 8.1 and Section 8.2 with respect to Collaboration Products, Verve shall have sole authority over and control of the manufacture of Products, itself or through one or more Affiliates or Third Parties selected by Verve.

Article 9 DELIVERY TECHNOLOGY

9.1 **General**. From time to time during the Term, either Party or any of its Affiliates may obtain rights to Know-How or Patent Rights that claim, embody or incorporate [**]. Each Party shall use reasonable efforts, in securing such rights, to Control such rights so that Know-How or Patent Rights, subject to Section 9.2, are Delivery Technology under this Agreement for the purposes of Section 2.1.3 or 2.1.4, as applicable; provided that, for clarity, neither Party shall have the obligation to secure such rights (other than the obligation to use reasonable efforts as described in this sentence) or to pay any additional consideration or payment in order to Control such Know-How or Patent Rights.

9.2 **Third Party Agreements**. Notwithstanding anything to the contrary in this Agreement, in the event that a Party enters into an agreement or arrangement with a Third Party under which such Party or its Affiliate is granted rights to any Patent Right or Know-How that would be Delivery Technology of such grantee Party or its Affiliate hereunder, such Patent Right or Know-How is hereby deemed not to be Delivery Technology of such grantee Party or its Affiliate unless and until, in each case to the extent permitted under any confidentiality obligations related to such arrangement or agreement, (a) such grantee Party provides the other Party with a written notice of such agreement or arrangement and [**], and (b) such other Party, within [**] after receipt of such notice, [**]. Each Party will use commercially reasonable efforts to secure the right to disclose to the other Party the information described in the foregoing clauses (i) through (iii). The grantee Party shall be required to provide the notice described in clause (a) of this Section 9.2 within [**] of the effective date of an agreement or arrangement under which the grantee Party or its Affiliate is granted rights to any Patent Right or Know-How that would be Delivery Technology hereunder if accepted by the other Party. If the other Party provides notice to have such Patent Right or Know-How deemed Delivery Technology hereunder, such other Party shall reimburse the grantee Party for all amounts that are owed to such Third Party solely as a result of the exercise of rights as a sublicensee under such Third Party Agreement within [**] of receipt of an invoice from the grantee Party. If the other Party does not provide the notice described in clause (b) of this Section 9.2 or indicates in such written notice that it does not wish to obtain a sublicense under the relevant Patent Right or Know-How, such Patent Right or Know-How is hereby deemed not to be Delivery Technology hereunder.

Article 10 PAYMENTS AND CONSIDERATION; EQUITY PURCHASE

10.1 **Initial Issuance**. In accordance with the terms of the Subscription Agreement entered into by the Parties on the date hereof, Verve shall, on the Effective Date and concurrently with the execution of this Agreement, as partial consideration for the licenses granted hereunder, issue to Beam or designees identified to Verve in writing prior to the Effective Date, an aggregate of 2,556,322 shares of Verve's common stock.

10.2 Development Milestone Payments.

10.2.1 In further consideration for the licenses granted herein by Beam to Verve, upon the terms and conditions contained herein, Verve shall pay to Beam the milestone payment set forth in the table below for each Licensed Product that achieves the corresponding milestone event:

Milestone Event	For any Licensed Product that is not a Collaboration Product, in the Territory	For any Licensed Product that is a Collaboration Product, outside the Collaboration Territory
[**]	[**] U.S. Dollars ($[**])	[**] U.S. Dollars ($[**])
[**]	[**] U.S. Dollars ($[**])	[**] Dollars ($[**])
[**]	[**] U.S. Dollars ($[**])	[**] U.S. Dollars ($[**])

Verve shall notify Beam in writing within [**] following the achievement of each milestone, and shall make the appropriate milestone payment within [**] after the achievement of such milestone. All milestone payments are payable only once under this Agreement for each Licensed Product to achieve such milestone. If a milestone set forth in the table in this Section 10.2.1 is skipped (e.g. [**]), the payment associated with such skipped milestone shall be paid when the subsequent milestone is achieved in addition to the payment that would otherwise be due upon achievement of such subsequent milestone.

10.2.2 In further consideration for the licenses granted by each Party under Sections 2.1.3 and 2.1.4, respectively, upon the terms and conditions contained herein, each Party shall pay the other Party the milestone payment for each Delivery Technology Product of such paying Party to achieve the corresponding milestone event as set forth in the table below:

Milestone Event	For each Delivery Technology Product
[**]	[**] Dollars ($[**])
[**]	[**] Dollars ($[**])
[**]	[**] Dollars ($[**])

The owing Party shall notify the other Party in writing within [**] following the achievement of each milestone, and shall make the appropriate milestone payment within [**] after the achievement of such milestone. All milestone payments are payable only once under this Agreement for each Delivery Technology Product to achieve such milestone. If the [**] milestone set forth in the table in this Section 10.2.2 is skipped (e.g., [**]), the payment associated with such skipped milestone shall be paid upon [**] for such Delivery Technology Product. For purposes of this Section 10.2, one (1) Licensed Product or Delivery Technology Product, as the case may be, that [**] for multiple Indications, multiple patient populations or multiple dosage forms shall be deemed to be a single Licensed Product or Delivery Technology Product, as the case may be.

10.3 Net Sales Milestones.

10.3.1 Subject to Section 10.3.2, on a Licensed Product-by-Licensed Product basis, Verve will pay Beam the following one-time payments when aggregate Net Sales of a Licensed Product that is not a Collaboration Product in a Calendar Year in the Territory first reach the respective thresholds indicated below:

Calendar Year Territory-Wide Net Sales for a Licensed Product that is not a Collaboration Product	Net Sales Milestone
Over [**] U.S. Dollars ($[**])	[**] U.S. Dollars ($[**])
Over [**] U.S. Dollars ($[**])	[**] U.S. Dollars ($[**])

10.3.2 Notwithstanding Section 10.3.1, on a Licensed Product-by-Licensed Product basis, with respect to any Licensed Product that is a Collaboration Product, Verve will pay Beam the following one-time payments when aggregate Net Sales of such Licensed Product outside the Collaboration Territory first reach the respective thresholds indicated below:

Calendar Year Net Sales for a Licensed Product that is a Collaboration Product Outside the Collaboration Territory	Net Sales Milestone
Over [**] U.S. Dollars ($[**])	[**] U.S. Dollars ($[**])
Over [**] U.S. Dollars ($[**])	[**] U.S. Dollars ($[**])

10.3.3 Verve will make any Net Sales threshold milestone payment payable with respect to a Calendar Year within [**] after the end of the applicable Calendar Year. The Net Sales threshold milestone payments set forth above are payable only once on the first achievement by each Licensed Product of the relevant threshold. No amounts shall be due under this Agreement for subsequent or repeated achievements of any milestone by the same Licensed Product. If more than one Net Sales threshold milestone is achieved in the same Calendar Year, Verve will pay to Beam all Net Sales threshold milestone payments achieved in such Calendar Year in accordance with this Section 10.3.3.

10.4 Royalties.

10.4.1 Royalties to Beam for Licensed Products.

(a) Subject to the provisions of Sections 10.4.1(c) and 10.4.1(d), Verve will pay Beam royalties on a tiered marginal royalty rate basis as set forth below based on the annual aggregate Territory-wide Net Sales resulting from the sale of each Licensed Product that is not a Collaboration Product, on a Licensed Product-by-Licensed Product basis, during each Calendar Year of the applicable Royalty Term for each such Licensed Product.

Net Sales of a Licensed Product that is not a Collaboration Product	Marginal Royalty Rate (% of Calendar Year Net Sales for such Licensed Product in the Territory)
Annual Net Sales up to [**] Dollars ($[**])	[**]%
Annual Net Sales including and above [**] Dollars ($[**]), up to [**] Dollars ($[**])	[**]%
Annual Net Sales including and above [**] Dollars ($[**])	[**]%

Each marginal royalty rate set forth in the table above will apply only to that portion of the Net Sales of a given Licensed Product in the Territory during a given Calendar Year that falls within the indicated range.

(b) Subject to the provisions of Sections 10.4.1(c) and 10.4.1(d), Verve will pay Beam royalties on a tiered marginal royalty rate basis as set forth below based on the annual aggregate Net Sales outside of the Collaboration Territory resulting from the sale of each Licensed Product that is a Collaboration Product, on a Licensed Product-by-Licensed Product basis, during each Calendar Year of the applicable Royalty Term for each such Licensed Product.

Net Sales of a Licensed Product that is a Collaboration Product Outside of the Collaboration Territory	Marginal Royalty Rate (% of Calendar Year Net Sales for such Licensed Product outside the Collaboration Territory)
Annual Net Sales up to [**] Dollars ($[**]).	[**]%
Annual Net Sales including and above [**] Dollars ($[**]), up to [**] Dollars ($[**])	[**]%
Annual Net Sales including and above [**] Dollars ($[**])	[**]%

Each marginal royalty rate set forth in the table above will apply only to that portion of the Net Sales of a given Licensed Product in the applicable countries outside the Collaboration Territory during a given Calendar Year that falls within the indicated range.

(c) During time periods when the Royalty Term is only in effect in a given country for a given Licensed Product due to clause (c) of Section 1.149.1, then the royalty rate provided for such Licensed Product in such country shall be reduced by [**] percent ([**]%) from that set forth in Section 10.4.1(a) or 10.4.1(b), as applicable, above for such portions of the Royalty Term for such Licensed Product in such country.

(d) On a Licensed Product-by-Licensed Product basis, if Verve is legally required by a future court order, settlement agreement, contract, or other legally binding written commitment to make payments to a Third Party for a license under or the use of Patent Rights held by such Third Party

that [**], then Verve may offset [**] percent ([**]%) of any running royalty payments on net sales actually paid by Verve to such Third Party under such Third Party license with respect to such patent application(s) or patent(s) with respect to sales of such Licensed Product against the running royalty payments that are due to Beam with respect to Net Sales of such Licensed Product in such country under Section 10.4.1(a) or 10.4.1(b), as applicable; provided that, in no event, shall (a) the running royalty payments to Beam with respect to such any Licensed Products be reduced, after the application of any reduction in Section 10.4.1(c) and this Section 10.4.1(d), by more than [**] percent ([**]%) of the amount otherwise due under Section 10.4.1(a) or 10.4.1(b), as applicable, and (b) with respect to royalties paid to the Third Party solely on the basis of claims of pending patent applications of the Third Party (and no issued patent claim of the Third Party Covers the applicable Licensed Product), such amounts shall only be offsettable in accordance with this Section 10.4.1(d) if the Covering pending claim of the Third Party's pending application would meet the definition of Valid Claim set forth in this Agreement were such pending claim within the Patent Rights as of the Effective Date.

10.4.2 **Royalties related to Delivery Technology**.

(a) Subject to the provisions of Section 10.4.2(b) and 10.4.2(c), each Party will pay the other Party royalties on a tiered marginal royalty rate basis as set forth below based on the annual aggregate Territory-wide Net Sales resulting from the sale of each Delivery Technology Product of such paying Party, on a Delivery Technology Product-by-Delivery Technology Product basis, during each Calendar Year of the applicable Royalty Term for each such Delivery Technology Product.

Territory-Wide Net Sales of a Delivery Technology Product	**Marginal Royalty Rate (% of Calendar Year Net Sales for such Delivery Technology Product in the Territory)**
Annual Net Sales up to [**] Dollars ($[**]).	[**]%
Annual Net Sales including and above [**] Dollars ($[**]), up to [**] Dollars ($[**])	[**]%
Annual Net Sales including and above [**] Dollars ($[**])	[**]%

Each marginal royalty rate set forth in the table above will apply only to that portion of the Net Sales of a given Delivery Technology Product in the Territory during a given Calendar Year that falls within the indicated range.

(b) During time periods when the Royalty Term is only in effect in a given country for a given Delivery Technology Product due to clause (c) of Section 1.149.2 or 1.149.3, as applicable, then the royalty rate provided for such Delivery Technology Product in such country shall be reduced by [**] percent ([**]%) from that set forth in Section 10.4.2(a), as applicable, above for such portions of the Royalty Term for such Delivery Technology Product in such country.

(c) On a Delivery Technology Product-by-Delivery Technology Product basis, if the licensee Party with respect to the Delivery Technology Product under Section 2.1.3 or 2.1.4, as applicable, is legally required by a future court order, settlement agreement, contract, or other legally binding written commitment to make payments to a Third Party for a license under or the use of Patent Rights held by such Third Party that [**], then the licensee Party may offset [**] percent ([**]%) of any running royalty payments on net sales actually paid by such licensee Party to such Third Party under such Third Party license with respect to such patent application(s) or patent(s) with respect to sales of such Delivery Technology Product against the running royalty payments that are due to the other Party with respect to Net Sales of such Delivery Technology Product in such country under Section 10.4.2(a); provided that in no event shall (a) the running royalty payments to the other Party with respect to such Delivery Technology Products be reduced, after the application of any reduction in Section 10.4.2(b) and this Section 10.4.2(c), by more than [**] percent ([**]%) of the amount otherwise due under Section 10.4.2(a) and (b) with respect to royalties paid to the Third Party solely on the basis of claims of pending patent applications of the Third Party (and no issued patent claim of the Third Party Covers the applicable Delivery Technology Product), such amounts shall only be offsettable in accordance with this Section 10.4.1(c) if the Covering pending claim of the Third Party's pending application would meet the definition of Valid Claim set forth in this Agreement were such pending claim within the Patent Rights as of the Effective Date.

10.5 Revenue and Cost Sharing in the Collaboration Territory; Reconciliation Payments.

10.5.1 **General**. The terms and conditions of this Section 10.5 shall govern each Party's rights and obligations with respect to Shared Development Costs, Shared Commercialization Costs and Collaboration Territory Revenue, in each case relating to Collaboration Products. In the event of a conflict between Section 10.5.1(a) or 10.5.1(b), on one hand, and, on the other hand, any Schedules to this Agreement, the terms of Section 10.5.1(a) or 10.5.1(b) shall take precedence, govern and control.

(a) The Parties shall share all Shared Development Costs for each Collaboration Product incurred pursuant to this Agreement on the basis of [**] percent ([**]%) by Verve and [**] percent ([**]%) by Beam; provided, however, that in the event Beam exercises a Beam Opt-In Option upon receipt of an [**] for a Collaboration Product, Verve will be solely responsible for all of its own costs and all FTE Costs and out-of-pocket costs that are incurred as an expense in accordance with GAAP (including Third Party Payments) by Beam or any of its Affiliates in connection with all Development activities through the end of the Phase I Clinical Trial for such Collaboration Product, in accordance with Section 5.1 and the applicable Subsequent Development Plan.

(i) **Development Budget for Collaboration Products**. Notwithstanding the foregoing, expenses charged by either Party as Shared Development Costs for an activity under a Subsequent Development Plan shall not exceed [**] percent ([**]%) of the amount included for the total itemized expenditure in the relevant then-current Development Budget for such activity, and any expenses in excess of such [**]% threshold shall be borne by the incurring Party except if the cause of the excess expenditures is outside the incurring Party's reasonable control, in which case the incurring Party shall, upon learning of the likelihood of the excess expenditure, promptly revise the Development Budget and submit it in writing, with an explanation of the variance and the reasons therefor, to the JDC. If the JDC recommends approval of the revised budget (the consent of each Party's representatives on the JDC not to be unreasonably withheld, delayed or conditioned) then such revised Development Budget shall be incorporated into the respective Subsequent Development Plan.

(b) The Parties shall share all Shared Commercialization Costs for such Collaboration Product incurred pursuant to this Agreement, and Collaboration Territory Revenue for each Collaboration Product in the Collaboration Territory on the basis of fifty percent (50%) by Verve and fifty percent (50%) by Beam. Notwithstanding the provisions of Section 10.5.1(a), Verve shall bear [**] percent ([**]%) of all Development costs and Commercialization costs for Products for which Beam has elected to exercise the Beam Opt-Out Option pursuant to Section 5.3, which costs are incurred by Verve following the applicable Opt-Out Date, subject to the last sentence of Section 5.3, and Beam shall bear [**] percent ([**]%) of all Development costs and Commercialization costs for Products for which Verve has elected to exercise the Verve Opt-Out Option pursuant to Section 5.4, which costs are incurred by Beam following the applicable Opt-Out Date, subject to the last sentence of Section 5.4. Expenses charged by either Party as Shared Commercialization Costs for an activity under a US Commercialization Plan shall not exceed [**] percent ([**]%) of the amount included for the total itemized expenditure in the relevant then-current Commercialization Budget for such activity and any expenses in excess of such [**]% threshold shall be borne by the incurring Party except if the cause of the excess expenditures is outside the incurring Party's reasonable control, in which case the incurring Party shall, upon learning of the likelihood of the excess expenditure, promptly revise the Commercialization Budget and submit it in writing, with an explanation

of the variance and the reasons therefor, to the JCC. If the JCC recommends approval of the revised budget (the consent of each Party's representatives on the JCC not to be unreasonably withheld, delayed or conditioned) then such revised Commercialization Budget shall be incorporated into the respective US Commercialization Plan.

10.5.2 **Calculation and Payment**.

(a) Following any exercise by Beam of the Beam Opt-In Option, within [**] after the end of each Calendar Quarter, each Party shall provide the other Party and the JCC and JDC, as applicable, with (i) a detailed, activity-based statement of its Shared Development Costs incurred in such Calendar Quarter, including, without limitation, an itemized breakdown of the calculation of FTE Costs included in the Shared Development Costs (each, a "**Development Cost Report**"), (ii) a detailed, activity-based statement of its Shared Commercialization Costs (each statement, together with the corresponding Development Cost Report, the "**Cost Reports**"), in each case to the extent incurred in such Calendar Quarter (or a good faith estimate of any portions thereof where actuals are not known as of such time), as well as details of any adjustments to be made to the amounts submitted in the previous Calendar Quarter in previous Cost Reports, in a format to be agreed upon by the JCC and JDC, as applicable.

(b) Along with the Cost Reports, Verve shall provide Beam and the JCC with a report setting forth Verve's itemized Net Sales of each Collaboration Product in the Collaboration Territory during such Calendar Quarter.

(c) Within [**] after the end of each Calendar Quarter, each Party will provide the other Party and the JSC with a written, non-binding, preliminary report that will set forth, in a format to be mutually agreed by the Parties promptly after the Effective Date, such Party's good faith estimate of: (i) the amounts and information that will be set forward in such Party's Cost Reports for such Calendar Quarter; and (ii) in the case of Verve, the aggregate Net Sales of Collaboration Products in the Collaboration Territory and Collaboration Territory Revenue for such Calendar Quarter.

(d) In addition to the preliminary reports to be provided by each Party in accordance with Section 10.5.2(c) above, within [**] after the end of each Calendar Quarter, Verve shall provide Beam and the JSC with a written report (the "**Reconciliation Report**") setting forth, in a format to be mutually agreed by the Parties promptly after the Effective Date, the calculations of [**]. Any net payment owed from one Party to the other Party shall be paid within [**] following receipt of such reconciliation (i.e. within [**] after the end of the Calendar Quarter); provided that if a Party disputes an amount provided in such Reconciliation Report then

such disputed amount shall be reviewed by the JDC (with respect to Shared Development Costs) or JCC (with respect to Shared Commercialization Costs or Net Sales), as applicable, and any net payment owed with respect to the undisputed amounts shall be paid within such [**] period (and the disputed amount, if determined to be owed, shall be paid within [**] of resolution of the dispute). If requested by Verve or Beam, any invoices or other supporting documentation for any payments to a Third Party that individually exceed [**] Dollars ($[**]) shall be promptly provided**.**

10.6 **Currency Exchange**. All payments to be made by a Party under this Agreement shall be made in US dollars, by wire transfer, pursuant to the instructions of the Party receiving payment, as designated from time to time. To the extent Shared Development Costs or Shared Commercialization Costs are incurred in a currency other than US dollars, the applicable expense shall be converted into US dollars on a monthly basis using as a rate of exchange the average actual foreign currency exchange rate for the month in which the expense is incurred. Likewise, to the extent Licensed Products or Collaboration Products are sold in a currency other than US dollars, the amount received shall be converted into US dollars on a monthly basis using as a rate of exchange the average actual foreign currency exchange rate for the month in which the expense is incurred. All currency conversions shall be according to the exchange rates utilized by each Party in its own internal accounting system, consistently applied.

10.7 **Record-Keeping and Audit**.

10.7.1 Each Party and its Affiliates shall maintain complete and accurate books and records of account, in accordance with GAAP, of all transactions and other business activities under this Agreement, sufficient to confirm the accuracy of all reports furnished by a Party to the other Party under this Agreement, and all payments by a Party to the other Party under this Agreement. During the Term and for [**] after final payment has been made under this Agreement, upon reasonable written notice to a Party, but no more often than [**], such Party shall permit an independent certified public accountant of national standing designated by the other Party to audit such books and records of account of such Party in order to confirm the accuracy and completeness of all such reports and all such payments. The accounting firm shall disclose to the Party requesting the audit only whether the audited reports are correct or incorrect and the specific details concerning any discrepancies. No other information shall be provided to the Party requesting the audit.

10.7.2 The Party requesting an audit shall bear all costs and expenses incurred in connection with any such audit; provided, however, that if any such audit correctly identifies any underpayments by the audited Party hereunder or overpayments by the auditing Party that are the fault of the audited Party hereunder in excess of [**] percent ([**]%) of the amount actually payable by such Party to the Party requesting the audit hereunder, or $[**] US dollars, whichever is greater, then, in addition to paying the full amount of such underpayment or overpayment, the audited Party shall reimburse the other Party for all reasonable out-of-pocket costs and expenses incurred by such Party in connection with that audit.

10.7.3 Neither Party shall be required to maintain books and records for more than [**] following the end of the Calendar Year in which they were generated.

10.7.4 The Party requesting an audit shall treat all financial information subject to review under this Section 10.7 in accordance with the confidentiality and non-use provisions of this Agreement, and shall cause its accounting firm to enter into an acceptable confidentiality agreement with the audited Party obligating it to retain all such information in confidence pursuant to such confidentiality agreement.

10.8 Income Tax Withholding.

10.8.1 **VAT**. It is understood and agreed between the Parties that any payments made under this Agreement are exclusive of any value added or similar tax (VAT), which shall be added thereon as applicable. Where value added tax or similar tax is properly added to a payment made under this Agreement, the Party making the payment will pay the amount of value added tax or similar tax only on receipt of a valid tax invoice issued in accordance with the Applicable Laws of the country in which the value added tax or similar tax is chargeable.

10.8.2 **Withholding Taxes**. In the event any payments made pursuant to this Agreement become subject to withholding taxes under the laws or regulation of any jurisdiction, the Party making such payment shall deduct and withhold the amount of such taxes for the account of the payee to the extent required by Applicable Laws or regulations and such amounts payable to the payee shall be reduced by the amount of taxes deducted and withheld. Any such withholding taxes required under Applicable Laws or regulations to be paid or withheld shall be an expense of, and borne solely by, the payee.

10.8.3 **Tax Cooperation**. To the extent that the Party making a payment is required to deduct and withhold taxes on any payments under this Agreement, the Party making such payment shall pay the amounts of such taxes to the proper Governmental Authority in a timely manner and promptly transmit to the payee an official tax certificate or other evidence of such withholding sufficient to enable the payee to claim such payments of taxes. The payee shall provide any tax forms to the Party making such payment that may be reasonably necessary in order for such Party not to withhold tax or to withhold tax at a reduced rate under an applicable bilateral income tax treaty. The payee shall use reasonable efforts to provide any such tax forms to the Party making the payment at least [**] prior to the due date for any payments for which the payee desires that the Party making the payment apply a reduced withholding rate. Each Party shall provide the other with reasonable assistance to enable the recovery, as permitted by Applicable Law, of withholding taxes, VAT, or similar obligations resulting from payments made under this Agreement, such recovery to be for the benefit of the Party bearing such withholding tax or VAT.

10.8.4 Notwithstanding anything in this Agreement to the contrary, if an action (including but not limited to any assignment or sublicense of its rights or obligations under this Agreement, or any failure to comply with Applicable Laws or filing or record retention requirements) by a Party leads to the imposition of withholding tax liability or VAT on the other Party that would not have been imposed in the absence of such action or in an increase in such liability above the liability that would have been imposed in the absence of such action, such Party shall indemnify and hold harmless the other Party from any such additional or increased withholding tax liability or VAT (except to the extent that the other Party can reclaim it, provided that such other Party will be reimbursed for any reasonable out of pocket costs incurred in the reclaim).

10.9 **Late Payments.** Any payments by a Party that are not being disputed in good faith by such Party and not paid on or before the date such payments are due under this Agreement will bear interest at the lower of (a) [**] percent ([**]%) [**] and (b) the maximum rate allowed by law. Interest will accrue beginning on the [**] day following the due date for payment and will be compounded [**]. Payment of such interest by the relevant Party shall not limit, in any way, the other Party's right to exercise any other remedies it may have as a consequence of any payment due but unpaid hereunder.

Article 11 CONFIDENTIALITY AND PUBLICATION

11.1 **Confidentiality; Exceptions**. Except to the extent expressly authorized by this Agreement or otherwise agreed in writing by the Parties, the Parties agree that the receiving Party (the "**Receiving Party**") shall keep confidential and shall not publish or otherwise disclose or use for any purpose other than as provided for in this Agreement any confidential and proprietary information and materials, patentable or otherwise, in any form (written, oral, photographic, electronic, magnetic, or otherwise) which is disclosed to it by the other Party (the "**Disclosing Party**") or otherwise received or accessed by a Receiving Party in the course of performing its obligations or exercising its rights under this Agreement, including trade secrets, Know-How, inventions or discoveries, proprietary information, formulae, processes, techniques and information relating to a Party's past, present and future Commercialization, financial, and Development activities of any product or potential product or useful technology of the Disclosing Party and the pricing thereof (collectively, "**Confidential Information**"), except to the extent that it can be established by the Receiving Party that such Confidential Information:

11.1.1 was in the lawful knowledge and possession of the Receiving Party prior to the time it was disclosed to, or learned by, the Receiving Party, or was otherwise developed independently by the Receiving Party, as evidenced by written records kept in the ordinary course of business, or other documentary proof of actual use by the Receiving Party;

11.1.2 was generally available to the public or otherwise part of the public domain at the time of its disclosure to the Receiving Party;

11.1.3 became generally available to the public or otherwise part of the public domain after its disclosure and other than through any act or omission of the Receiving Party in breach of this Agreement; or

11.1.4 was disclosed to the Receiving Party, other than under an obligation of confidentiality, by a Third Party who had no obligation to the Disclosing Party not to disclose such information to others.

11.2 **Authorized Disclosure**. Except as expressly provided otherwise in this Agreement, a Receiving Party may use and disclose Confidential Information of the Disclosing Party as follows: (a) under appropriate confidentiality provisions similar to those in this Agreement, in connection with the performance of its obligations or exercise of rights granted or reserved in this Agreement (including the rights to Develop, Manufacture and Commercialize Products and to grant sublicenses as permitted hereunder); or (b) to the extent such disclosure is reasonably necessary in filing or prosecuting patent, copyright and trademark applications in accordance with this Agreement, prosecuting or defending litigation, complying with applicable governmental regulations, seeking and obtaining regulatory approval, conducting non-clinical activities or clinical trials, preparing and submitting INDs to Regulatory Authorities, or is otherwise required by Applicable Law or the rules of a recognized stock exchange or automated quotation system applicable to such Party; provided, however, that if a Receiving Party is required by Applicable Law to make any such disclosure of a Disclosing Party's Confidential Information it will, except where impracticable, give reasonable advance notice to the Disclosing Party of such disclosure requirement and, if requested by the Disclosing Party, cooperate with the Disclosing Party to secure confidential treatment of such Confidential Information required to be disclosed; or (c) in communication with existing or prospective investors, consultants, advisors, licensees or collaborators or others on a need to know basis, in each case that are not Competitors of the Disclosing Party and under appropriate confidentiality provisions substantially equivalent to those of this Agreement (except for the term of such obligations, which shall be customary for the particular disclosure) or (d) to the extent mutually agreed to in writing by the Parties.

11.3 **Publications**. Verve and Beam each acknowledge the other Party's interest in publishing the results of its research in order to obtain recognition within the scientific community and to advance the state of scientific knowledge. Each Party also recognizes the mutual interest in obtaining valid patent protection and in protecting business interests and trade secret information. Consequently, except for disclosures permitted pursuant to Section 11.2, if either Party, its Affiliates, or their respective employee(s) wishes to make a publication or public presentation related to a Collaboration Product or Licensed Product or which otherwise may reasonably contain Confidential Information, or intellectual property, of the other Party, such Party must first obtain approval by the JSC of the general subject matter of such proposed publication or presentation and thereafter shall deliver to such other Party a copy of the proposed written publication or an outline of any proposed oral disclosure at least [**] prior to submission for publication or presentation. The

reviewing Party shall have the right (a) to require removal from the publication or presentation of such reviewing Party's Confidential Information or (b) to request a reasonable delay in publication or presentation in order to protect patentable information. If the reviewing Party requests a delay, the publishing Party shall delay submission or presentation for a period of [**] to enable patent applications protecting each Party's rights in such information to be filed in accordance with Section 13.2. Upon expiration of such [**], the publishing Party shall be free to proceed with the publication or presentation. If the reviewing Party requests modifications to the publication or presentation, the publishing or presenting Party shall edit such publication or presentation to prevent disclosure of Confidential Information, trade secret and proprietary business information of the reviewing Party prior to submission of the publication or presentation. Notwithstanding the foregoing, the Parties agree that (i) study information and results must be posted to clinicaltrials.gov in accordance with statutory deadlines and (ii) such study results required to be posted pursuant to clause (i) of this Section 11.3 will, following such posting, no longer constitute Confidential Information of either Party.

11.4 **Press Releases; Disclosure of Agreement**. The Parties shall reasonably cooperate and mutually agree on an initial press release to be made by each Party regarding the execution of this Agreement. Neither Party shall issue or cause the publication of any other press release or public announcement regarding the terms of this Agreement without the express prior approval of the other Party other than as required by Applicable Law or the rules of any stock exchange, provided that if any such publication, press release or public announcement is required by Applicable Law, the Party obligated to make such publication, press release or public announcement shall, if practicable, notify the other Party in advance thereof and reasonably consider any timely comments from such other Party, including any reasonable request to limit such publication, press release or public announcement. Notwithstanding anything to the contrary in this Agreement, each Party may disclose this Agreement, as well as redacted versions of any Third Party Agreements provided to such Party, on a reasonable need-to-know basis to actual and potential investors, acquirers, sublicensees and collaborators under reasonable conditions of confidentiality, including, in the case of the applicable Third Party Agreements, confidentiality obligations imposed under such Third Party Agreements.

11.5 **Use of Names**. Neither Party shall use the name, symbol, trademark, trade name or logo of the other Party or its Affiliates in any press release, publication or other form of public disclosure without the prior written consent of the other Party in each, except for those disclosures for which consent has already been obtained, including as authorized in Section 2.3.

11.6 **Termination of Prior Agreement**. This Agreement supersedes and replaces the Mutual Confidential Disclosure Agreement by and between the Parties dated as of [**] (the "**Existing Confidentiality Agreement**"). All information exchanged between the Parties under the Existing Confidentiality Agreement shall be deemed Confidential Information of the respective Disclosing Party hereunder and shall be so subject to the terms of this Agreement.

11.7 **Remedies**. Each Party shall be entitled to seek, in addition to any other right or remedy it may have, at Applicable Law or in equity, a temporary injunction, without the posting of any bond or other security, enjoining or restraining the other Party from any violation or threatened violation of this Article 11.

Article 12 REPRESENTATIONS, WARRANTIES AND COVENANTS

12.1 **Representations and Warranties of Each Party**. Each Party represents and warrants to the other Party that as of the Effective Date:

12.1.1 it has the full right, power and authority to enter into this Agreement and to perform its obligations hereunder;

12.1.2 this Agreement has been duly executed by it and is legally binding upon it, enforceable in accordance with its terms, and does not conflict with any agreement, instrument or understanding, oral or written, to which it is a party or by which it may be bound, nor violate any material Applicable Law or regulation of any court, governmental body or administrative or other agency having jurisdiction over it; and

12.1.3 it is licensed, registered, or qualified under Applicable Law, regulations, policies, and administrative requirements to do business.

12.2 **Verve Representations, Warranties and Covenants**. Verve represents and warrants to Beam as of the Effective Date that and, with respect to Sections 12.2.5, 12.2.9, 12.2.10 and 12.2.11, covenants during the Term:

12.2.1 to Verve's knowledge, the Patent Rights to be licensed to Beam under Sections 2.1.2 and 2.1.3 have been properly maintained and are not invalid or unenforceable, in whole or in part;

12.2.2 Verve is the sole and exclusive owner of, or has Control via a license to, the Patent Rights licensed to Beam as of the Effective Date under Sections 2.1.2 and 2.1.3;

12.2.3 Verve has not granted any right or license to any Third Party relating to any of the Patent Rights that Verve Controls that conflicts or interferes with any of the rights or licenses granted hereunder by Verve to Beam;

12.2.4 there are no claims, judgments or settlements against or owed by Verve and, to the knowledge of Verve, no pending or threatened claims or litigation relating to the Patent Rights Controlled by Verve to be licensed to Beam under Sections 2.1.2 and 2.1.3;

12.2.5 Verve will not, and will cause its Affiliates not to incur or permit to exist, with respect to any Know-How or Patent Rights Controlled by Verve or its Affiliates (including the Verve Delivery Technology and Joint Collaboration Technology) any lien, encumbrance, charge, security interest, mortgage, liability, assignment, grant of license or other binding obligation that is or would be inconsistent with or would diminish, derogate from or otherwise conflict with the licenses and other rights granted to Beam under this Agreement;

12.2.6 the Third Party Agreements set forth on Schedule 1.167(b) are all of the agreements or arrangements between Third Parties and Verve or its Affiliates under which Verve or its Affiliates are granted rights to any Verve Delivery Technology or any other intellectual property rights related to or useful for the Development, Commercialization, Manufacture or use of any Product or pursuant to which Beam would be subject to any obligations (including payment obligations) based upon the rights granted by Verve to Beam under this Agreement or the Development or Commercialization of a Product under this Agreement;

12.2.7 Verve has provided to Beam true and correct partially-redacted copies of all Third Party Agreements to which Verve or its Affiliate is a party in their current form (including any amendments thereto) (each, a "**Verve Third Party Agreement**"), which Verve Third Party Agreements are in full force and effect, and the redacted provisions do not materially relate to Beam's rights or obligations under this Agreement, including provisions related to the scope of the licenses granted to Beam under Section 2.1.2, 2.1.3 or 2.1.5 or the ownership of any Patent Rights invented or Know-How conceived, developed, generated or reduced to practice arising out of a Party's performance of its obligations under this Agreement during the Term;

12.2.8 Verve is not in material breach and, to its knowledge, none of the Third Parties who are party to a Verve Third Party Agreement are in material breach of the relevant Verve Third Party Agreement, Verve has not waived or allowed to lapse or terminate any of its rights under any Verve Third Party Agreements that would adversely affect the rights granted to Beam under this Agreement, and Verve has not received any notice of breach of such Verve Third Party Agreements;

12.2.9 Verve shall not amend any Third Party Agreement to which Verve or any of its Affiliates is a party in a manner that would adversely affect the rights or obligations of Beam under this Agreement without Beam's prior written consent;

12.2.10 Verve shall furnish Beam with copies of all notices received by Verve relating to any alleged breach or default by Verve under any Verve Third Party Agreement within [**] after Verve's receipt thereof. In the event that Verve does not resolve any such breach that is an undisputed breach to make one or more payments when due under the Verve Third Party Agreement, Verve shall notify Beam within a sufficient period of time before the expiration of the cure period for such breach under such Verve Third Party Agreement such that Beam, in its sole discretion, is able to cure or otherwise resolve such payment breach. If Beam makes any payments to a Third Party in connection with the cure or other resolution of such payment breach of Verve, then Beam may credit the amount of such payments against any amounts payable to Verve pursuant to this Agreement; and

12.2.11 Verve shall promptly (and in any event within [**] following receipt) furnish Beam with copies of all amendments of the Verve Third Party Agreements solely to the extent material to Beam or its rights granted under this Agreement.

12.3 **Beam Representations, Warranties and Covenants**. Beam represents and warrants to Verve as of the Effective Date and, with respect to Sections 12.3.7, 12.3.8, 12.3.9 and 12.3.11, covenants during the Term that:

12.3.1 to Beam's knowledge, the Beam Base Editor Patent Rights, Beam C2C1 Patent Rights and any Patent Rights within the Beam Delivery Technology have been properly maintained and are not invalid or unenforceable, in whole or in part;

12.3.2 Beam is the sole and exclusive owner of, or has Control via a license to, the Beam Base Editor Patent Rights, Beam C2C1 Patent Rights and any Patent Rights within the Beam Delivery Technology;

12.3.3 Beam has not granted any right or license to any Third Party relating to any of the Beam Base Editor Patent Rights, Beam C2C1 Patent Rights or any Patent Rights within the Beam Delivery Technology that conflicts or interferes with any of the rights or licenses granted hereunder with respect to the Beam Base Editor Patent Rights, Beam C2C1 Patent Rights and any Patent Rights within the Beam Delivery Technology;

12.3.4 the Third Party Agreements set forth on Schedule 1.167(a) are all of the agreements or arrangements between Third Parties and Beam or its Affiliates under which Beam or its Affiliates are granted rights to any Beam Base Editor Technology, Beam C2C1 Technology or Beam Delivery Technology or pursuant to which Verve would be subject to any obligations (including payment obligations) based upon the rights granted by Beam to Verve under this Agreement or the Development or Commercialization of a Product under this Agreement;

12.3.5 Beam has provided to Verve true and correct partially-redacted copies of all Third Party Agreements to which Beam or its Affiliate is a party in their current form (including any amendments thereto) (each, a "**Beam Third Party Agreement**"), which Beam Third Party Agreements are in full force and effect, and the redacted provisions do not materially relate to Verve's rights or obligations under this Agreement, including provisions related to the scope of the licenses granted to Beam under the Beam Base Editor Patent Rights or Beam C2C1 Patent Rights or the ownership of any Patent Rights invented or Know-How conceived, developed, generated or reduced to practice arising out of a Party's performance of its obligations under this Agreement during the Term;

12.3.6 Beam is not in material breach and, to its knowledge, none of the Third Parties who are party to a Beam Third Party Agreement are in material breach of the relevant Beam Third Party Agreement, Beam has not waived or allowed to lapse or terminate any of its rights under any Beam Third Party Agreements that would adversely affect the rights granted to Verve under this Agreement, and Beam has not received any notice of breach of such Beam Third Party Agreements;

12.3.7 Beam shall not amend any Beam Third Party Agreement in a manner that would adversely affect the rights or obligations of Verve under this Agreement without Verve's prior written consent;

12.3.8 Beam shall furnish Verve with copies of all notices received by Beam relating to any alleged breach or default by Beam under any Beam Third Party Agreement within [**] after Beam's receipt thereof. In the event that Beam does not resolve any such breach that is an undisputed breach of Beam's obligation to make one or more payments when due under the Beam Third Party Agreement, Beam shall notify Verve within a sufficient period of time before the expiration of the cure period for such breach under such Beam Third Party Agreement such that Verve, in its sole discretion, is able to cure or otherwise resolve such payment breach. If Verve makes any payments to a Third Party in connection with the cure or other resolution of such payment breach of Beam, then Verve may credit the amount of such payments against any royalties or other amounts payable to Beam pursuant to this Agreement;

12.3.9 Beam shall promptly (and in any event within [**] following receipt) furnish Verve with copies of all amendments of the Beam Third Party Agreements, solely to the extent material to Verve or its rights granted under this Agreement;

12.3.10 there are no claims, judgments or settlements against or owed by Beam and, to the knowledge of Beam, no pending or threatened claims or litigation relating to the Beam Base Editor Technology, Beam C2C1 Technology or Beam Delivery Technology; and

12.3.11 Beam will not, and will cause its Affiliates not to incur or permit to exist, with respect to any Beam Base Editor Technology, Beam C2C1 Technology, Joint Collaboration Technology or Beam Delivery Technology, any lien, encumbrance, charge, security interest, mortgage, liability, assignment, grant of license or other binding obligation that is or would be inconsistent with or would diminish, derogate from or otherwise conflict with the licenses and other rights granted to Verve under this Agreement.

12.4 **Disclaimer**. THE FOREGOING REPRESENTATIONS AND WARRANTIES OF EACH PARTY ARE IN LIEU OF ANY OTHER REPRESENTATIONS AND WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR ANY IMPLIED WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE, ALL OF WHICH ARE HEREBY SPECIFICALLY EXCLUDED AND DISCLAIMED.

Article 13 INTELLECTUAL PROPERTY PROVISIONS

13.1 Ownership of Intellectual Property.

13.1.1 **General**. Inventorship shall be determined in accordance with United States patent laws.

13.1.2 **Beam Owned Intellectual Property**. Subject to the licenses granted to Verve under Section 2.1.1 and 2.1.4 and the rights retained by Beam under Section 2.1.6, the entire right, title and interest in and to the Beam Base Editor Technology, Beam Collaboration Technology and Beam Delivery Technology shall be owned solely by Beam. Verve shall, and hereby does (and shall cause its Affiliates to) sell, assign, transfer, convey and deliver to Beam, all of its right, title and interest in, to and under any Beam Collaboration Technology. Verve will promptly execute an assignment of Beam Collaboration Technology, including assignments of Patent Rights in forms registrable or recordable in the United States Patent and Trademark Office or applicable foreign offices in the Territory to the extent necessary to assign the Beam Collaboration Technology, all in forms reasonably acceptable to Beam.

13.1.3 **Verve Owned Intellectual Property**. Subject to the license granted to Beam under Sections 2.1.2, 2.1.3 and 6.3, the entire right, title and interest in and to the Verve Collaboration Technology, Verve Delivery Technology and the Clinical Trial Data shall be owned solely by Verve.

13.1.4 **Other Solely Invented Intellectual Property**. Subject to the licenses granted to each Party and the rights retained by each Party under Section 2.1 and except as set forth in Section 8.3, Section 13.1.2 or Section 13.1.3, all Know-How, patentable or otherwise, conceived, developed, generated or reduced to practice during the Term solely by a Party or its Affiliates or other persons acting on behalf of such Party shall be owned by such Party.

13.1.5 **Jointly Owned Intellectual Property**. Subject to the licenses granted to each Party and the rights retained by each Party under Section 2.1, (a) Joint Collaboration Technology shall be owned jointly by Verve and Beam and (b) each Party shall have the non-exclusive right to use Joint Collaboration Know-How, practice the inventions claimed by the Joint Collaboration Patent Rights, and grant licenses under its interest in Joint Collaboration Technology, as it deems appropriate without the consent of or any obligation to the other Party, including any duty to account.

13.2 Filing, Prosecution and Maintenance of Patent Rights.

13.2.1 As between the Parties, subject to Section 13.3.2, Beam shall have the exclusive right to file, prosecute and maintain the Beam Base Editor Patent Rights, Beam Collaboration Patent Rights, Beam C2C1 Patent Rights and Patent Rights within the Beam Manufacturing Technology and Beam Delivery Technology. Subject to Beam's obligations under Third Party Agreements, Beam shall give Verve the

opportunity to provide comments on and make requests of Beam concerning the prosecution and maintenance of the Beam Base Editor Patent Rights, Beam C2C1 Patent Rights, Beam Collaboration Patent Rights and Patent Rights within the Beam Delivery Technology and Beam shall consider such comments and requests in good faith; however, final decision-making authority with respect to the prosecution and maintenance of such Patent Rights shall vest in Beam.

13.2.2 If and to the extent permitted by the Third Party Agreements to which Beam is a Party, Verve shall have the first right to file, prosecute and maintain Product-Specific Patent Rights. Verve will keep Beam advised on the status of the preparation, filing, prosecution, and maintenance of all patent applications included within such Product-Specific Patent Rights and the maintenance of any issued patents included within such Product-Specific Patent Rights. Further, Verve will consult and reasonably cooperate with Beam with respect to the preparation, filing, prosecution and maintenance of Product-Specific Patent Rights, including: (i) allowing Beam a reasonable opportunity and reasonable time to review and comment regarding relevant communications to Verve and drafts of any responses or other proposed filings by Verve before any applicable filings are submitted to any relevant patent office or Governmental Authority and (ii) reflecting any reasonable comments offered by Beam in any final filings submitted by Verve to any relevant patent office or Governmental Authority. If Verve elects not to file a patent application included in the Product-Specific Patent Rights in a country in the Territory or elects to cease the prosecution or maintenance of any Product-Specific Patent Right, Verve will provide Beam with written notice immediately, but not less than [**] before any action is required, upon the decision to not file or continue the prosecution of such patent application or maintenance of such patent. In such event, Verve will permit Beam to file or continue prosecution or maintenance of any such Product-Specific Patent Right in such country.

13.2.3 As between the Parties, Verve shall have the exclusive right to file, prosecute and maintain the Patent Rights in the Verve Delivery Technology and any other Patent Rights that Verve has licensed to Beam under Section 2.1.2. Subject to Verve's obligations under Third Party Agreements, Verve shall give Beam the opportunity to provide comments on and make requests of Verve concerning the prosecution and maintenance of such Patent Rights and Verve shall consider such comments and requests in good faith; however, final decision-making authority with respect to the prosecution and maintenance of such Patent Rights shall vest in Verve.

13.2.4 With respect to any Joint Collaboration Patent Right, the Party responsible for the filing, prosecution and maintenance of such Joint Collaboration Patent Right shall be decided between the Parties in good faith, such decision to take into account the subject matter of the patent right and to which Party such subject matter is most relevant.

13.3 Enforcement and Defense of Beam Patent Rights.

13.3.1 Each Party shall give to the other Party notice of (i) any infringement of Beam Base Editor Patent Rights, Beam C2C1 Patent Rights, Beam Collaboration Patent Rights, Joint Collaboration Patent Rights to the extent related to Base Editors or the use of C2C1 in a base editor or nuclease product and Patent Rights within the Beam Delivery Technology but only, in each case, if such Patent Right is not a Product-Specific Patent Right, or (ii) any misappropriation or misuse of Beam Base Editor Know-How, Beam C2C1 Know-How, Beam Collaboration Know-How, Joint Collaboration Know-How to the extent related to Base Editors or the use of C2C1 in a base editor or nuclease product or Know-How within the Beam Delivery Technology but only, in each case, if such Know-How is not Product-Specific Know-How, that may come to such Party's attention which infringement or misappropriation is by a Third Party that is developing or commercializing a product that is competitive with a Licensed Product or a Delivery Technology Product that uses Beam Delivery Technology (a "**Beam IP Competitive Infringement**"). Beam shall have the sole right to initiate and prosecute such legal action at its own expense and in the name of Beam and, if requested by Beam in the name of Verve, or to control the defense of any declaratory judgment action relating to Beam Base Editor Technology, Beam Collaboration Technology and Beam Delivery Technology.

13.3.2 For any action to terminate any Beam IP Competitive Infringement, in the event that Beam is unable to initiate or prosecute such action solely in its own name, Verve will join such action voluntarily and will execute and cause its Affiliates to execute all documents necessary for Beam to initiate litigation to prosecute and maintain such action. Each Party shall have the right to be represented by counsel of its own choice, at its own expense in any such action. In connection with any action related to a Beam IP Competitive Infringement, Verve and Beam will cooperate fully and will provide each other with any information or assistance that either may reasonably request. Beam shall keep Verve informed of developments in any action or proceeding related to a Beam IP Competitive Infringement, including, to the extent permissible by Applicable Law, consultation on and approval of any settlement, the status of any settlement negotiations and the terms of any offer related thereto.

13.3.3 Any recovery applicable to Licensed Products or Delivery Technology Products obtained by Beam in connection with or as a result of any action related to a Beam IP Competitive Infringement contemplated by this Section 13.3, whether by settlement or otherwise, shall be shared in order as follows:

(a) Beam shall recoup all of its costs and expenses incurred in connection with the action, including any payments owed by Beam to a Third Party under any Third Party Agreement as a result of such action or recovery;

(b) Verve shall then, to the extent possible, recover its costs and expenses incurred in connection with the action, including any payments owed by Verve to a Third Party under any Third Party Agreement as a result of such action or recovery;

(c) [**].

13.4 Enforcement and Defense of Verve Patent Rights, Product-Specific Patent Rights or Joint Collaboration Patent Rights.

13.4.1 Each Party shall give the other Party notice of (i) any infringement of Patent Rights within the Verve Delivery Technology, Product-Specific Patent Rights, any Patent Rights licensed by Verve or its Affiliates to Beam under this Agreement or Joint Collaboration Patent Rights to the extent (in the case of Joint Collaboration Patent Rights) not related to Base Editors or the use of C2C1 in a base editor or nuclease product, or (ii) any misappropriation or misuse of Know-How within the Verve Delivery Technology, Product-Specific Know-How, any Know-How licensed by Verve or its Affiliates to Beam under this Agreement or Joint Collaboration Know-How to the extent (in the case of Joint Collaboration Know-How) not related to Base Editors or the use of C2C1 in a base editor or nuclease product, that may come to such Party's attention, which infringement or misappropriation is by a Third Party that is developing or commercializing a product that is competitive with a Licensed Product or a Delivery Technology Product that uses Verve Delivery Technology (an "**Verve IP Competitive Infringement**"). Verve shall have the sole right to initiate and prosecute such legal action at its own expense and in the name of Verve and if requested by Verve in the name of Beam, or to control the defense of any declaratory judgment action relating to such Patent Rights or Know-How. Each Party shall have the right to be represented by counsel of its own choice at its own expense.

13.4.2 For any action to terminate any Verve IP Competitive Infringement, in the event that Verve is unable to initiate or prosecute such action solely in its own name, Beam will join such action voluntarily and will execute and cause its Affiliates to execute all documents necessary for Verve to initiate litigation to prosecute and maintain such action. In connection with any action related to a Verve IP Competitive Infringement, Verve and Beam will cooperate fully and will provide each other with any information or assistance that either may reasonably request. Verve shall keep Beam informed of developments in any action or proceeding related to a Verve IP Competitive Infringement, including, to the extent permissible by Applicable Law, consultation on and approval of any settlement, the status of any settlement negotiations and the terms of any offer related thereto.

13.4.3 Any recovery obtained by Verve in connection with or as a result of any action contemplated by this Section 13.4, whether by settlement or otherwise, shall be shared in order as follows:

(a) Verve shall recoup all of its costs and expenses incurred in connection with the action, including any payments owed by Verve to a Third Party under any Third Party Agreement as a result of such action or recovery;

(b) Beam shall, to the extent possible, recover its costs and expenses incurred in connection with the action, including any payments owed by Beam to a Third Party under any Third Party Agreement as a result of such action or recovery; and

(c) [**].

13.5 **Patent Term Restoration**. The Parties agree to cooperate and to take reasonable actions to maximize the protections available under the safe harbor provisions of 35 U.S.C. 103(c) for US patents and patent applications. The Parties shall cooperate with each other, including without limitation to provide necessary information and assistance as the other Party may reasonably request, in obtaining patent term restoration or supplemental protection certificates or their equivalents in any country in the Territory where applicable to Beam Base Editor Patent Rights, Beam C2C1 Patent Rights, Patent Rights within the Beam Delivery Technology, Patent Rights within the Verve Delivery Technology, other Patent Rights licensed by Verve or its Affiliate under this Agreement or Joint Collaboration Patent Rights.

13.6 **Trademarks and Corporate Logos**.

13.6.1 **In the Collaboration Territory**.

(a) Verve shall be responsible for developing a list of potential trademarks to be used to identify the Collaboration Products in the Collaboration Territory. From Verve's initial list, the JSC shall ultimately be responsible for the selection of the actual trademarks used to identify the Collaboration Products in the Collaboration Territory, and all trademarks, logos, taglines, trade dress, domain names or indicia of origin for use in connection with the sale or marketing of Collaboration Products in the Collaboration Territory (the "**Collaboration Marks**"). Verve shall be responsible for any associated creation, searching, clearance, filing, registration, and maintenance of the Collaboration Marks, and all expenses associated therewith shall be treated as Shared Commercialization Costs to the extent included in the Commercialization Budget for the applicable Collaboration Product. Verve shall keep Beam reasonably advised of the status of the actual and prospective trademarks filings and, upon Beam's request, shall provide advance copies of any substantive papers related to the filing, prosecution and maintenance of such filings. All uses of the proposed major promotional activities using Collaboration Marks and, upon request of the JSC, other representative samples of proposed use of the Collaboration Marks, shall be reviewed by the JSC prior to first public display and shall comply with all Applicable Laws (including, without limitation, those Applicable Laws and regulations particularly applying to the proper use and designation of trademarks in the applicable countries of the Collaboration Territory). Verve shall own all Collaboration Marks (including associated goodwill) and copyrights created in connection with the marketing of the Products in the Collaboration Territory.

(b) With respect to those Collaboration Products for which Beam exercises its right to Co-Promote in the Collaboration Territory as set forth in Article 5, each Party shall provide to the other notice of any infringement or challenge to the Collaboration Marks. Verve and Beam shall thereafter consult and cooperate fully to determine a course of action, including but not limited to the commencement of legal action by either or both Verve and Beam. However, Verve, upon notice to Beam, shall have the first right to initiate and prosecute such legal action at its own expense and in the name of Verve and, if requested by Verve, in the name of Beam or to control the defense of any challenge relating to the Collaboration Marks. Verve shall promptly inform Beam if it elects not to exercise such first right and Beam shall, at its own expense, thereafter have the right to either initiate and prosecute such action or defend such action in the name of Beam and if requested by Beam in the name of Verve. Any recovery obtained by either or both Verve and Beam in connection with or as a result of any action contemplated by this Section 13.6, whether by settlement or otherwise, shall be shared in order as follows: (i) the Party which initiated and prosecuted the action shall recoup all of its costs and expenses incurred in connection with the action; (ii) the other Party shall then, to the extent possible, recover its costs and expenses incurred in connection with the action; and (iii) the amount of any recovery remaining shall then be allocated equally between the Parties. In connection with any action, Verve and Beam will cooperate fully and will provide each other with any information or assistance that either may reasonably request. Each Party shall keep the other informed of developments in any action or proceeding, including, to the extent permissible by Applicable Law, consultation on and approval of any settlement, the status of any settlement negotiations and the terms of any offer related thereto. Each Party shall have the right to be represented by counsel of its own choice, at its expense.

13.6.2 Use of Trademarks of the Other Party. Neither Party shall, without the other Party's prior written consent, use any trademarks or house marks of the other Party (including the other Party's corporate name, and, in the case of Beam, any Collaboration Marks), or marks confusingly similar thereto, in connection with such Party's marketing or promotion of Products under this Agreement, except as expressly permitted pursuant to Section 2.3 or as may be expressly agreed to by the Parties and except to the extent required to comply with Applicable Laws.

Article 14 INDEMNIFICATION

14.1 **General Indemnification by Beam**. Beam shall indemnify and hold harmless Verve, its Affiliates and their respective directors, officers, employees and agents (collectively, the "**Verve Indemnified Parties**"), from, against and in respect of any and all liabilities, losses, costs (including costs of investigation and defense), damages, fines, penalties, government orders, taxes, expenses or amounts paid in settlement (in each case, including reasonable attorneys' and experts fees and expenses), in each case to the extent resulting from any Action brought by a Third Party (collectively, "**Losses**"), to the extent such Losses are incurred or suffered by the Verve Indemnified Parties or any of them as a result of, arising out of or directly or indirectly relating to: [**].

14.2 **General Indemnification by Verve**. Verve shall indemnify and hold harmless Beam, its Affiliates and their respective directors, officers, employees and agents (collectively, the "**Beam Indemnified Parties**"), from, against and in respect of any and all Losses to the extent such Losses are incurred or suffered by the Beam Indemnified Parties or any of them as a result of, arising out of or directly or indirectly relating to: [**].

14.3 **Products Liability Claims.** Notwithstanding anything express or implied to the contrary herein, including Sections 14.1 and 14.2 hereof, in the event that there is a Third Party products liability claim for death, bodily injury or property damage suffered by such Third Party from or in connection with any Collaboration Product, then the liability, claims, damage, loss, or expense (including reasonable attorneys' fees) related to such claim against either Party shall be shared by the Parties in the following allocation: Verve shall bear [**] percent ([**]%) and Beam shall bear [**] percent ([**]%) of such related liability, claims, damage, loss and expense; provided that in the event such death, bodily injury or property damage giving rise to a Third Party product liability claim is proximately caused by the negligence or willful misconduct, violation of Applicable Law or breach of the terms and conditions of this Agreement by a Party, its Affiliates or their respective directors, officers, employees or agents, this Section 14.3 shall not apply and Sections 14.1 and 14.2 will apply to the extent relevant. The Parties shall follow the procedures set forth in Section 14.4 and, solely for purposes of determining the procedure for the defense of such claim, Verve shall be deemed to be the Indemnifying Party under Section 14.4.

14.4 **Claims for Indemnification**.

14.4.1 A Person entitled to indemnification under this Article 14 (an "**Indemnified Party**") shall give prompt written notification to the Party from whom indemnification is sought (the "**Indemnifying Party**") of the commencement of any Third Party Action for which indemnification may be sought or, if earlier, upon the assertion of any such Action by a Third Party (it being understood and agreed, however, that the failure by an Indemnified Party to give notice of a Third Party Action as provided in this Section 14.4.1 shall not relieve the Indemnifying Party of its indemnification obligation under this Agreement except and only to the extent that such Indemnifying Party is actually prejudiced as a result of such failure to give notice).

14.4.2 Within [**] after delivery of such notification, the Indemnifying Party may, upon written notice thereof to the Indemnified Party, assume control of the defense of such Action using counsel reasonably satisfactory to the Indemnified Party. If the Indemnifying Party does not assume control of such defense, the Indemnified Party shall control such defense.

14.4.3 The Party not controlling such defense may participate therein at its own expense; provided that if the Indemnifying Party assumes control of such defense and the Indemnified Party reasonably concludes, based on advice from counsel, that the Indemnifying Party and the Indemnified Party have conflicting interests with respect to such action, suit, proceeding or claim, the Indemnifying Party shall be responsible for the reasonable fees and expenses of counsel to the Indemnified Party solely in connection therewith; provided further, however, that in no event shall the Indemnifying Party be responsible for the fees and expenses of more than one counsel in any one jurisdiction for all Indemnified Parties.

14.4.4 The Party controlling such defense shall keep the other Party advised of the status of such action, suit, proceeding or claim and the defense thereof and shall consider recommendations made by the other Party with respect thereto.

14.4.5 The Indemnified Party shall not agree to any settlement of such action, suit, proceeding or claim without the prior written consent of the Indemnifying Party, which shall not be unreasonably withheld. The Indemnifying Party shall not agree to any settlement of such action, suit, proceeding or claim or consent to any judgment in respect thereof that does not include a complete and unconditional release of the Indemnified Party from all liability with respect thereto or that imposes any liability or obligation on the Indemnified Party without the prior written consent of the Indemnified Party.

14.5 **Disclaimer of Liability**. IN NO EVENT SHALL ANY PARTY OR ANY OF ITS RESPECTIVE AFFILIATES BE LIABLE UNDER THIS AGREEMENT FOR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES SUFFERED BY BEAM, VERVE OR ANY OF THEIR RESPECTIVE AFFILIATES IN CONNECTION WITH THIS AGREEMENT WHETHER IN CONTRACT, WARRANTY, TORT, NEGLIGENCE, STRICT LIABILITY OR OTHERWISE, INCLUDING LOSS OF PROFITS OR REVENUE; PROVIDED THAT THIS SECTION SHALL NOT RELIEVE EITHER PARTY FROM ITS INDEMNIFICATION OBLIGATIONS UNDER THIS AGREEMENT OR FROM ITS LIABILITY FOR ANY DAMAGES BASED UPON SUCH PARTY'S BREACH OF ITS OBLIGATIONS UNDER ARTICLE 11, GROSS NEGLIGENCE OR WILLFUL MISCONDUCT.

Article 15 TERM AND TERMINATION

15.1 **Term**. The term of this Agreement (the "**Term**") will commence on the Effective Date and extend, unless this Agreement is terminated earlier in accordance with this Article 15, until the last to expire of any Royalty Term for any Product or Delivery Technology Product in the Territory. Following expiration of the Royalty Term for any Product or Delivery Technology Product in a given country, no further royalties will be payable in respect of sales of such Product or Delivery Technology Product, as applicable, in such country and, thereafter the license granted to Beam under Section 2.1.3 or to Verve under Section 2.1.1 or 2.1.4 as applicable, with respect to such Product or Delivery Technology Product in such country will automatically become fully paid-up, perpetual, irrevocable and royalty-free.

15.2 **At-Will Termination by Verve**. Notwithstanding anything contained herein to the contrary, Verve may terminate this Agreement as to any Licensed Product or Nuclease Product by ninety (90) days' prior written notice to Beam at its sole discretion; provided that (a) with respect to a Licensed Product or Nuclease Product, Verve may not submit a notice of termination under this Section 15.2 unless and until Beam has either (i) submitted a written notice to Verve under this Agreement that it does not wish to exercise any Beam Opt-In Option with respect to such Product or (ii) not exercised the Beam Opt-In Option with respect to such Product in the relevant [**] period set forth in Section 5.1 and no longer has the right to so exercise under this Agreement, and (b) Verve may not terminate this Agreement pursuant to this Section 15.2 with respect to any Collaboration Product.

15.3 **Termination for Cause**. This Agreement may be terminated at any time during the Term:

15.3.1 upon written notice by either Party if the other Party is in breach of its material obligations under this Agreement and has not cured such breach within [**] after notice requesting cure of the breach; provided, however, in the event of a good faith dispute with respect to the existence of a material breach, the [**] cure period shall be tolled until such time as the dispute is resolved pursuant to Section 16.7; provided that in the event such breached material obligation does not relate to the Delivery Technology or a Delivery Technology Product, this Agreement will not be terminated under this Section 15.3.1 with respect to any rights or obligations related to Delivery Technology or a Delivery Technology Product; or

15.3.2 by either Party upon the filing or institution of bankruptcy, reorganization, liquidation or receivership proceedings, or upon an assignment of a substantial portion of the assets for the benefit of creditors by the other Party; provided, however, that in the case of any involuntary bankruptcy proceeding such right to terminate shall only become effective if the Party consents to the involuntary bankruptcy or such proceeding is not dismissed within [**] after the filing thereof.

15.4 **Termination for Patent Challenge**. If the applicable Licensee or any of its Affiliates or sublicensees directly or indirectly brings, assumes or participates in, or knowingly, willfully or recklessly assists in bringing a Patent Challenge, then the following shall apply: (a) in the case of Beam as the Licensor, Beam may terminate this Agreement in its entirety immediately upon written notice to Verve; or (b) in the case of Verve as the Licensor, Verve may terminate the license granted to Beam pursuant to Section 2.1.3 immediately upon written notice to Beam. For the avoidance of doubt, any participation by the Licensee, any of its Affiliates or sublicensees or its or their employees in any claim, challenge or proceeding that the Licensee, such Affiliates or sublicensees or such employees are required to participate in pursuant to a subpoena or court order or participates in a proceeding that is initiated by a patent office and not at the instigation of the Licensee, such Affiliates or sublicensees or such employees shall not constitute a Patent Challenge under this Section 15.4 and shall not give rise to Licensor's right to terminate any license hereunder. Notwithstanding anything to the contrary in this Agreement but only to the extent permitted by and consistent with the relevant Third Party Agreement (if any) under

which the Challenged Patent Right is sublicensed to the Licensee, the Licensor shall not be entitled to exercise its termination rights pursuant to this Section 15.4 based upon any Patent Challenge by a sublicensee of the Licensee, if such Patent Challenge has been withdrawn or the Licensee has terminated such sublicense within [**] of the date on which the Licensor notifies the Licensee of its intent to exercise its termination rights pursuant to this Section 15.4.

15.5 Effects of Termination.

15.5.1 **General**. As of the effective date of termination of this Agreement with respect to a Product(s) or all Products in the case of termination of this Agreement in its entirety (each such Product, the "**Terminated Product**"), (a) all rights and licenses granted to Verve by Beam or its Affiliates under Article 2 will terminate with respect to the Terminated Product, (b) no later than [**] after the effective date of such termination, each Party shall return or cause to be returned to the other Party all Confidential Information in tangible form received from the other Party and all copies thereof; provided, however, that each Party may retain one copy of Confidential Information received from the other Party in its confidential files for record purposes and, unless this Agreement has been terminated by Verve under Section 15.3, Beam shall be permitted to maintain Confidential Information of Verve necessary or useful to exploit the Terminated Product(s) in accordance with its ongoing rights and subject to the confidentiality and non-use obligations under this Agreement, and (c) except for the surviving provisions set forth in Section 15.6, the rights and obligations of the Parties hereunder shall terminate as of the effective date of termination.

15.5.2 **Other Effects of Termination**. Except for termination of this Agreement by Verve under Section 15.3,

(a) Where permitted by Applicable Law, upon written request, Verve shall assign to Beam all of its right, title and interest in and to, and transfer possession to Beam of, all Regulatory Documentation (including, for clarity, regulatory approvals) then in its name applicable to any Terminated Product other than (i) an Independent Product that is not a Collaboration Product or (ii) a former Collaboration Product for which Beam exercised the Beam Opt-Out Option if Verve has terminated this Agreement within [**] following Beam's exercise of such Beam Opt-Out Option (such Terminated Product, other than as described in the foregoing clauses (i) and (ii), a "**Terminated Reversion Product**"), in the same form in which Verve maintains such Regulatory Documentation, and upon request execute and deliver such additional documents or instruments reasonably necessary to effect such transfer, in each case at Beam's cost and expense;

(b) Upon written request, Verve shall grant and hereby grants, and shall cause its Affiliates to grant, to Beam an exclusive (even as to Verve and its Affiliates), perpetual, irrevocable, royalty-bearing (as set forth in and

subject to this Section 15.5.2(b)) license under the Patent Rights and Know-How Controlled by Verve or its Affiliates as of the effective date of termination that either (i) claim or cover the composition, use or manufacture of the applicable Terminated Reversion Product(s) or (ii) were otherwise used or practiced in the Development, Manufacture, Commercialization or exploitation of the Terminated Reversion Product(s) on or prior to the effective date of termination (collectively, "**Post-Termination Licensed Technology**"), solely to Develop, Manufacture, Commercialize or otherwise exploit such Terminated Reversion Product(s) in the Field in the Territory, provided, however, that in the case of any such Patent Right or Know-How that requires payment to a Third Party pursuant to an applicable license or other agreement, such Patent Right or Know-How shall be [**] to such Third Party as a result of Beam's exercise of such license. Unless Beam terminates this Agreement for Verve's material breach of this Agreement under Section 15.3.1 (in which case no royalties are owed), Beam will pay Verve royalties equal to [**] percent ([**]%) of the annual aggregate Net Sales resulting from the sale of each such Terminated Reversion Product in the Field in the Territory and such royalties will be due to Verve, on a Product-by-Product and country-by-country basis for the duration of the Royalty Term for the applicable Terminated Reversion Product in the applicable country as if this Agreement had stayed in effect. [**].

(c) Unless expressly prohibited by any Regulatory Authority, upon written request of Beam, Verve shall transfer control to Beam conduct of any Clinical Trials of such Terminated Reversion Product(s) being conducted as of the effective date of termination and continue to conduct such Clinical Trial(s) in accordance with a budget and plan agreed upon by the Parties, at Beam's cost and expense, for up to [**] to enable such transfer to be completed without interruption of such Clinical Trial(s); provided that Beam shall not have any obligation to continue any Clinical Trial unless required by Applicable Law;

(d) To the extent that, as of the effective date of termination of this Agreement, Verve has existing and ongoing contracts with Third Parties related to the Development, Manufacture or Commercialization of the Terminated Reversion Product(s), at the written request of Beam, Verve will use good faith commercially reasonable efforts to transfer such contracts and arrangements to Beam, including using good faith commercially reasonable efforts to assign contracts and arrangements to Beam in part or facilitate separate arrangements with Beam if such contracts and arrangements relate to more than solely the Terminated Reversion Product(s);

(e) At Beam's written request, Verve shall deliver such quantities of the applicable Terminated Reversion Product(s) that Verve or its Affiliates has in its respective inventory or control (including inventory in its control on the premises of a Third Party subcontractor) as of the date of Beam's request; provided that Beam shall reimburse Verve for the Cost of Goods Manufactured and the costs of shipping and handling with respect to such quantities; provided further that, with respect to a Collaboration Product, Beam shall only be obligated to reimburse Verve for any portion of the costs thereof not previously reimbursed pursuant to this Agreement.

(f) If Beam does not manufacture the applicable Terminated Reversion Product(s) either itself or on its behalf, Verve shall supply to Beam such reasonable quantities of such Terminated Reversion Product(s) as Beam indicates in written forecasts and orders from time to time, until the earlier of (i) such time as Beam has established an alternative, validated source of supply for such Terminated Reversion Product(s) and (ii) the [**] of the effective date of termination of this Agreement. The costs to Beam for supply of such Terminated Reversion Product(s) from Verve shall be equal to Verve's Cost of Goods Manufactured for such Terminated Reversion Product(s) [**]. Notwithstanding anything to the contrary in this Agreement, if any such Terminated Reversion Product is manufactured for Verve by a Third Party contract manufacturer pursuant to a written contract, then Verve may satisfy its obligations pursuant to this Section 15.5.2(f) with respect to such Terminated Reversion Product by assigning its rights and obligations under such contract (or the portion of such contract pertaining to such Terminated Reversion Product) to Beam.

(g) Verve shall, at the written request and expense of Beam, provide Beam with such assistance as is reasonably necessary to effectuate a smooth and orderly transition to Beam or its designee of any Development, Manufacture and Commercialization activities relating to the applicable Terminated Reversion Product(s) so as to minimize the disruption of such activities, provided, however, that Verve shall not be obligated to initiate any new substantive activity, distinct from any previously ongoing substantive activity, that would itself create any new obligations on the part of Verve that would continue following such termination. Further, upon Beam's written request, Verve shall make its personnel reasonably available to provide such technical assistance, at no cost to Beam (except for reimbursement of Verve's direct out of pocket costs therefor), as may reasonably be requested to transfer all Manufacturing technology Controlled by Verve or its Affiliates that is or had been used by or on behalf of Verve and its Affiliates in connection with the Manufacture of any Terminated Reversion Product.

15.5.3 **Termination for Bankruptcy**. If this Agreement is terminated by either Party pursuant to Section 15.3.2, all licenses and rights to licenses granted under or pursuant to this Agreement by the non-terminating Party to the terminating Party are, and shall otherwise be deemed to be, for purposes of Section 365(n) of the

United States Bankruptcy Code (the "**Code**"), licenses of rights to "intellectual property" as defined under Section 101(35A) of the Code. The Parties agree that the terminating Party, as a licensee of such rights under this Agreement, shall retain and may fully exercise all of its rights and elections under the Code, and that upon commencement of a bankruptcy proceeding by or against the non-terminating Party under the Code, the terminating party shall be entitled to a complete duplicate of or complete access to, any such intellectual property and all embodiments of such intellectual property. Such intellectual property and all embodiments thereof shall be promptly delivered to the terminating Party (i) upon any such commencement of a bankruptcy proceeding upon written request therefor by the terminating Party, unless the non-terminating Party elects to continue to perform all of its obligations under this Agreement or (ii) if not delivered under (i) above, upon the rejection of this Agreement by or on behalf of the non-terminating Party upon written request therefor by the terminating Party. The foregoing provisions of Section 15.5.3 are without prejudice to any rights that either Party may have arising under the Code or other Applicable Law.

15.6 **Effect of Termination; Survival**. Termination of this Agreement shall not relieve the Parties of any obligation accruing upon or prior to such termination. Any termination of this Agreement shall be without prejudice to the rights of either Party against the other accrued or accruing under this Agreement upon or prior to termination, including without limitation (a) obligations to pay any license fees or milestones that accrue under this Agreement upon or prior to termination and (b) the obligation to share Shared Costs incurred prior to such termination in accordance with this Agreement, and to share the Collaboration Territory Revenue from Products sold prior to such termination, in the case of both clause (a) and (b) above, in accordance with the provisions of Article 10. The provisions of Article 11 shall survive the termination of this Agreement and shall continue in effect for [**] following such termination. In addition, the provisions of Section 2.2.4, Section 2.2.5(c), Section 2.6.3 (Unauthorized Use of Party Materials), Section 2.6.4 (Title to Party Materials; Return), Section 10.6 (Currency Exchange) (solely with respect to Terminated Reversion Products), Section 10.7 (Record-Keeping and Audit), Section 10.8 (Income Tax Withholding) (solely with respect to Terminated Reversion Products and payment obligations accrued under this Agreement upon or prior to termination), Section 10.9 (Late Payments) (solely with respect to Terminated Reversion Products and payment obligations accrued under this Agreement upon or prior to termination), Section 13.1 (Ownership of Intellectual Property), Section 13.2.4, Section 13.3 (Enforcement and Defense of Beam Patent Rights) (solely with respect to Joint Collaboration Patent Rights), Section 13.4 (Enforcement and Defense of Verve Patent Rights, Product-Specific Patent Rights or Joint Collaboration Patent Rights) (solely with respect to Joint Collaboration Patent Rights), Article 14 (Indemnification), Section 15.5 (Effects of Termination), this Section 15.6 (Effect of Termination; Survival), and Article 16 (Miscellaneous) shall each survive termination of this Agreement in its entirety and all definitions relating to the foregoing, shall survive any termination of this Agreement.

Article 16 MISCELLANEOUS

16.1 **Use of Affiliates**. Either Party shall have the right to exercise its rights and perform its obligations under this Agreement either itself or through any of its Affiliates. In addition, in each case where a Party's Affiliate has an obligation pursuant to this Agreement or performs an obligation pursuant to this Agreement, (a) such Party shall cause and compel such Affiliate to perform such obligation and comply with the terms of this Agreement and (b) any breach of the terms or conditions of this Agreement by such Affiliate shall be deemed a breach by such Party of such terms or conditions, for which such Party is liable.

16.2 **Interpretation**. Except where the context expressly requires otherwise, (a) the use of any gender herein shall be deemed to encompass references to either or both genders, and the use of the singular shall be deemed to include the plural (and vice versa), (b) the words "include", "includes" and "including" shall be deemed to be followed by the phrase "without limitation", (c) the word "will" shall be construed to have the same meaning and effect as the word "shall", (d) any definition of or reference to any agreement, instrument or other document herein shall be construed as referring to such agreement, instrument or other document as from time to time amended, supplemented or otherwise modified (subject to any restrictions on such amendments, supplements or modifications set forth herein), (e) any reference herein to any person shall be construed to include the person's successors and assigns, (f) the words "herein", "hereof" and "hereunder", and words of similar import, shall be construed to refer to this Agreement in its entirety and not to any particular provision hereof, (g) all references herein to Sections or Schedules shall be construed to refer to Sections or Schedules of this Agreement, and references to this Agreement include all Schedules hereto, (h) the word "notice" means notice in writing (whether or not specifically stated) and shall include notices, consents, approvals and other written communications contemplated under this Agreement, (i) provisions that require that a Party, the Parties or any committee hereunder "agree," "consent" or "approve" or the like shall require that such agreement, consent or approval be specific and in writing, whether by written agreement, letter, approved minutes or otherwise (but excluding e-mail and instant messaging), (j) references to any specific law, rule or regulation, or article, section or other division thereof, shall be deemed to include the then-current amendments thereto or any replacement or successor law, rule or regulation thereof, and (k) the term "or" shall be interpreted in the inclusive sense commonly associated with the term "and/or."

16.3 **Force Majeure**. Neither Party shall be held liable to the other Party nor be deemed to have defaulted under or breached this Agreement for failure or delay in performing any obligation under this Agreement to the extent such failure or delay is caused by or results from causes beyond the reasonable control of the affected Party or any of its Affiliates, potentially including, but not limited to, embargoes, war, acts of war (whether war be declared or not), acts of terrorism, insurrections, riots, civil commotions, strikes, lockouts or other labor disturbances, fire, floods, or other acts of God, or acts, omissions or delays in acting by any Governmental Authority or the other Party. The affected Party shall notify the other Party of such force majeure circumstances as soon as reasonably practical, and shall promptly undertake all reasonable efforts necessary to resume performance.

16.4 **Assignment**. Except as provided in this Section 16.4 and Section 2.2.3, this Agreement may not be assigned or otherwise transferred, nor may any right or obligation hereunder be assigned or transferred, by either Party without the consent of the other Party; provided, however, that (a) Verve or Beam may, without such consent, assign this Agreement and its rights and obligations hereunder to an Affiliate, in whole or in part and (b) any Party may assign this Agreement and its rights and obligations hereunder, in whole or in part, in connection with the transfer or sale of all or substantially all of its assets related to the subject matter of this Agreement, or in the event of its merger or consolidation or change in control or similar transaction. Any attempted assignment not in accordance with this Section 16.4 shall be void and unenforceable. Any permitted assignee shall assume all assigned obligations of its assignor under this Agreement.

16.5 **Severability**. If any one or more of the provisions contained in this Agreement is held invalid, illegal or unenforceable in any respect, the validity, legality and enforceability of the remaining provisions contained herein shall not in any way be affected or impaired thereby, unless the absence of the invalidated provision(s) adversely affects the substantive rights of the Parties. The Parties shall in such an instance use their best efforts to replace the invalid, illegal or unenforceable provision(s) with valid, legal and enforceable provision(s) which, insofar as practical, implement the purposes of this Agreement.

16.6 **Notices**. All notices which are required or permitted pursuant to this Agreement shall be in writing and sufficient if delivered personally, sent by facsimile (and promptly confirmed by personal delivery, registered or certified mail or overnight courier), sent by nationally-recognized overnight courier or sent by registered or certified mail, postage prepaid, return receipt requested, addressed as follows:

If to Beam:	Beam Therapeutics Inc. 26 Landsdowne Street Cambridge, MA 02139 Email: [**] Attn: CEO
With a copy to:	Ropes & Gray LLP Prudential Tower 800 Boylston Street Boston, MA 02199 Telephone: [**] Facsimile: [**] E-mail: [**] Attn: Marc A. Rubenstein
If to Verve:	Verve Therapeutics, Inc. 26 Landsdowne Street Cambridge, MA 02139 E-mail: [**] Attn: President

With a copy to: Wilson Sonsini Goodrich & Rosati
650 Page Mill Road
Palo Alto, CA 94304
Telephone: [**]
Facsimile: [**]
E-mail: [**]
Attn: Lowell A. Segal

or to such other address(es) as the Party to whom notice is to be given may have furnished to the other Party in writing in accordance herewith. Any such notice shall be deemed to have been given: (a) when delivered if personally delivered or sent by facsimile on a Business Day (or if delivered or sent on a non-Business Day, then on the next Business Day); (b) on the Business Day after dispatch if sent by nationally-recognized overnight courier; or (c) on the fifth (5th) Business Day following the date of mailing, if sent by mail.

16.7 **Dispute Resolution**. If any dispute between the Parties arises out of or relates to this Agreement, other than a dispute within the JSC to be resolved as set forth in Section 3.3.3, (a "**Dispute**"), either Party by written notice to the other Party may have such issue referred for resolution to the Senior Officers. The Senior Officers shall meet promptly to discuss the matter submitted and to determine a resolution. If the Senior Officers are unable to resolve the Dispute within [**] after it is referred to them, then the Parties may pursue all other rights and remedies available to them under this Agreement, including the right to terminate this Agreement, and the matter shall, upon written notice of either Party to the other Party, be resolved by final, binding arbitration in accordance with Section 16.8.

16.8 **Governing Law and Arbitration**. This Agreement will be governed by, and construed in accordance with, the substantive laws of the Commonwealth of Massachusetts and the patent laws of the United States, in each case without giving effect to any choice or conflict of law provision. Any arbitration of a Dispute shall be conducted by the American Arbitration Association ("**AAA**") under its rules of arbitration then in effect, except as modified in this Agreement. The arbitration shall be conducted in the English language, by a single arbitrator. If the Parties are unable to agree on an arbitrator, the arbitrator shall be selected in accordance with the AAA rules, or if the AAA rules do not provide for such selection, by the chief executive of AAA. At either Party's election, the arbitrator shall engage an independent expert with experience in the subject matter of the Dispute to advise the arbitrator, but final decision making authority shall remain in the arbitrator. The arbitrator shall determine what discovery will be permitted, consistent with the goal of reasonably controlling the cost and time that the Parties must expend for discovery, provided that the arbitrator shall permit such discovery as he or she deems necessary to permit an equitable resolution of the Dispute. The Parties and the arbitrator shall use reasonable efforts to complete any such arbitration within [**]. The Parties agree that the decision of the arbitrator shall be the binding remedy between them regarding the Dispute presented to the arbitrator, and judgment upon the award rendered by the arbitrator may be entered in any court of competent jurisdiction. Unless otherwise agreed by the Parties, the arbitration proceedings shall be conducted in Boston, Massachusetts. The Parties shall

share equally the cost of the arbitration filing and hearing fees, the cost of an independent expert retained by the arbitrator and the cost of the arbitrator and administrative fees of AAA. Each Party shall bear its own costs and attorneys' and witnesses' fees and associated costs and expenses. Each Party agrees not to commence any legal proceedings based upon or arising out of this Agreement in a court of law, except that a Party may seek a temporary restraining order or a preliminary injunction from any court of competent jurisdiction in order to prevent immediate and irreparable injury, loss or damage on a provisional basis, pending the selection of the arbitrator or pending the arbitrator's determination of the merits of any Dispute pursuant to this Section 16.8.

16.9 **Entire Agreement; Amendments**. This Agreement, together with the Schedules hereto, contains the entire understanding of the Parties with respect to the subject matter hereof. Any other express or implied agreements and understandings, negotiations, writings and commitments, either oral or written, in respect to the subject matter hereof are superseded by the terms of this Agreement, including (a) the Existing Confidentiality Agreement; provided that nothing in this Section 16.9 shall affect a Party's ability to enforce the terms of the Existing Confidentiality Agreement with respect to the subject matter hereof for actions or omissions taking place prior to the Effective Date, and (b) the Material Transfer Agreement. The Schedules to this Agreement are incorporated herein by reference and shall be deemed a part of this Agreement. This Agreement may be amended, or any term hereof modified, only by a written instrument duly executed by authorized representatives of each of the Parties.

16.10 **Headings**. The captions to the several Articles, Sections and subsections hereof are not a part of this Agreement, but are merely for convenience to assist in locating and reading the several Articles and Sections hereof.

16.11 **Independent Contractors**. It is expressly agreed that Beam and Verve shall be independent contractors and that the relationship between the Parties shall not constitute a partnership, joint venture or agency, provided, in the event Beam exercises any Beam Opt-In Option, the Parties shall confer and determine by mutual written agreement whether the Parties have entered into a partnership solely for U.S. income tax purposes. Neither Beam nor Verve shall have the authority to make any statements, representations or commitments of any kind, or to take any action, which shall be binding on the other Party, without the prior written consent of the other Party.

16.12 **Waiver**. The waiver by either Party of any right hereunder, or of any failure of the other Party to perform, or of any breach by the other Party, shall not be deemed a waiver of any other right hereunder or of any other breach by or failure of such other Party whether of a similar nature or otherwise.

16.13 **Cumulative Remedies**. Except as expressly set forth in this Agreement, no remedy referred to in this Agreement is intended to be exclusive, but each shall be cumulative and in addition to any other remedy referred to in this Agreement or otherwise available under Applicable Law.

16.14 **Waiver of Rule of Construction**. Each Party has had the opportunity to consult with counsel in connection with the review, drafting and negotiation of this Agreement. Accordingly, the rule of construction that any ambiguity in this Agreement shall be construed against the drafting Party shall not apply.

16.15 **Business Day Requirements**. In the event that any notice or other action or omission is required to be taken by a Party under this Agreement on a day that is not a Business Day then such notice or other action or omission shall be deemed to be required to be taken on the next occurring Business Day.

16.16 **Counterparts**. This Agreement may be signed in any number of counterparts (facsimile and electronic transmission included), each of which shall be deemed an original, but all of which shall constitute one and the same instrument. After facsimile or electronic transmission, the parties agree to execute and exchange documents with original signatures upon written request by either Party. Counterpart signatures delivered via facsimile or e-mail in PDF or similar electronic format shall have the same binding effect as original signatures.

[Signature page follows]

IN WITNESS WHEREOF, the Parties have executed this Agreement as of the Effective Date.

VERVE THERAPEUTICS, INC.		**BEAM THERAPEUTICS INC.**	
BY:	/s/ Andrew Ashe	BY:	/s/ John Evans
NAME:	Andrew Ashe	NAME:	John Evans
TITLE:	President and Chief Operating Officer	TITLE:	Chief Executive Officer

[Signature Page to Collaboration and License Agreement]

Exhibit 10.11

Certain identified information has been excluded from the exhibit because it is both (i) not material and (ii) is the type of information that the registrant treats as private or confidential. Double asterisks denote omissions.

AMENDED AND RESTATED

Development and Option Agreement

by and between

ACUITAS THERAPEUTICS, INC.

and

VERVE THERAPEUTICS, INC.

dated

October 6, 2020

Table of Contents

Table of Contents

List of Exhibits

Amended and Restated Development and Option Agreement

This Amended and Restated Development and Option Agreement (this "Agreement"), dated as of October 5, 2020 (the "Amendment Effective Date"), is made by and between Verve Therapeutics, Inc. a Delaware corporation ("Verve") and Acuitas Therapeutics Inc., a British Columbia corporation ("Acuitas"). Each of Verve and Acuitas may be referred to herein as a "Party" or together as the "Parties."

WHEREAS, Acuitas has expertise and intellectual property relating to the development of LNP Technologies (as defined below);

WHEREAS, Verve has expertise and intellectual property relating to gene editing therapeutics, including mRNA Constructs (as defined below) and Genome Editing Constructs (as defined below); and

WHEREAS, the Parties believe that certain proprietary Acuitas LNP Technology (as defined below) could be useful for the formulation and delivery of Verve's proprietary Genome Editing Constructs; and

WHEREAS, Verve and Acuitas previously entered into a Development and Option Agreement (the "Original Agreement"), dated effective as of December 11, 2019 (the "Effective Date"), under which the Parties began a collaboration to evaluate the development of products incorporating Acuitas LNP Technology and Verve Technology (as defined below); and

WHEREAS, Verve and Acuitas wish to amend and restate the Original Agreement as set forth herein.

NOW, THEREFORE, in consideration of the mutual covenants contained herein, and for other good and valuable consideration, the amount and sufficiency of which are hereby acknowledged, the Parties hereby agree that, from and after the Amendment Effective Date hereof, the Original Agreement is hereby amended and restated as follows:

ARTICLE 1

Definitions

The following terms and their correlatives will have the following meanings:

1.1 "Acuitas Background Technology" means any and all proprietary LNP Technology that is owned or Controlled by Acuitas (a) as of the Effective Date, or (b) developed by Acuitas outside of the scope of this Agreement, and in each case necessary or useful for the conduct of the Workplan and/or the research, development, manufacturing and commercialization of Licensed Products. The Patents in the Acuitas Background Technology as of the Effective Date are listed in **Exhibit 1.1** attached hereto.

1.2 "Acuitas Indemnitees" has the meaning set forth in Section 8.6(b).

1.3 "Acuitas LNP Technology" means the Acuitas Background Technology and the Acuitas Sole Technology. For the avoidance of doubt, any LNP or component thereof that is proprietary to Acuitas and provided by or on behalf of Acuitas to Verve shall be Acuitas Background Technology and, therefore, Acuitas LNP Technology under this Agreement.

1.4 "Acuitas Sole Technology" means, without regard to inventorship, all Technology (other than Workplan Data) that arises from the Workplan that is solely an Improvement of Acuitas Background Technology and does not incorporate or consist of an Improvement to the Verve Background Technology. For clarity, any Technology arising out of the Workplan that (a) is an Improvement of Acuitas Background Technology and (b) specifically relates to any mRNA Construct or Guide RNA provided or used by Verve under the Workplan is Joint IP and not Acuitas Sole Technology.

1.5 "Acuitas Workplan Leader" has the meaning set forth in Section 2.1.

1.6 "Affiliate" of a person or entity means any other person or entity which (directly or indirectly) is controlled by, controls or is under common control with such person or entity. For the purposes of this definition, the term "control" (including, with correlative meanings, the terms "controlled by" and "under common control with") as used with respect to an entity will mean (a) in the case of a corporate entity, direct or indirect ownership of voting securities entitled to cast at least fifty percent (50%) of the votes in the election of directors or (b) in the case of a non-corporate entity, direct or indirect ownership of at least fifty percent (50%) of the equity interests with the power to direct the management and policies of such entity, provided that if local Law restricts foreign ownership, control will be established by direct or indirect ownership of the maximum ownership percentage that may, under such local Law, be owned by foreign interests.

1.7 "Agreement" has the meaning set forth in the Preamble.

1.8 "Amendment Effective Date" has the meaning set forth in the Preamble.

1.9 "Calendar Quarter" means the respective periods of three (3) consecutive calendar months ending on March 31, June 30, September 30 and December 31.

1.10 "Collaboration Partner" means with respect to any Third Party to whom Verve wishes to disclose Acuitas Confidential Information or transfer Acuitas LNP Technology or Materials provided by Acuitas to Verve, any Third-Party licensee or assignee of Verve Technology subject to requirements of Section 3.1(h).

1.11 "Concurrent Reserved List Limits" has the meaning set forth in Section 4.2(e).

1.12 "Confidential Information" has the meaning set forth in Section 7.1.

1.13 "Contract Research Organization" means an entity in the business of providing specialized research, development and manufacturing services on a fee for service basis pursuant to agreements that include terms that provide that all data, materials and intellectual property generated in performing such services be owned by the contracting party in accordance with Section 3.1(i), excluding improvements to such entity's Technology that is used to perform such services.

1.14 "Contract Year" will refer to the twelve (12)-month period beginning on the Effective Date and on each anniversary thereafter during the Term.

1.15 "Control" or "Controlled" means, with respect to a particular Technology, Acuitas owns or has a license to use and practice such Technology and has the right to grant a license or sublicense to such Technology without violating the terms of any agreement with any Third Party and without owing any milestone, royalty or other monetary obligations to a Third Party under the terms of any agreement with such Third Party.

1.16 "Deficiency" means the existence of any of the following factors, to the extent supported by reasonable and verifiable documentation or other supporting evidence: (i) a significant failure to adhere to internationally accepted standards of quality and safety in the manufacture of pharmaceutical or biologic products as documented by a regulatory authority with jurisdiction over pharmaceutical manufacturing, as the same are relevant to the stage of development and certification of the products to be manufactured; (ii) less than [**] of experience in manufacturing pharmaceutical or biological products; or (iii) a significant history of violating confidentiality or intellectual property rights or (iv) a party who is a direct competitor of Acuitas in the field of LNP Technology. For clarity, no factor that is not listed in (i), (ii), (iii) or (iv) above will be considered in determining the existence of a Deficiency. A listing of pre-approved CMOs (definition of CMO as in Section 3.1(f)) is provided in Appendix 1.15.

1.17 "Diligent Efforts" means, with respect to the efforts to be expended by each Party with respect to any activity set forth in the Workplan, active and sustained efforts to conduct the applicable activity, or to attempt to achieve the applicable requirement or goal, in a prompt and expeditious manner, as is reasonably practicable under the circumstances consistent with the Workplan (including the level of FTE funding and budget for out-of-pocket and Third Party contractors set forth therein) and the terms of this Agreement.

1.18 "Disclosing Party" has the meaning set forth in Section 7.1.

1.19 "Effective Date" has the meaning set forth in the Preamble.

1.20 "Escrow Agent" means the Third-Party escrow agent designated by Acuitas and reasonably acceptable to Verve, which escrow agent shall initially be [**].

1.21 "Executive Officers" has the meaning set forth in Section 2.2(d).

1.22 "Field of Use" means Genome Editing for all human therapeutic or prophylactic uses of Licensed Products.

1.23 "Formulated Product" means product produced by Acuitas in accordance with the Workplan that incorporates Verve Genome Editing Constructs formulated with Acuitas LNP Technology.

1.24 "Formulated Product Fee" means the fees to be charged by Acuitas for supply of Formulated Product to Verve under this Agreement, which fees are set forth in the Workplan and will include FTE Costs and Third-Party costs for materials used in the Formulated Product or its manufacture.

1.25 "FTE" means the work of a full-time person for one year, or more than one person working the equivalent of a full-time person for one year, where "full-time" is determined by the standard practices in the biopharmaceutical industry in the geographic area in which such personnel are working, but means [**] hours per year, in the performance of the Works and Services, including scientific management oversight as reasonably required.

1.26 "FTE Costs" mean the actual FTEs employed by Acuitas in the conduct of the Works and Services multiplied by an annual rate per FTE equal to [**] Dollars (US$[**]). Such FTE Costs represent reimbursement for all costs of FTEs in providing the Works and Services (including salaries, benefits, lab supplies, reagents, equipment and overhead, as well as other G&A costs).

1.27 "Genome Edit(ing)" means to correct, modify, insert, delete, inactivate or repair the expression of a Human Genome Target for human therapeutic or prophylactic applications.

1.28 "Genome Editing Construct" means a construct consisting of [**] mRNA Constructs that each encode a [**] to Genome Edit up to [**] Human Genome Targets. For the avoidance of doubt, each Genome Editing Construct (i) may, but shall not be required to, contain Guide RNAs (whether or not formulated with Acuitas LNP Technology) in any combination or combinations and (ii) will be defined by the specific combination of [**] and each different combination of the foregoing will be a different Genome Editing Construct (provided that each Genome Editing Construct may contain [**].

1.29 "Genome Editing Protein Target" means a Protein Target that is intended to Genome Edit a Human Genome Target.

1.30 "GMP" means current good manufacture practices as defined under regulations promulgated by the U.S. Food and Drug Administration.

1.31 "Guide RNA" means one or more synthetic, short ribonucleic acid sequences composed of a scaffold sequence that binds to the Genome Editing Protein Target and a sequence complementary to the site on the Human Genome at which the Genome Editing Protein Target is intended to Genome Edit.

1.32 "Human Genome Target" means (a) a naturally occurring human gene, including all coding, non-coding and regulatory regions thereof, as identified by the applicable transcript identifier (i.e., NCBI Refseq transcript ID), gene identifier (i.e., NCBI Refseq Gene ID), gene name and synonyms and nucleotide sequence coordinates, gene transcript and nucleotide sequence; (b) any naturally occurring non-coding region of the human genome including, but not limited to, transcriptional regulatory elements, non-protein coding RNA and intergenic regions; and with respect to a gene covered by (a) or (b) above, any variants of such gene, including the wild type and naturally occurring mutant and allelic variants, provided, however, that any such variant (i) encodes a protein [**] to the protein product of the original (reference) gene and has a coding region with greater than [**] percent ([**]%) sequence identity to the coding region of the original (reference) gene. For clarity, a nucleotide sequence may be considered to encode a protein regardless of whether such sequence contains a start codon.

1.33 "Improvement" means, with respect to the Acuitas Background Technology or the Verve Background Technology, as applicable, any improvement, enhancement, change, modification, variation or derivative of such Technology.

1.34 "Indemnification Claim Notice" has the meaning set forth in Section 8.6(c).

1.35 "Indemnified Party" has the meaning set forth in Section 8.6(c).

1.36 "Insolvency Legislation" has the meaning set forth in Section 10.1(a).

1.37 "JDC" has the meaning set forth in Section 2.2(a).

1.38 "JDC Deadlock" has the meaning set forth in Section 2.2(d).

1.39 "Joint IP" means, without regard to inventorship, each of the following: (a) Technology that arises out of the Workplan that relates to, constitutes an Improvement to and/or incorporates both the Acuitas Background Technology and the Verve Background Technology, (b) any other Technology that arises out of the Workplan that in each case does not constitute either Acuitas Sole Technology or Verve Sole Technology and (c) the Workplan Data.

1.40 "Know-How" means all Materials and all confidential and proprietary information including commercial, technical, scientific and other know-how and information, trade secrets, knowledge, technology, methods, processes, practices, formulae, instructions, skills, techniques, procedures, experiences, ideas, technical assistance, designs, drawings, assembly procedures, computer programs, specifications, data and results (including biological, chemical, pharmacological, toxicological, pharmaceutical, physical and analytical, preclinical, clinical, safety, manufacturing and quality control data and know-how, including study designs and protocols, in all cases, provided such information is confidential and proprietary, and regardless of whether patentable, in written, electronic or any other form now known or hereafter developed.

1.41 "Law" or "Laws" means all laws, statutes, rules, regulations, orders, judgments or ordinances having the effect of law of any federal, national, multinational, state, provincial, county, city or other political subdivision.

1.42 "Licensed Product" means any product that (a) consists of up to [**] Genome Editing Constructs that encode [**] specified Genome Editing Protein Targets including up to [**] Guide RNAs intended to Genome Edit up to [**] Human Genome Targets and (b) is derived from, incorporates, or utilizes, any LNP Technology that is Controlled by Acuitas or its Affiliates as of the Effective Date or at any time during the Term. For clarity, each Licensed Product will consist of a specific combination of Genome Editing Constructs ([**]) that target either [**] Human Genome Target or [**] Human Genome Targets.

1.43 "Licensed Technology" means LNP Technology Controlled by Acuitas or its Affiliates, as of the Effective Date or generated or obtained during the Term (including the Acuitas Background Technology, Acuitas Sole Technology and Acuitas' interest in any Joint IP) necessary or useful for the research, development, manufacture, use or sale of a Licensed Product.

1.44 "LNP" means lipid nanoparticles.

1.45 "LNP Technology" means any Technology that claims, embodies or incorporates delivery systems (and components thereof) based on or incorporating LNPs.

1.46 "Losses" has the meaning set forth in Section 8.6(a).

1.47 "Materials" means any tangible chemical or biological material, including any compounds, LNP, DNA, RNA (including mRNA), clones, cells, and any expression product, progeny, derivative or other improvement thereto, along with any tangible chemical or biological material embodying any Know-How.

1.48 "mRNA Construct" means any mRNA that encodes a Genome Editing Protein Target and any associated non-coding sequences, including any cap sequence, 5' UTR, 3'UTR, and any polyadenylation sequences. The term "mRNA Construct" also includes the chemistry of natural and non-natural nucleic acids, and other chemical modifications associated with such mRNA and associated non-coding sequences.

1.49 "Non-Exclusive License Agreement" means a non-exclusive license agreement in the form attached hereto as **Exhibit 1.48**.

1.50 "Option" has the meaning set forth in Section 5.1.

1.51 "Option Exercise Fee" means Two Million Dollars (US$2,000,000).

1.52 "Option Limit" has the meaning set forth in Section 5.1(c).

1.53 "Option Notice" has the meaning set forth in Section 5.2(a).

1.54 "Party" and "Parties" have the meaning set forth in the Preamble.

1.55 "Patent(s)" means an (a) issued patent, a patent application and a future patent issued from any such patent application, (b) a future patent issued from a patent application filed in any country worldwide which claims priority from a patent or patent application included in (a), (c) any additions, divisions, continuations, continuations-in-part, invention certificates, substitutions, reissues, reexaminations, extensions, registrations, utility models, supplementary protection certificates and renewals based on any patent or patent application under (a) or (b), but not including any rights that give rise to regulatory exclusivity periods (other than supplementary protection certificates, which will be treated as "Patents" hereunder), and (d) any counterpart of any patent or patent application under (a), (b) or (c) filed in any country worldwide.

1.56 "Pre-Existing Restrictions" means, with respect to a particular Target as of the date of the applicable Target Notice, that (a) Acuitas or its Affiliates are precluded from granting Verve a non-exclusive license under the Acuitas LNP Technology (as set forth in this Agreement) due to a conflicting grant of rights (or an outstanding option to obtain such a grant of rights) or covenant to a Third Party with respect to such Target pursuant to a *bona fide* written agreement that is executed in good faith in the ordinary course of business prior to the date of the Target Notice for such Target that is still in effect on such date or (b) such Target has been internally reserved by Acuitas.

1.57 "Program" means the program of activities using Acuitas LNP Technology and Verve Genome Editing Technology for the development of Licensed Products incorporating Verve's Genome Editing Constructs that the Parties engage in under this Agreement pursuant to the Workplan.

1.58 "Protein Target" means either (a) any naturally occurring protein encoded by a specific gene locus, as identified by the applicable transcript identifier (i.e., NCBI Refseq transcript ID), gene identifier (i.e., NCBI Refseq Gene ID), gene name and synonyms and DNA sequence coordinates and the applicable amino acid sequence, together with all variants of such protein, including the wild type, naturally occurring variants, engineered variants wherein modifications to the native amino acid sequence have been introduced (for example, mutated versions, derivatives or fragments), and species homologs and orthologs thereof, provided however that any such naturally occurring variant, engineered variant, or species homolog or ortholog possesses substantially similar mechanism of action and biological activity to the naturally occurring human protein (for example immunogenicity in case of antigens); or (b) any protein that is not covered by subclause (a) above (together with any variants, mutated versions, derivatives or fragments of such protein, provided that any such variant, mutated version, derivative or fragment possesses substantially similar mechanism of action and biological activity as such protein) and has greater than [**] percent ([**]%) sequence identity to a reference amino acid sequence provided by Verve to the Escrow Agent pursuant to this subclause (b). For clarity, in the case of a Genome Editing Protein Target, substantially similar mechanism of action and biological activity means that any variants, mutated versions, derivatives or fragments of such protein Genome Edit the same Human Genome Target at the same site.

1.59 "Receiving Party" has the meaning set forth in Section 7.1.

1.60 "Records" has the meaning set forth in Section 3.3(a).

1.61 "Reserved Target" means a Target with respect to which Verve shall have delivered to the Escrow Agent a Target Notice and that is deemed to be added to the Reserved Target List in accordance with Section 4.2(d)(ii). A Target that is removed from or replaced on the Reserved Target List pursuant to Section 4.2 will no longer be deemed a Reserved Target. For avoidance of doubt, the term Reserved Target includes all variants of such Target set forth within the definition of Target.

1.62 "Reserved Target List" means collectively, the list of all Reserved Targets.

1.63 "Restricted Target List" has the meaning set forth in Section 4.2(b).

1.64 "Target" means, collectively, a Genome Editing Protein Target, a Guide RNA, and a Human Genome Target, as the case may be, each, as identified in the appropriate nomination form.

1.65 "Target Notice" has the meaning set forth in Section 4.2(c).

1.66 "Target Reservation and Maintenance Fees" means the annual fees set forth in Section 4.4(a).

1.67 "Target Acceptance Notice" has the meaning set forth in Section 4.2(d)(ii).

1.68 "Target Rejection Notice" has the meaning set forth in Section 4.2(d)(i).

1.69 "Target Response Notice" has the meaning set forth in Section 4.2(d).

1.70 "Technology" means collectively Patents and Know-How.

1.71 "Technology Access Fee" has the meaning set forth in Section 3.4(d).

1.72 "Technology Maintenance Fee" has the meaning set forth in Section 3.4(d).

1.73 "Term" has the meaning set forth in Section 9.1.

1.74 "Territory" means worldwide.

1.75 "Third Party" means any person or entity other than Verve, Acuitas and their respective Affiliates.

1.76 "Third Party Claims" has the meaning set forth in Section 8.6(a).

1.77 "Verve Background Technology" means any and all proprietary Verve Genome Editing Technology provided or made available to Acuitas by Verve to conduct activities as a part of the Workplan.

1.78 "Verve Indemnitees" has the meaning set forth in Section 8.6(a).

1.79 "Verve Genome Editing Technology" means all Technology that is owned or controlled by Verve as of the Effective Date or during the term of this Agreement and in each case relates to Genome Editing Constructs including mRNA Constructs.

1.80 "Verve Sole Technology" means without regard to inventorship, (a) all Technology (other than Workplan Data) that arises out of the Workplan and is solely an Improvement to the Verve Background Technology and that does not incorporate or consist of an Improvement to the Acuitas Background Technology.

1.81 "Verve Technology" means Verve Background Technology and Verve Sole Technology. For the avoidance of doubt, any Genome Editing Construct or component thereof that is proprietary to Verve and provided by or on behalf of Verve to Acuitas shall be Verve Background Technology and, therefore, Verve Technology under this Agreement.

1.82 "Verve Workplan Leader" has the meaning set forth in Section 2.1.

1.83 "Workplan" has the meaning set forth in Section 3.1(a).

1.84 "Workplan Data" means the results of studies using Formulated Product conducted in accordance with the Workplan. For avoidance of doubt, the results of LNP formulation studies conducted by Acuitas and Genome Editing Construct studies conducted by Verve which, in each case support the Formulated Product studies, will not be Workplan Data.

1.85 "Workplan Leaders" has the meaning set forth in Section 2.1.

1.86 "Works and Services" means the activities to be performed by Acuitas or Verve, as applicable, pursuant to the Workplan.

ARTICLE 2

Governance

2.1 Management. Management of the Program activities will be under the responsibility of [**], for Acuitas (the "Acuitas Workplan Leader"), and [**] for Verve (the "Verve Workplan Leader," and together with the Acuitas Workplan Leader, the "Workplan Leaders"). Each Workplan Leader will be the primary point of contact for the other Party on all matters relating to the Program activities.

2.2 Joint Development Committee.

(a) ***Development Committee***. As soon as practicable, the Parties will establish a joint development committee, comprised of up to [**] representatives of Verve and up to [**] representatives of Acuitas (the "JDC"). One such representative from each Party will be such Party's Workplan Leader. Each Party may replace its Workplan Leader and other JDC representatives at any time upon written notice to the other Party, provided, however, that each Party shall use reasonable efforts to ensure continuity on the JDC. With the consent of the other Party (which will not be unreasonably withheld, conditioned or delayed), each Party may invite non-voting employees and consultants to attend JDC meetings, subject to their agreement to be bound to the same extent as a permitted subcontractor under Section 3.1(i).

(b) ***Meetings*****.** During the Term, the JDC shall meet each [**] by teleconference, videoconference or in person unless agreed otherwise by the JDC representatives. The JDC will have a quorum if at least one (1) representative of each Party is present or participating. Each Party will be responsible for all of its own expenses of participating in the JDC meetings. The Parties will endeavor to schedule meetings of the JDC at least [**] in advance. The Parties will alternate in preparing the meeting agenda, and the Party that was responsible for preparing the meeting agenda will prepare and circulate for review and approval by the other Party written minutes of such meeting within [**] after such meeting. The Parties will agree on the minutes of each meeting promptly, but in no event later than [**] after such meeting.

(c) ***Responsibilities.*** The JDC will oversee and supervise the overall performance of the Workplan and within such scope will:

(i) review the efforts of the Parties in the performance of the Workplan and allocate those resources for the Workplan committed by Acuitas (FTE Costs and external costs) hereunder;

(ii) revise and approve any revisions to the Workplan, or confirm that no revisions are necessary, on a regular basis and in any event before the start of each [**] during the Term;

(iii) form such other committees as the JDC may deem appropriate, provided that such committees may make recommendations to the JDC but may not be delegated JDC decision-making authority;

(iv) address such other matters (A) relating to the activities of the Parties under the Workplan as either Party may bring before the JDC, (B) that are delegated to the JDC under this Agreement, or (C) as may be mutually agreed by the Parties from time to time; and

(v) attempt to resolve any disputes within the scope of the JDC's authority on an informal basis.

(d) ***Decision-making.*** The JDC will make decisions only by consensus with each Party having collectively one (1) vote. In the event the JDC is unable to reach agreement as to a matter within the JDC's jurisdiction within [**] after it has first met and attempted to reach agreement (such event, a "JDC Deadlock"), upon the written request of a Party, such matter will be referred to a senior executive of each Party that is not on the JDC (the "Executive Officers") (or their designees, provided that such designee is not on the JDC and has decision-making authority on behalf of such Party), who will attempt in good faith to resolve such JDC Deadlock by negotiation and consultation for a [**] period following receipt of such written notice. If, despite such efforts, agreement on a particular matter cannot be reached by the Executive Officers within such [**] period, then Verve shall have the final decision-making authority with respect to such JDC Deadlock, subject to Section 3.1(c).

(e) ***Limits on JDC Authority*****.** Each Party will retain the rights, powers and discretion granted to it under this Agreement and no such rights, powers, or discretion will be delegated to or vested in the JDC unless such delegation or vesting of rights is expressly provided for in this Agreement or the Parties expressly so agree in writing. The JDC will not have the power to amend, modify or waive compliance with this Agreement (other than as expressly permitted hereunder).

ARTICLE 3

The Program

3.1 Program Generally. The Parties will jointly conduct the Program. It is intended that Acuitas will be responsible for the lipid chemistry and LNP formulation and characterization work, Verve will be responsible for Genome Editing Construct development and Acuitas and Verve will each undertake preclinical studies as set forth in the Workplan.

(a) ***Workplan Preparation*****.** The development activities to be undertaken by the Parties with respect to each Reserved Target will be described in a detailed written development plan (the "Workplan"). The initial Workplan will be finalized within [**] of the Effective Date and will cover the initial [**] of the Program and will be attached hereto as **Exhibit 3.1(a)** once finalized.

(b) *Workplan Contents*. The goal of the Workplan and the Program will be to evaluate and produce LNP formulations that are safe and efficacious for delivery of Verve's Genome Editing Constructs and to advance the development of such RNA-LNP formulations as therapeutic drug candidates. All activities using Acuitas LNP Technology will be limited to Reserved Targets and will be only as set forth in the Workplan. The Workplan will include (i) all activities to be undertaken by each Party with respect to the Program, including Acuitas' manufacture and supply of Formulated Product at scales and quality sufficient for preclinical non-human primate testing and pilot scale manufacturing, (ii) a detailed budget of the FTE activities, FTE Costs and out-of-pocket costs to be incurred by Acuitas for which Verve will reimburse Acuitas in connection with the performance of the Works and Services, (iii) the Materials to be provided by one Party to the other Party, (iv) the specifications, quantity and delivery date for the Formulated Product to be manufactured and supplied by Acuitas, and (v) the projected timelines for completion of all activities set forth therein. The Workplan will be comprehensive and include all activities using the Acuitas LNP Technology by both Parties commencing after the Effective Date, including any preclinical or other activities outsourced to Third Parties, to be undertaken prior to Verve exercising an Option for a Non-Exclusive License Agreement. No Acuitas LNP Technology or Formulated Product will be used by Verve outside of the Workplan prior to Verve exercising an Option for a Non-Exclusive License Agreement and then only to the extent permitted under the Non-Exclusive License Agreement.

(c) *Amendments to the Workplan*. The Workplan will be reviewed as necessary at each meeting of the JDC, and at any other time upon the reasonable request of either Party, and will be modified in a manner that is consistent with the requirements for the Workplan set forth in Section 3.1(b) and otherwise at the direction of the JDC to reflect material scientific (and other) developments. Each [**], the JDC will update the Workplan to cover at least the subsequent [**] of the Program in detail or confirm that no updates are necessary. In all events, the Workplan will be consistent and not conflict with the terms of this Agreement, and in the event of any conflict between the Workplan and this Agreement, the terms of this Agreement will control. The Workplan may be amended by the JDC to accelerate, decelerate, add or remove activities thereunder, including reducing or eliminating Acuitas' responsibilities for an activity thereunder; provided, that Acuitas' written consent is required in order to make (i) a material change to the Workplan that significantly accelerates or decelerates the planned Acuitas activities and requires allocation by Acuitas of FTEs significantly greater than or less than (i.e., change of more than [**] percent ([**]%)) those provided for in the Workplan or (ii) make a material change to the Formulated Product Fees, Formulated Product requirements, delivery dates or specifications. Acuitas shall use commercially reasonable efforts and cooperate with Verve to comply with Verve's requests. Verve may not exercise its final decision-making authority to amend the Workplan to include any activities that conflict with Pre-Existing Restrictions.

(d) *Obligations Under the Workplan*. During the Term, each Party will perform the Works and Services in a professional manner and in accordance with the Workplan and all applicable Laws, and each Party will use Diligent Efforts to meet the objectives and timelines set forth therein. Neither Party shall knowingly employ (or use a subcontractor that employs) any individual or entity debarred by the FDA or its successor agency (or subject to a similar sanction of any other regulatory authority), or any individual or entity which is the subject of an FDA debarment investigation or proceeding (or similar proceeding of any other regulatory authority), in the performance of the Works and Services. It is understood that the activities and goals of the Workplan are experimental and that successful results cannot be guaranteed. The Parties will otherwise conduct the Program on the terms and conditions set forth in this Agreement

and in accordance with the Workplan. Each Party will cooperate with and provide reasonably requested non-financial support to the other Party in such other Party's performance of its responsibilities under the Workplan. In addition to the reporting obligations set forth in Section 3.3(b), each Party will keep the other Party reasonably informed of such Party's activities under the Workplan through the JDC or as otherwise reasonably requested by the other Party.

(e) ***Supply of Formulated Product.*** Acuitas will use Diligent Efforts to manufacture and supply Verve with Formulated Product as set forth in the Workplan and Verve will pay to Acuitas the Formulated Product Fee for such Formulated Product. Verve will use the Formulated Product solely for research purposes in laboratory animals and/or *in vitro* studies as set forth in the Workplan and will not use Formulated Product in humans. The Formulated Product will be manufactured and supplied by Acuitas (i) in accordance with the specifications set forth in the Workplan, (ii) in compliance with applicable Laws, and (iii) by the delivery date set forth in the Workplan. No Formulated Product will be used outside of the Workplan. Verve will not perform any chemical analysis or testing of Formulated Product except as set forth in the Workplan and specifically will not attempt to determine the lipid composition or lipid structures or in any way seek to reverse-engineer any Formulated Product. Further Verve will not provide any Formulated Product to a Third Party unless previously approved by Acuitas in writing.

(f) ***Additional Development Studies for a Licensed Product.*** Following exercise of a license by Verve, Verve may choose to include additional development studies for the Licensed Product as part of the Workplan ("Additional Development Studies for a Licensed Product"). As part of such Additional Development Studies for a Licensed Product Acuitas will disclose to Verve the structure of the cationic lipid component of the LNP compositions actually included in non-human primate studies with Verve for the Licensed Product. Ownership of Technology generated during Additional Development Studies for Licensed Product will be determined on the same basis as for all other studies conducted under the Workplan in accordance with Section 6.2.

(g) ***Technology Transfer to Contract Manufacturing Organization.*** Prior to Verve's exercise of an Option for a Licensed Product, Acuitas will be responsible for the RNA-LNP formulation, including analytical testing and documentation for all Licensed Products directed to Reserved Targets. Following the execution of a Non-Exclusive License Agreement, Acuitas will transfer all Know-How relating to the then-current formulation process for the manufacture of such Licensed Product to Verve or to a single contract manufacturing organization (a "CMO") which will be determined by Verve (and reasonably acceptable to Acuitas). In the event the transfer of such Know-How is to a CMO the information will also be copied to Verve. For clarity, to be reasonably acceptable to Acuitas such proposed CMO must not be subject to a Deficiency. Acuitas will provide reasonable assistance to enable Verve or such CMO to manufacture such Licensed Product. Initiation of such technology transfer will be determined by Verve and will be for the then current formulation of the Licensed Product. Specifically, in the event that Additional Development Studies for a Licensed Product are undertaken, Verve will notify Acuitas once a formulation is selected for technology transfer. Acuitas will be reimbursed for such activities by Verve on an FTE basis and Verve will also be responsible for all external costs incurred by Acuitas relating to transfer of the Licensed Product formulation to Verve or a GMP manufacturer provided such costs have been approved by Verve in advance. Once the Licensed Product formulation is transferred to Verve or the CMO, Verve will assume responsibilities for future manufacturing of Licensed Product. Acuitas will provide ongoing technical support if requested by Verve with such support reimbursed on a time, materials and FTE basis.

(h) ***Payment for External Expenses*****.** On a Calendar Quarter-by-Calendar Quarter basis, Verve will reimburse Acuitas for any reasonable external costs that are incurred by Acuitas in connection with performing the Works and Services in accordance with the Workplan and Workplan budget, provided that such external costs have been specified in the Workplan or, if agreed by the JDC, are promptly added to the Workplan. Acuitas will send a reasonably detailed invoice to Verve no later than [**] after the end of each Calendar Quarter, which invoice shall include a detailed summary of and reasonable documentation for all such external costs. Verve agrees to pay undisputed amounts in each such invoice within [**] of Verve's receipt thereof. Except for such reimbursement of external costs and Verve's payments to Acuitas with respect to FTE Costs as set forth in Section 3.2, each Party will bear its own costs of performing the Workplan. For clarity, Verve shall not be responsible for reimbursing Acuitas for external costs to the extent that such costs exceed the budgeted amount for such costs in the Workplan for the applicable time period.

(i) ***Collaboration Partners.*** Verve may conduct parts of the Program together with a Third Party other than as set forth in subsection (i) below (Permitted Subcontracting); provided that such Third Party is a sublicensee of Verve Technology being used in the Program and Verve has obtained the prior written consent of Acuitas (not to be unreasonably withheld, conditioned or delayed), and the Third Party, upon Verve's receipt of such written consent, shall be deemed to be a Collaboration Partner hereunder. Acuitas will refuse to consent to a Third Party that Verve wishes to use as a Collaboration Partner if such Third Party is actively developing and/or commercializing LNP Technology and Acuitas reasonably determines that such Third Party is a competitor of Acuitas and such refusal will be deemed reasonable. Verve shall provide written notice to Acuitas of its execution of each agreement with a Collaboration Partner. Verve will ensure that each Collaboration Partner is subject to terms and conditions consistent with the terms and conditions in this Agreement (i) protecting and limiting use and disclosure of Confidential Information and Materials and Know-How, and (ii) requiring such Collaboration Partner and its personnel to assign to Verve all right, title and interest in and to any Patents and Know-How created, conceived, developed or reduced to practice in connection with the performance of activities in accordance with this Agreement in order to give effect to the provisions of Article 6. For avoidance of doubt, breach of any of the terms or conditions of this Agreement by a Collaboration Partner shall be a breach by Verve.

(j) ***Permitted Subcontracting*****.** Each Party may subcontract activities to be performed under the Workplan to any of its Affiliates, subject to the Affiliate's compliance with the terms and condition of this Agreement including Article 6 and Article 7 below. In addition, each Party may subcontract its activities to be performed under the Workplan to a Contract Research Organization. Any such Contract Research Organization will have entered into a written agreement with the subcontracting Party that includes terms and conditions protecting and limiting use and disclosure of Confidential Information and Materials and Know-How at least to the same extent as under this Agreement, and requiring such Contract Research Organization and its personnel to assign to the subcontracting Party all right, title and interest in and to any Patents and Know-How and Materials created, conceived, developed or reduced to practice in connection with the performance of subcontracted activities in accordance with this Agreement in order to give effect to the provisions of Article 6 and Article 7. Any such subcontracting activities will be described in the reports for the Program required by Section 3.3(b).

3.2 FTEs.

(a) *Generally.* Acuitas will perform the Works and Services under the Workplan and as part of the Program. The actual number of Acuitas FTEs committed to work on the Program at any particular point in time will be set forth in the Workplan. The Parties will prepare the Workplan, which will determine the number of Acuitas FTEs to be funded each year. Notwithstanding anything to the contrary set forth herein, in no event will (i) Acuitas be required to devote any FTEs to the conduct of the Program other than those funded by Verve or (ii) Verve be required to fund more than the actual number of FTEs devoted by Acuitas to the Workplan.

(b) *FTEs.* Acuitas shall ensure that those individuals selected by Acuitas to perform the Works and Services and otherwise support the activities to be undertaken by Acuitas pursuant to the Workplan will have sufficient scientific expertise, skill, training and competency to perform the proposed work and have similar skills, training and competency as those FTEs employed by Acuitas to perform work on Acuitas' internal programs and for Third Parties. In the event that Verve has concerns regarding the selection of an individual to perform the Works and Services or other activities under this Agreement, the Parties will discuss such concerns in good faith through the JDC.

(c) *FTE Costs*. Verve will fund Acuitas FTEs based on the number of hours actually worked by such FTEs and otherwise as set forth in the Workplan. Verve will reimburse Acuitas for FTE Costs on a Calendar Quarter-by-Calendar Quarter basis. Acuitas will send a reasonably detailed invoice to Verve no later than [**] after the end of each Calendar Quarter, which invoice shall include a summary of all activities by the name of each individual, number of hours devoted by each such individual, and Works and Services type/activity performed by each such individual during such Calendar Quarter. Verve agrees to pay undisputed amounts in each such invoice within [**] of Verve's receipt thereof.

3.3 Program Records, Reports and Materials.

(a) ***Records***. Each Party will maintain, or cause to be maintained, records of its activities under the Program in sufficient detail and in good scientific manner appropriate for scientific, Patent and regulatory purposes, which will properly reflect all work included in the Program ("Records") for a period of at least [**] after the creation of such Records or such longer period required by applicable Laws. Verve will have the right to request and receive a copy of any such Records maintained by Acuitas; and Acuitas will have the right to request and receive a copy of any such Records maintained by Verve to the extent such Records are required by Acuitas to exercise its rights under this Agreement.

(b) *Data and Program Reports*. Acuitas and Verve will share with one another through the JDC the Workplan Data. The Parties will not share with each other Confidential Information or Know-How relating to their Background Technologies or the Acuitas Sole Technology or Verve Sole Technology, respectively, including, in the case of Acuitas, LNP

formulation information, except as provided in Section 3.1(f) and 3.1(g). Verve will share with Acuitas Workplan Data regarding the Genome Editing Constructs only as and if needed by Acuitas to evaluate performance of the LNP Technology in order to conduct the Program. Acuitas shall not disclose any Workplan Data to any Third Party except in connection with the filing of patent applications for Acuitas Sole Technology (so long as no Verve Confidential Information is disclosed) and may use any Workplan Data only for internal research and development purposes. Verve may only use Workplan Data for research and development activities (which, for clarity, shall not include commercial exploitation of a product) and may disclose Workplan Data to Third Parties so long as no Acuitas Confidential Information is disclosed; provided that following Verve's exercise of an Option, Verve may also use such Workplan Data as set forth in the Non-Exclusive License Agreement. Acuitas may only use Workplan Data for research and development activities (which, for clarity, shall not include commercial exploitation of a product) and may disclose Workplan Data to Third Parties so long as no Verve Confidential Information is disclosed. During the Term, each Party will furnish to the JDC a summary written report within [**] after the end of each Calendar Quarter describing its progress under the Workplan and evaluating such work in relation to the goals of the Workplan as well as provide such other information as reasonably requested by the JDC. Within [**] following expiration or earlier termination of this Agreement, each Party will furnish to the JDC a final summary written report.

(c) ***Materials.***

(i) Each Party will, during the Term, furnish to each other samples of Materials which comprise, embody or incorporate Verve Technology or Acuitas LNP Technology only as expressly set forth in the Workplan. Acuitas will furnish to Verve the quantities of Formulated Product as set forth in the Workplan and will use commercially reasonable efforts to provide any additional quantities which will be required in performance of the Program. In addition, each Party will, upon the other Party's reasonable written request, furnish to such other Party other samples of Materials which comprise, embody or incorporate Verve Technology or Acuitas LNP Technology that are in such Party's Control and are reasonable (both in quantity and identity) and useful for the other Party to carry out its responsibilities under the Workplan, provided (A) such Materials are reasonably and readily available in excess of the providing Party's own requirements, and (B) supply of such Materials will not, in the providing Party's reasonable judgment, (1) conflict with the providing Party's internal or Third Party research programs, (2) conflict with the providing Party's internal policies regarding such Materials, or (3) violate any agreement to which the providing Party is a party. Upon termination or expiration of this Agreement and unless such Material is necessary and useful for the exercise of a Party's rights or obligations under a Non-Exclusive License Agreement, Materials will, at the providing Party's option and request to be made (if at all) within [**] after such termination or expiration or the effective date of termination, be returned to the providing Party or destroyed. The provision of Materials hereunder by either Party will not constitute any grant, option or license under any Patents or Know-How, except as expressly set forth herein.

(ii) Each Party will use such Materials only in accordance with the Workplan and otherwise in accordance with the terms and conditions of this Agreement. Except as otherwise specified in the Workplan or except with the prior written consent of the supplying Party, the Party receiving any Materials will not distribute or otherwise allow the release of Materials to any Third Party, except, with respect to either Party, to any permitted subcontractors under Section 3.1(i) and, with respect to Verve, to any Collaboration Partners. All Materials delivered to the receiving Party will remain the sole property of the providing Party and will be used in compliance with all applicable Laws and only to perform activities set forth in the Workplan. The Materials supplied under this Agreement will be used with prudence and appropriate caution in any experimental work because not all of their characteristics may be known.

3.4 Program Licenses.

(a) *By Acuitas.* Subject to the terms and conditions of this Agreement, Acuitas hereby grants to Verve (and to its Affiliates) a worldwide, non-exclusive, royalty-free license under the Acuitas LNP Technology, solely to the extent necessary to enable Verve (and its Affiliates) to perform its activities set forth in the Workplan and for no other purpose. The foregoing license shall not include the right to grant sublicenses, except to permitted Collaboration Partners and Contract Research Organizations in accordance with Sections 3.1(i) and 3.1(h).

(b) *By Verve.* Subject to the terms and conditions of this Agreement, Verve hereby grants to Acuitas a worldwide, non-exclusive, royalty-free license under the (i) Verve Technology, solely to the extent needed to enable Acuitas to perform its activities set forth in the Workplan and for no other purpose. The foregoing license shall not include the right to grant sublicenses, except to permitted Contract Research Organizations in accordance with Section 3.1(i).

(c) *No Other Licenses*. No license or right is or will be created or granted hereunder by implication, estoppel or otherwise. All licenses and rights are or will be granted only as expressly provided in this Agreement.

(d) *Technology Access Fee.* Within [**] following the Effective Date, Verve will pay to Acuitas a technology access fee equal to Five Hundred Thousand Dollars (US$500,000) ("Technology Access Fee"). On each anniversary of the Effective Date during the Term, Verve will pay to Acuitas a maintenance fee of Two Hundred Fifty Thousand Dollars (US$250,000) ("Technology Maintenance Fee") for each of the maximum of two (2) Options that has not been exercised as a Non-Exclusive License Agreement prior to the Anniversary Date. Technology Access Fees are not reimbursable and will not be pro-rated.

ARTICLE 4

Reserved Targets

4.1 Generally. Verve shall have the right, but not the obligation, to non-exclusively reserve Targets for potential use in the Workplan, in accordance with this Article 4. Verve will select the Targets that will be the subject of the work performed as part of the Program from the Reserved Targets specified in accordance with this Article 4. Additionally, Verve shall have the right, but not the obligation, to exercise Options in accordance with this Article 4 and Article 5.

4.2 Reserved Target List, Restricted Target List and Target Notices.

(a) ***Escrow Agent.*** The Escrow Agent shall maintain in confidence the Restricted Target List and respond to Verve's Target Notices and Option Notices on behalf of Acuitas. The Escrow Agent shall not inform Acuitas of any Verve potential Reserved Targets without Verve's prior written consent, which shall be deemed given with respect to a Human Genome Target (but not any other Reserved Target, including if such Reserved Target is set forth on the same Target Acceptance Notice as such Human Genome Target) upon Verve's receipt of a Target Acceptance Notice for such Human Genome Target in accordance with Section 4.2(d)(ii). For the avoidance of doubt, the Escrow Agent shall not notify Acuitas if a potential Reserved Target has been rejected from the Reserved Target List under this Section 4.2. All costs and expenses incurred through the Escrow Agent will be borne by Acuitas.

(b) ***Pre-Existing Restrictions.*** Acuitas shall maintain, at the Escrow Agent, a current and up-to-date list of Targets that are subject to Pre-Existing Restrictions (the "Restricted Target List"). Such list will also identify the scope of the Pre-Existing Restrictions. Acuitas represents, warrants and covenants to Verve that (i) the Restricted Target List is and will at all times be accurate and (ii) neither Acuitas nor any of its Affiliates will grant any licenses, options or other rights in or to the Acuitas LNP Technology that would preclude Acuitas from granting to Verve a non-exclusive license for each Reserved Target as set forth herein. The decision of the Escrow Agent with respect to the Targets subject to Pre-Existing Restrictions will be conclusive unless there is fraud on the part of Acuitas in which case Verve reserves all rights against Acuitas but absent fraud on the part of the Escrow Agent, Verve shall have no recourse against the Escrow Agent.

(c) ***Target Notices***. If (i) Verve desires to add or remove a Target from the Reserved Target List, or (ii) Verve desires to exercise an Option for a Licensed Product, Verve will notify the Escrow Agent in writing of the same. Such notice will identify as applicable, in addition to the information relating to such proposed Targets set forth on the form of Target Notice attached hereto as **Exhibit 4.2** (I) in the case of clause (i) above, whether Verve wishes to non-exclusively reserve such Target or remove such Target from the Reserved Target List, (II) in the case of clause (ii) above, if Verve wishes to exercise an Option, and if so, the information required under Section 5.2(a) (each such notice, a "Target Notice"). Each Target Notice in the case of clause (I) above will specify each Target and each Target Notice in the case of clause (II) above will specify the Human Genome Target(s) and each Genome Editing Protein Target and Guide RNAs associated with each Genome Editing Construct to Genome Edit such Human Genome Target(s).

(d) ***Target Response Notices*****.** The Escrow Agent, on behalf of Acuitas, will review each Target Notice provided by Verve and, within [**] of the Escrow Agent's receipt of a Target Notice, the Escrow Agent will provide Verve with written notice that includes the following information (each such notice, a "Target Response Notice"):

(i) If, as of the date of Verve's Target Notice for a Target, such Target is on the Restricted Target List and is listed as being subject to Pre-Existing Restrictions that restrict Acuitas from taking the action requested by Verve in the Target Notice, or if the action requested by Verve would exceed the applicable Concurrent Reserved List Limit or the Option Limit, then the Target Response Notice issued for such Target will so certify to Verve and will specify whether such applicable Target is subject to a Pre-Existing Restriction (such notice, a "Target Rejection Notice"). For clarity, the Target Rejection Notice will specify which Target (Human Genome Target or Genome Editing Protein Target) is subject to a Pre-Existing Restriction.

(ii) If, as of the date of Verve's Target Notice for a Target, such Target is not subject to any Pre-Existing Restrictions that would prevent the action requested by Verve in the Target Notice, and the action requested by Verve would not exceed the applicable Concurrent Reserved List Limit or the Option Limit, then such Target shall, consistent with the Target Notice, automatically be as of the date of the Target Notice (A) added or removed from the Reserved Target List on a non-exclusive basis, and (B) subject to the payment of the Option Exercise Fee, deemed to be subject to an Option exercised by Verve on a non-exclusive basis, and the Target Response Notice issued for the Targets included in the Licensed Product will certify the same to Verve (such notice, an "Target Acceptance Notice"). So long as a Human Genome Target is on the Reserved Target List, Acuitas and its Affiliates shall be prohibited from granting any Third Party an exclusive license (or an option to obtain such a grant of rights) under the Acuitas LNP Technology with respect to such Human Genome Target. This Section 4.2(d)(ii) shall survive the termination or expiration of this Agreement solely in the event that the Parties enter into a Non-Exclusive License Agreement prior to such termination or expiration.

(e) ***Concurrent Reserved List Limits.*** During the Term, Verve will have the right to select up to [**] Human Genome Targets and up to [**] Genome Editing Protein Targets and up to [**] Guide RNAs associated with each Human Genome Target at any one time to be placed on the Reserved Target List (the "Concurrent Reserved List Limit"). Genome Editing Protein Targets and Guide RNAs can be removed from the Reserved List, added to the Reserved List and/or replaced on the Reserved List at any time subject to the limitations on the total numbers of each Target to be associated with the Human Genome Targets. The Concurrent Reserved List Limit for Human Genome Targets will be reduced by one for each Option exercised such that number of Reserved Human Genome Targets plus the number of Options exercised shall not exceed four (4).

(f) ***Minimum Target Reservation Requirement.*** Verve will elect and maintain at least one (1) Target consisting of a Human Genome Target to be placed on the Reserved Target List at all times ("Minimum Target Reservation Requirement").

4.3 Expiration of Pre-Existing Restrictions. If any Pre-Existing Restrictions identified in a Target Rejection Notice that precluded Acuitas from taking the action requested by Verve in a Target Notice later expire or otherwise are modified or terminate such that Acuitas is no longer precluded from taking the action requested by Verve in a Target Notice, the Escrow Agent will notify Verve of such event and Verve will have an option, for a period of [**] following delivery of such notice to Verve, to (a) add such Target to the Reserved Target List, or (b) exercise

an Option with respect to such a Licensed Product including such Human Genome Target or Genome Editing Protein Target, as the case may be, in each case ((a) and (b)), subject to the Concurrent Reserved List Limits and the Option Limit. For clarity, Verve will at all times thereafter have the right to provide a Target Notice for such Target to the Escrow Agent pursuant to Section 4.2(c) but such Target Notice will be subject to any intervening Pre-Existing Restrictions.

4.4 Fees.

(a) ***Target Reservation and Maintenance Fees.*** Verve will pay to Acuitas (i) One Hundred Thousand Dollars (US$100,000) per Contract Year prorated on a monthly basis for each Human Genome Target until such Target is removed from the Reserved Target List or Verve exercises an Option with respect to such Target. Human Genome Target(s) removed from the Reserved Target List shall be available to Third Parties and the related payments will not be credited against any Option Exercise Fees, unless the same Target is re-nominated to the Reserved Target List.

(b) ***Credit.*** The Target Reservation and Maintenance Fee for a Human Genome Target will be creditable up to Two Hundred Fifty Thousand Dollars (US$250,000) against the Option Exercise Fee payable if Verve exercises its Option for a Non-exclusive License for a Licensed Product directed to such Human Genome Target.

ARTICLE 5

Verve License Options

5.1 Option. From the period commencing on the Effective Date and ending on the expiration of the Term, Acuitas hereby grants to Verve the options (each, an "Option") set forth below. Verve's Option is non-exclusive with respect to each combination of Reserved Targets included in a Licensed Product.

(a) ***Non-Exclusive License***. On a Licensed Product by Licensed Product basis, an Option shall include the right to enter into a non-exclusive, worldwide, license, with a right to sub-license through multiple tiers, under the Licensed Technology to research, develop, make, have made, keep, use, sell, offer to sell, have sold, import, export and/or otherwise commercialize and exploit Licensed Products in the Field of Use in the Territory. The Option to obtain a non-exclusive license will be limited to Targets that are on the Reserved Target List at the time of exercise of the Option.

(b) ***Option Limit***. Verve shall have the right to exercise Options with respect to a maximum of [**] (the "Option Limit"). For avoidance of doubt, Verve may exercise [**].

(c) ***Form of Non-Exclusive License Agreement.*** The Non-Exclusive License Agreement shall be used for all licenses granted upon the exercise of an Option hereunder. Each Non-Exclusive License Agreement will grant rights for a Licensed Product that include the Reserved Targets specified in the Option Notice.

(d) ***Combination Product.*** In the event that Verve has exercised both options under the Development and Option Agreement and has taken two non-exclusive licenses each directed against a single Human Genome Target and wishes to combine the rights under both licenses into a single combination product ("Combination Product") the Parties will negotiate in good faith the terms of an amendment to both licenses to allow such Combination Product. Such amendment will provide that any Milestone Events not yet achieved for either product will be combined into a single new milestone (which will be the sum of the individual Milestone Payments) and will be due on achievement of the Milestone Event for the Combination Product. The Royalty Rate for the Combination Product will be [**]% with a Minimum Royalty of [**]%. Other provisions of Section 4.3 of the Non-Exclusive License Agreement will remain unchanged. This Section 5.1 (d) will survive the Term of this Agreement.

5.2 Verve's Exercise of Option. Verve may exercise each such Option by delivering to Acuitas an Option Notice and paying to Acuitas the Option Exercise Fee in accordance with this Section 5.2. If not exercised prior to the expiration of the Term, the Options granted to Verve under this Article 5 with respect to all Reserved Targets will terminate in full and will no longer be exercisable.

(a) ***Option Notice.*** Verve has the right to deliver to the Escrow Agent, prior to the expiration of the Term, a Target Notice including the information set forth in Exhibit 4.2(c), as applicable, with respect to up to [**] Human Genome Target(s), the Genome Editing Protein Targets and Guide RNAs included in the Licensed Products for which Verve wishes to exercise an Option (each such Target Notice, an "Option Notice"). Each Option Notice will specify up to [**] Genome Editing Constructs (including the Genome Editing Protein Targets and Guide RNAs included therein) and up to [**] Human Genome Targets. Verve will submit one (1) Option Notice for each Licensed Product for which Verve wishes to exercise the Option and each Licensed Product will be defined by the Genome Editing Constructs and Human Genome Target(s) set forth in the Option Notice.

(b) ***Non-Exclusive License Agreement***. Within [**] of the Escrow Agent's receipt of an Option Notice, Verve and Acuitas will enter into a Non-Exclusive License Agreement using the form specified in Appendix 1.48 for the Licensed Products specified in the relevant Option Notice.

(c) ***Option Exercise Fee.*** Within [**] after entry into a Non-Exclusive License Agreement, Acuitas will issue an invoice to Verve for the Option Exercise Fee less any amounts creditable against such Option Exercise Fee for such Non-Exclusive License Agreement pursuant to Section 4.4(b). Each such payment will be due within [**] after Verve's receipt of such invoice from Acuitas. A separate Option Exercise Fee will be required for each Non-Exclusive License Agreement executed by the Parties in accordance with this Article 5.

ARTICLE 6

Ownership of Program Technology

6.1 Disclosure of LNP Know-How. Notwithstanding anything to the contrary in this Agreement, Acuitas shall not disclose to Verve any Know-How within the Acuitas LNP Technology without Verve's prior written consent other than pursuant to a Non-Exclusive License Agreement following Verve's exercise of an Option.

6.2 Ownership.

(a) ***Verve Owned Technology***. As between the Parties, Verve will own all right, title and interest in and to the Verve Technology.

(b) ***Acuitas Owned Technology***. As between the Parties, Acuitas will own all right, title and interest in and to the Acuitas LNP Technology.

(c) ***Joint Technology*****.** The Parties will jointly own any and all Joint IP. Each Party will have an undivided one-half interest in and to such Joint IP. Subject to the terms of this Agreement and any Non-Exclusive License Agreement, each Party will exercise its ownership rights in and to such Joint IP, including the right to license and sublicense or otherwise to exploit, transfer or encumber its ownership interest, without an accounting or obligation to, or consent required from, the other Party, but subject to the licenses hereunder and the other terms and conditions of this Agreement. At the reasonable written request of a Party, the other Party will in writing grant such consents and confirm that no such accounting is required to effect the foregoing regarding Joint IP.

(d) ***Assignment of Technology***. Each Party, for itself and on behalf of its Affiliates, hereby assigns (and to the extent such assignment can only be made in the future, hereby agrees to assign), to the other Party (i) any Technology that is solely owned by such other Party under this Section 6.2, and (ii) a joint and undivided interest in and to all Joint IP. The Parties will reasonably cooperate to more fully document the rights of each Party as defined in this Section 6.2, including by executing all lawful papers and instruments, obtaining and executing necessary powers of attorney and assignments by the named inventors, making all rightful oaths and declarations and providing consultation and assistance as may be necessary.

6.3 Assignment. Each Party shall require, to the extent legally possible under relevant national or local Laws, all of its employees, Affiliates or any Third Parties working pursuant to this Agreement on its behalf, to assign or otherwise convey rights to such Party its right, title and interest in any invention or Patent conceived, reduced to practice, created or otherwise made in order to accomplish the ownership provisions set forth in this Article 6. Each Party shall be responsible for any compensation payable by such Party to its employees, Affiliates or any Third Parties working pursuant to this Agreement on its behalf.

6.4 Prosecution and Maintenance.

(a) *General*. As between the Parties and subject to any Non-Exclusive License Agreement, Verve will have the sole right but not the obligation, at its expense, to prosecute and maintain Patents within the Verve Technology and Acuitas will have the sole right but not the obligation, at its expense, to prosecute and maintain Patents within the Acuitas LNP Technology. Upon request by either Party, the Parties will promptly enter into a joint prosecution and maintenance agreement with respect to the Joint IP that, unless otherwise agreed by the Parties, shall provide at a minimum that the Party with the responsibility to prosecute and maintain the Patents within the Joint IP will (i) keep the other Party reasonably informed of its prosecution and maintenance activities, (ii) provide the other Party with a reasonable opportunity to review and comment on any material submissions or correspondence with a patent office and incorporate in good faith any comments from the other Party, and (iii) provide to the other Party copies of all correspondence sent to or received from a patent office with respect to such Patents.

(b) *Cooperation*. Each Party will reasonably cooperate with the other Party in the prosecution and maintenance of the Patents within the Joint IP. Such cooperation includes promptly executing all documents, or requiring inventors, subcontractors, employees and consultants to execute all documents, as reasonable and appropriate so as to enable the prosecution and maintenance of any such Patents in any country.

6.5 Patent Enforcement and Defense.

(a) *Notice.* To the extent not in breach of an obligation of confidentiality, each Party will promptly notify, in writing, the other Party upon learning of any actual or suspected infringement of any Patents comprised in the Acuitas LNP Technology by a Third Party, or of any claim of invalidity, unenforceability, or non-infringement of any Patents comprised in the Acuitas LNP Technology, and will, along with such notice, supply the other Party with any evidence in its possession pertaining thereto.

(b) *Enforcement.* As between the Parties and subject to any Non-Exclusive License Agreement, Acuitas will have the sole right, but not the obligation, to seek to abate any infringement of the Patents comprised in the Acuitas LNP Technology by a Third Party, or to file suit against any such Third Party for such infringement.

(c) *Defense*. As between the Parties and subject to any Non-Exclusive License Agreement, Acuitas will have the sole right, but not the obligation, to defend against a declaratory judgment action or other action challenging any Patents comprised in the Acuitas LNP Technology.

ARTICLE 7

Confidentiality

7.1 Confidential Information. Each Party ("Disclosing Party") may disclose to the other Party ("Receiving Party"), and the Receiving Party may acquire during the course and conduct of activities under the Agreement, certain proprietary or confidential information of the Disclosing Party in connection with this Agreement. The term "Confidential Information" means all information of any kind, whether in written, oral, graphical, machine-readable or other form, whether or not marked as confidential or proprietary, that is disclosed or made available by or on behalf of the Disclosing Party to or on behalf of the Receiving Party in connection with this

Agreement; provided, that (a) the Acuitas Sole Technology will be considered the Confidential Information of Acuitas and the Verve Sole Technology will be considered the Confidential Information of Verve, (b) the Joint IP will be considered Confidential Information of both Parties, and either Party may use and disclose Joint IP in connection with such Party's permitted exploitation of such Technology, provided that the recipient is bound by confidentiality and non-use obligations corresponding to the obligations under this Agreement, and (c) the data and results generated from the Workplan shall be subject to Section 3.3(b), which shall supersede any other provisions of this Agreement to the contrary.

7.2 Restrictions. During the Term and for [**] thereafter, or with respect to any trade secret included in the Confidential Information for so long as such trade secret is protected under applicable Laws (provided, that Receiving Party has not publicly disclosed such trade secret in breach of its obligations under this Article 8), the Receiving Party will keep all Disclosing Party's Confidential Information in confidence with the same degree of care with which Receiving Party holds its own confidential information, but in no event less than reasonable care. Receiving Party will not use Disclosing Party's Confidential Information except for in connection with the performance of its obligations and exercise of its rights under this Agreement or any Non-Exclusive License Agreement. Receiving Party has the right to disclose Disclosing Party's Confidential Information without Disclosing Party's prior written consent to (a) Receiving Party's Affiliates, and (b) each of Receiving Party's employees, permitted subcontractors (subject to Section 3.1(i)) and Collaboration Partners, consultants or agents who have a need to know such Confidential Information in order to perform its obligations and exercise its rights under this Agreement and who are under written obligations to comply with the restrictions on use and disclosure that are no less restrictive than those set forth in this Section 7.2. Receiving Party assumes responsibility for such persons maintaining Disclosing Party's Confidential Information in confidence and using same only for the purposes described herein.

7.3 Exceptions. Receiving Party's obligation of nondisclosure and the limitations upon the right to use the Disclosing Party's Confidential Information will not apply to a specific portion of the Disclosing Party's Confidential Information to the extent that Receiving Party can demonstrate that such portion: (a) was known to Receiving Party or any of its Affiliates prior to the time of disclosure by the Disclosing Party without obligation of confidentiality; (b) is or becomes public knowledge through no fault or omission of Receiving Party or any of its Affiliates; (c) is obtained on a non-confidential basis by Receiving Party or any of its Affiliates from a Third Party who to Receiving Party's knowledge is lawfully in possession thereof and under no obligation of confidentiality to Disclosing Party; or (d) has been independently developed by or on behalf of Receiving Party or any of its Affiliates without the aid, application or use of Disclosing Party's Confidential Information.

7.4 Permitted Disclosures. Receiving Party may disclose Disclosing Party's Confidential Information to the extent (and only to the extent) such disclosure is permitted under Section 7.2 or is reasonably necessary in the following instances:

(a) in order and to the extent required to comply with applicable Laws (including any securities Laws or the regulations or rules of a securities exchange applicable to Receiving Party) or with a legal or administrative proceeding;

(b) in connection with prosecuting or defending litigation;

(c) in connection with filing, prosecuting and enforcing Patents in connection with Receiving Party's rights and obligations pursuant to this Agreement;

(d) to acquirers or permitted assignees, investment bankers, investors and lenders, including potential acquirers, assignees, investment bankers, investors and lenders; and

(e) in the case of Verve, to Collaboration Partners, but in case the Collaboration Partner is only a potential licensee, partner or assignee, only such information that is reasonably necessary or useful for the potential licensee, partner or assignee to evaluate the Technology of interest, including design of experiments conducted under the Workplan, data and results generated under the Workplan and LNP/Licensed Product manufacturing processes, but if a Non-Exclusive License Agreement has not been executed excluding the particular chemical structure and formulation of any lipid nanoparticles (which excluded information may be disclosed to such potential licensee, partner or assignee upon Acuitas' prior written consent);

provided, that (1) where reasonably possible, Receiving Party will notify Disclosing Party of Receiving Party's intent to make any disclosure pursuant to subsections (a) and (b) sufficiently prior to making such disclosure so as to allow Disclosing Party adequate time to take whatever action it may deem appropriate to protect the confidentiality of the information to be disclosed, and (2) with respect to subsections (d) and (e), each of those entities are required to comply with the restrictions on use and disclosure in Section 7.2 (other than investment bankers, investors and lenders, which must be bound prior to disclosure by commercially reasonable obligations of confidentiality).

7.5 Return of Confidential Information. Upon expiry or earlier termination of the Agreement, upon written request of a Party (such request, if made, to be made within [**] of such expiry or termination) the other Party will destroy or return (as shall be specified in such request) to the requesting Party all copies of the Confidential Information of the requesting Party; provided, that a Party may retain: (a) one copy of such Confidential Information for record-keeping purposes, for the sole purpose of ensuring compliance with this Agreement; (b) any copies of such Confidential Information as is required to be retained under applicable Laws; (c) any copies of such Confidential Information as is necessary or useful for such Party to exercise a right or fulfill an obligation under this Agreement; and (d) any copies of any computer records and files containing Confidential Information that have been created by such Party's routine archiving/backup procedures, in each case provided that such copies are maintained in accordance with this Article 7.

7.6 Publications. Notwithstanding anything in this Agreement to the contrary, each Party shall be permitted to publish the results of the Program including Workplan Data that constitute the other Party's or joint Confidential Information only with the prior written consent of the other Party, subject to Verve's right to publish the results of its development under the applicable Non-Exclusive License Agreement in accordance with Section 8.6 thereof. Acuitas shall submit any proposed publication of the results of the Program to Verve. Following receipt of the proposed publication by Verve, Verve will use commercially reasonable efforts to review and provide any objection to disclosure of Verve or Joint Confidential Information. Verve shall

submit any proposed publication of the results of the Program to Acuitas. Following receipt of the proposed publication by Acuitas, Acuitas will use commercially reasonable efforts to review and provide any objection to disclosure of Acuitas or Joint Confidential Information. Expedited reviews for abstracts or poster presentations, or for other publications that may relate to potential patent applications, may be arranged only with the prior written consent of both Parties. Verve and Acuitas will each comply with standard academic practice regarding authorship of scientific publications and recognition of the contributions of other parties in any publications relating to studies conducted under the Workplan.

7.7 Patents. Except as expressly permitted under this Agreement, neither Party will file a patent application that includes or discloses the Confidential Information of the other Party or Joint Confidential Information, without the consent of such other Party.

7.8 Terms of this Agreement; Publicity. The Parties agree that the material terms of this Agreement will be treated as Confidential Information of both Parties, and thus may be disclosed only as permitted by Sections 7.2 and 7.4. Except as required by applicable Laws (including any securities Laws or the regulations or rules of a securities exchange) or otherwise agreed by the Parties in writing, each Party agrees not to issue any press release or public statement disclosing information relating to the existence of this Agreement or the transactions contemplated hereby or the terms hereof without the prior written consent of the other Party, such consent not to be unreasonably withheld, conditioned or delayed.

ARTICLE 8

Warranties; Covenants; Limitations of Liability; Indemnification

8.1 Representations and Warranties. Each Party represents and warrants to the other as of the Effective Date that (a) it is a corporation duly organized, validly existing, and in good standing under the Laws of the jurisdiction in which it is incorporated, (b) it has the legal right and power to enter into this Agreement, to extend the rights, licenses and options granted or to be granted to the other in this Agreement, and to fully perform its obligations hereunder, (c) it has taken all necessary corporate action on its part required to authorize the execution and delivery of this Agreement and the performance of its obligations hereunder, (d) this Agreement has been duly executed and delivered on behalf of such Party, and constitutes a legal, valid, and binding obligation of such Party that is enforceable against it in accordance with its terms, (e) the execution, delivery and performance of this Agreement by such Party does not violate any Law of any court, governmental body or administrative or other agency having jurisdiction over such Party, and (f) no government authorization, consent, approval, license, exemptions of or filing or registration with any court or governmental department, commission, board, bureau, agency or instrumentality, domestic or foreign, under any applicable Laws currently in effect, is necessary for the transactions contemplated by this Agreement or for the performance of its obligations under this Agreement.

8.2 Additional Representations and Warranties of Acuitas. Acuitas hereby represents and warrants to Verve as of the Effective Date as follows:

(a) ***Impairment***. Neither Acuitas nor any of its Affiliates has entered into any agreement or otherwise licensed, granted, assigned, transferred, conveyed or otherwise encumbered or disposed of any right, title or interest in or to any of its assets, including any Technology, that would in any way conflict with or impair the scope of any rights, licenses or options granted to Verve hereunder or that would be granted to Verve under any Non-Exclusive License Agreement.

(b) ***Patents and Know-How***. **Exhibit 1.1** sets forth a complete and accurate list of all Patents included in the Acuitas Background Technology. Acuitas Controls the Acuitas Background Technology. All Acuitas inventors of the Acuitas Background Technology have validly assigned their rights to the Acuitas Background Technology to Acuitas. Acuitas is and will remain entitled to grant to Verve the licenses specified herein or under a Non-Exclusive License Agreement during the Term, to the Patents and the Know-How within the Acuitas LNP Technology. To Acuitas' knowledge, the Patents listed on **Exhibit 1.1** have been diligently prosecuted and maintained in accordance with applicable Law. None of the Patents included in the Acuitas Background Technology listed on **Exhibit 1.1** are or have been involved in any opposition, cancellation, interference, reissue or reexamination proceeding, and to Acuitas' knowledge as of the Effective Date, no Acuitas Background Technology is the subject of any judicial, administrative or arbitral order, award, decree, injunction, lawsuit, proceeding or stipulation. As of the Effective Date, neither Acuitas nor any of its Affiliates has received any notice alleging that the Patents in the Acuitas Background Technology listed on **Exhibit 1.1** are invalid or unenforceable, or challenging Acuitas' ownership of or right to use the Acuitas Background Technology.

(c) ***Entire LNP Technology.*** The Acuitas LNP Technology licensed to Verve under this Agreement or any Non-Exclusive License Agreement comprises all LNP Technology owned or Controlled by Acuitas. As of the Effective Date, the License Agreement dated [**] between Acuitas and [**] is the only LNP Technology owned or controlled by Acuitas that is not Acuitas LNP Technology.

(d) ***Encumbrances.*** Acuitas and its Affiliates are not subject to any payment obligations to Third Parties as a result of the execution or performance of this Agreement. As of the Effective Date, neither Acuitas nor any of its Affiliates has granted any liens or security interests on the Acuitas Background Technology, and the Acuitas Background Technology is free and clear of any mortgage, pledge, claim, security interest, covenant, easement, encumbrance, lien or charge of any kind.

(e) ***Defaults.*** The execution, delivery and performance by Acuitas of this Agreement and the consummation of the transactions contemplated hereby will not result in any violation of, conflict with, result in a breach of or constitute a default under any understanding, contract or agreement to which Acuitas is a party or by which it is bound, including each of the agreements which Acuitas has identified to Verve prior to the Effective Date, in each case as would reasonably be expected to have a material adverse effect on the rights granted to Verve hereunder or under any Non-Exclusive License Agreement.

(f) ***Litigation.*** There is no action, suit, proceeding or investigation pending or, to the knowledge of Acuitas, currently threatened in writing against or affecting Acuitas that questions the validity of this Agreement, the right of Acuitas to enter into this Agreement or consummate the transactions contemplated hereby or that relates to the Acuitas LNP Technology.

(g) ***Infringement***. Neither Acuitas nor any of its Affiliates has received any notice of any claim, nor does Acuitas or its Affiliates have any knowledge of any basis for any claim, that any Patent, Know-How or other intellectual property owned or controlled by a Third Party would be infringed or misappropriated by the practice of any Acuitas LNP Technology in connection with the performance of the Workplan or the use of Acuitas LNP Technology in connection with the production, use, research, development, manufacture or commercialization of any product as contemplated by a Non-Exclusive License Agreement.

(h) ***Third Party Infringement.*** To Acuitas' knowledge, no Third Party is infringing or has infringed any Patent within the Acuitas LNP Technology or is misappropriating or has misappropriated any Know-how within the Acuitas LNP Technology.

8.3 Disclaimers. Without limiting the respective rights and obligations of the Parties expressly set forth herein, each Party specifically disclaims any guarantee that the Program will be successful, in whole or in part. EXCEPT AS OTHERWISE EXPRESSLY PROVIDED IN THIS AGREEMENT, THE PARTIES MAKE NO REPRESENTATIONS AND EXTEND NO WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED.

8.4 No Consequential Damages. NOTWITHSTANDING ANYTHING IN THIS AGREEMENT OR OTHERWISE, NEITHER PARTY WILL BE LIABLE TO THE OTHER OR ANY THIRD PARTY WITH RESPECT TO ANY SUBJECT MATTER OF THIS AGREEMENT FOR ANY INDIRECT, PUNITIVE, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES; PROVIDED THAT THIS SECTION 8.4 WILL NOT APPLY TO BREACHES OF ARTICLES 6 OR 7 OR THE PARTIES' INDEMNIFICATION RIGHTS AND OBLIGATIONS UNDER ARTICLE 8.

8.5 Performance by Others. The Parties recognize that each Party may perform some or all of its obligations under this Agreement through Affiliates, and/or permitted subcontractors in accordance with Section 3.1(i); provided, however, that each Party will remain responsible and liable for the performance by its Affiliates and/or permitted subcontractors and will cause its Affiliates and permitted subcontractors to comply with the provisions of this Agreement in connection therewith.

8.6 Indemnification.

(a) ***Indemnification by Acuitas***. Acuitas will indemnify Verve, its Affiliates and their respective directors, officers, employees, Third Party licensors, licensees, permitted subcontractors, Collaboration Partners and agents, and their respective successors, heirs and assigns (collectively, "Verve Indemnitees"), and defend and hold each of them harmless, from and against any and all losses, damages, liabilities, costs and expenses (including reasonable attorneys' fees and expenses) (collectively, "Losses") in connection with any and all suits, investigations, claims or demands of Third Parties (collectively, "Third Party Claims") against the Verve Indemnitees to the extent arising from or occurring as a result of: (i) the breach by Acuitas of any provision of this Agreement; or (ii) any negligence or willful misconduct on the part of any Acuitas Indemnitee in the conduct of the Workplan; or (iii) any alleged infringement or misappropriation of Patents or other intellectual property rights by Verve in the conduct of the Workplan based solely on Verve's use of Acuitas LNP Technology as permitted hereunder in the performance of the Program (excluding for clarity infringement of Patents, Know-How or Materials covering Verve Technology used by Verve in the performance of the Workplan) except in each case (i)-(iii) to the extent Verve is obligated to indemnify an Acuitas Indemnitee in accordance with Section 8.6(b).

(b) ***Indemnification by Verve***. Verve will indemnify Acuitas, its Affiliates and their respective directors, officers, employees and agents, and their respective successors, heirs and assigns (collectively, "Acuitas Indemnitees"), and defend and hold each of them harmless, from and against any and all Losses in connection with any and all Third Party Claims against Acuitas Indemnitees to the extent arising from or occurring as a result of: (i) the breach by Verve of any provision of this Agreement; or (ii) any negligence or willful misconduct on the part of any Verve Indemnitee in the conduct of the Workplan; or (iii) any alleged infringement or misappropriation of Patents or other intellectual property rights by Acuitas in the conduct of the Workplan based solely on Acuitas' use of Verve Technology as permitted hereunder in the performance of the Program (excluding, for clarity, infringement of Acuitas LNP Technology used by Acuitas in the performance of the Workplan), except in each case (i)-(iii) to the extent Acuitas is obligated to indemnify Verve in accordance with Section 8.6(a).

(c) ***Notice of Claim*****.** All indemnification claims provided for in subsections (a) and (b) above will be made solely by such Party to this Agreement (the "Indemnified Party"). The Indemnified Party will promptly notify the indemnifying Party (the "Indemnifying Party") in writing of any Losses or the discovery of any fact upon which the Indemnified Party intends to base a request for indemnification under subsections (a) or (b) above (each such notice, an "Indemnification Claim Notice"), provided that the failure to promptly provide such notice and details shall not relieve the Indemnifying Party of any of its indemnification obligations hereunder, except to the extent that the Indemnifying Party's defense of the relevant Third Party Claim is prejudiced by such failure. Each Indemnification Claim Notice must contain a description of the claim and the nature and amount of such Loss (to the extent that the nature and amount of such Loss is known at such time). The Indemnified Party will furnish promptly to the Indemnifying Party copies of all papers and official documents received in respect of any Losses and Third-Party Claims.

(d) ***Defense, Settlement, Cooperation and Expenses.***

(i) Control of Defense. At its option, the Indemnifying Party may assume the defense of any Third-Party Claim by giving written notice to the Indemnified Party within [**] after the Indemnifying Party's receipt of an Indemnification Claim Notice. Upon assuming the defense of a Third-Party Claim, the Indemnifying Party may appoint as lead counsel in the defense of the Third Party Claim any legal counsel selected by the Indemnifying Party (the Indemnifying Party will consult with the Indemnified Party with respect to such legal counsel and a possible conflict of interest of such counsel retained by the Indemnifying Party). In the event the Indemnifying Party assumes the defense of a Third-Party Claim, the Indemnified Party will immediately deliver to the Indemnifying Party all original notices and documents (including court papers) received by the Indemnified Party in connection with the Third-Party Claim.

(ii) Right to Participate in Defense. Without limiting subsection (i) above, any Indemnified Party will be entitled to participate in, but not control, the defense of such Third Party Claim and to employ counsel of its choice for such purpose; provided, however, that such employment will be at the Indemnified Party's own cost and expense unless (A) the Indemnifying Party has failed to assume the defense and employ counsel in accordance with subsection (i) above (in which case the Indemnified Party will control the defense) or (B) the interests of the Indemnified Party and the Indemnifying Party with respect to such Third Party Claim are sufficiently adverse to prohibit the representation by the same counsel of both Parties under applicable Law, ethical rules or equitable principles, in which case the Indemnifying Party will assume [**] percent ([**]%) of any such reasonable costs and expenses of counsel for the Indemnified Party.

(iii) Settlement. With respect to any Third Party Claims that relate solely to the payment of money damages in connection with a Third Party Claim and that will not (A) result in the Indemnified Party's becoming subject to injunctive or other relief, (B) include any admission or concession of liability or wrongdoing on the part of the Indemnified Party, or (C) otherwise adversely affect the business or Patents of the Indemnified Party in any manner, and as to which the Indemnifying Party will have acknowledged in writing the obligation to indemnify the Indemnified Party hereunder, the Indemnifying Party will have the sole right to consent to the entry of any judgment, enter into any settlement or otherwise dispose of such Loss, on such terms as the Indemnifying Party, in its sole discretion, will deem appropriate. With respect to all other Losses in connection with Third Party Claims, where the Indemnifying Party has assumed the defense of the Third Party Claim in accordance with subsection (i) above, the Indemnifying Party will have authority to consent to the entry of any judgment, enter into any settlement or otherwise dispose of such Loss provided it obtains the prior written consent of the Indemnified Party (which consent will not be unreasonably withheld, conditioned or delayed). Where the Indemnifying Party has assumed the defense of the Third-Party Claim in accordance with subsection (i) above, the Indemnifying Party will not be liable for any settlement or other disposition of a Loss by an Indemnified Party that is reached without the written consent of the Indemnifying Party. Regardless of whether the Indemnifying Party chooses to defend or prosecute any Third-Party Claim, no Indemnified Party will admit any liability with respect to or settle, compromise or discharge, any Third-Party Claim without the prior written consent of the Indemnifying Party, such consent not to be unreasonably withheld, conditioned or delayed.

(iv) Cooperation. Regardless of whether the Indemnifying Party chooses to defend or prosecute any Third Party Claim, the Indemnified Party will, and will cause each other Indemnified Party to, cooperate in the defense or prosecution thereof and will furnish such records, information and testimony, provide such witnesses and attend such conferences, discovery proceedings, hearings, trials and appeals as may be reasonably requested in connection therewith at the Indemnifying Party's expense. Such cooperation will include access during normal business hours afforded to the Indemnifying Party to, and reasonable

retention by the Indemnified Party of, records and information that are reasonably relevant to such Third Party Claim, and making indemnified parties and other employees and agents available on a mutually convenient basis to provide additional information and explanation of any material provided hereunder, and the Indemnifying Party will reimburse the Indemnified Party for all its reasonable out-of-pocket costs and expenses in connection therewith.

(v) Costs and Expenses. Except as provided above in this Section 8.6, the costs and expenses, including reasonable attorneys' fees and expenses, incurred by the Indemnified Party in connection with any claim will be reimbursed on a Calendar Quarter basis by the Indemnifying Party, without prejudice to the Indemnifying Party's right to contest the Indemnified Party's right to indemnification and subject to prompt refund in the event the Indemnifying Party is ultimately held not to be obligated to indemnify the Indemnified Party.

8.7 Insurance. Each Party will maintain at its sole cost and expense, an adequate liability insurance or self-insurance program to protect against potential liabilities and risk arising out of activities to be performed under this Agreement and upon such terms (including coverages, deductible limits and self-insured retentions) as are customary in the respective industry of such Party for the activities to be conducted by such Party under this Agreement. The coverage limits set forth herein will not create any limitation on a Party's liability to the other under this Agreement. Upon the request of a Party, the other Party will provide evidence of the insurance coverage required by this Section 8.7.

ARTICLE 9

Term and Termination

9.1 Term. This Agreement will commence as of the Effective Date and, unless sooner terminated in accordance with the terms this Article 9 or by mutual written consent, will terminate on the third (3rd) anniversary of the Effective Date; provided, Verve will have one (1) option to extend the initial three (3) year term for an additional two (2) year period by providing written notice thereof to Acuitas at least six (6) months prior to the third (3rd) anniversary of the Effective Date (the "Term").

9.2 Termination by Verve.

(a) ***Breach.*** Verve will have the right to terminate this Agreement or the Program in full upon delivery of written notice to Acuitas in the event of a material breach by Acuitas of its obligations under this Agreement, provided that such breach has not been cured within [**] after written notice thereof is given by Verve to Acuitas specifying the nature of the alleged breach. In the event of a termination of the Program for Acuitas' uncured material breach, the JDC will be disbanded, Acuitas will receive no further reimbursement for FTE Costs or external expenses and Acuitas will conduct a technology transfer and provide necessary licenses to Verve or its Third Party designee each as reasonably necessary for Verve or such Third Party designee to complete the conduct of the Program. For avoidance of doubt, termination of the Program pursuant to this Section 9.3(a) will not terminate Verve's reservation of Reserved Targets or the Options, subject to the payment of the fees associated therewith. Any Option that is in effect as of the effective date of termination pursuant to this Section 9.2(a) will continue in effect until the expiration of the Term, as the Term may be extended by Verve.

(b) *Discretionary Termination*. Verve will have the right to terminate this Agreement in full at any time without cause by giving thirty (30) days' prior written notice to Acuitas. Upon termination by Verve pursuant to this subsection, Verve will pay to Acuitas all accrued, then-unpaid Target Reservation and Maintenance Fees, and any amounts payable to Acuitas for any Works and Services performed pursuant to the Workplan up through the date of such termination and provided however, that if Verve terminates the Agreement within the first year after the Effective Date, payment of any outstanding amount of the FTE Costs that would have due under the Workplan for the first year (to the extent that such FTE Costs have been specified in the Workplan).

9.3 Termination by Acuitas. Acuitas will have the right to terminate this Agreement in full upon delivery of written notice to Verve in the event of a material breach by Verve of its obligations under this Agreement, provided that such breach has not been cured within [**] after written notice thereof is given by Acuitas to Verve specifying the nature of the alleged breach. Verve hereby agrees that Acuitas is entitled to receive payment of any amounts payable to Acuitas for any Works and Services performed pursuant to the Workplan up through the date of such termination. If Acuitas terminates this Agreement pursuant to this Section 9.3, then Acuitas will have the right, but not the obligation, to terminate any then-existing Non-Exclusive License Agreement.

9.4 Termination Upon Bankruptcy. If either Party makes an assignment for the benefit of creditors, appoints or suffers appointment of a receiver or trustee over all or substantially all of its property, files a petition under any bankruptcy or insolvency act in any state or country or has any such petition filed against it which is not discharged within [**] of the filing thereof, then the other Party may thereafter terminate this Agreement effective immediately upon written notice to such Party. All rights and licenses granted under or pursuant to this Agreement by Acuitas are, and will otherwise be deemed to be, for purposes of Section 65.11(7) of the Bankruptcy and Insolvency Act, R.S.C. 1985, c. B-3 and Section 32(6) of the Companies' Creditors Arrangement Act, R.S.C. 1985, c. C-36 (the "Insolvency Legislation"), a grant of "right to use intellectual property" as used in the Insolvency Legislation. The Parties agree that Verve and its Affiliates, as licensees of such rights under this Agreement, will retain and may fully exercise all of their rights and elections under the Insolvency Legislation subject to the payment of amounts provided for herein. Without limiting Verve's rights under the Insolvency Legislation, if Acuitas becomes insolvent or makes an assignment for the benefit of its creditors or there is filed by or against the Acuitas any bankruptcy, receivership, reorganization or similar proceeding pursuant to or under the Insolvency Legislation or otherwise, Verve shall be entitled to a copy of any and all such intellectual property and all embodiments of such intellectual property, and the same, if not in the possession of Acuitas, shall be promptly delivered to it (a) before this Agreement is rejected by or on behalf of Acuitas, within [**] after Verve's written request, unless Acuitas, or its trustee or receiver, elects within [**] to continue to perform all of its obligations under this Agreement, or (b) after any rejection of this Agreement by or on behalf of Acuitas, if not

previously delivered as provided under clause (a) above. All rights of the Parties under this Section 9.4 and under Section 65.11(7) of the Bankruptcy and Insolvency Act, R.S.C. 1985, c. B-3 and Section 32(6) of the Companies' Creditors Arrangement Act are in addition to and not in substitution of any and all other rights, powers, and remedies that each Party may have under this Agreement, the Insolvency Legislation, and any other applicable Laws.

9.5 Effects of Termination.

(a) In the event of a dispute as to whether Verve has materially breached its payment obligations or Acuitas has materially breached its obligations under the Workplan, Verve shall make payment of the disputed amounts to a Third-Party trustee selected by Verve and reasonably acceptable to Acuitas. The Third-Party trustee shall confirm to Acuitas that it holds such payment and will forward the monies to Acuitas or return the monies to Verve once the dispute has been finally resolved and depending on the outcome of the resolved dispute. Upon the request of Verve, the following shall apply to any dispute described in the first sentence of this Section 9.5(a): the informal dispute resolution process in Section 10.1(a) shall not apply; the negotiation period for the Executive Officers in Section 10.1(a) shall be limited to [**].

(b) Upon termination by either Party under Sections 9.2, 9.3 or 9.4, (a) Acuitas will terminate all Works and Services in progress in an orderly manner as soon as practical and in accordance with a schedule agreed to by Verve, (b) Acuitas will use commercially reasonable efforts to terminate or limit any outstanding commitments and costs associated with the Workplan, (c) Acuitas will deliver to Verve any Verve Materials in its possession or control and all deliverables developed through termination or expiration, and (d) Acuitas will promptly issue a final invoice to Verve and Verve will pay Acuitas any monies due and owing Acuitas, up to the time of termination or expiration, for Works and Services actually performed and all authorized expenses actually incurred (as specified in the Workplan).

9.6 Survival. In addition to the termination consequences set forth in Section 9.5, the following provisions will survive termination or expiration of this Agreement, as well as any other provision which by its terms or by the context thereof, is intended to survive such termination: Article 1 (to the extent applicable to any other surviving provisions), Article 6, Article 7 and Article 10 and Section 3.1(f) (with respect to Acuitas' obligation to complete a technology transfer, as applicable), Section 3.3(a), Section 3.3(b) (with respect to the Parties' permitted use of Workplan Data), Section 3.3(c)(i) (with respect to the Parties' obligation to return or destroy Materials after expiration or termination of this Agreement), Section 5.1 (d), Section 5.2 (to the extent that Verve exercises an Option, as applicable), Section 8.3, Section 8.4, Section 8.6, Section 9.5 and this Section 9.6. Termination or expiration of this Agreement will not relieve the Parties of any liability or obligation which accrued hereunder prior to the effective date of such termination or expiration nor preclude either Party from pursuing all rights and remedies it may have hereunder or at Law or in equity with respect to any breach of this Agreement nor prejudice either Party's right to obtain performance of any obligation. All other rights and obligations will terminate upon expiration of this Agreement.

ARTICLE 10

Miscellaneous

10.1 Dispute Resolution.

(a) *Disputes.* Disputes arising under or in connection with this Agreement will be resolved pursuant to this Section 10.1; provided, however, that in the event a dispute cannot be resolved without an adjudication of the rights or obligations of a Third Party (other than any Verve Indemnitees or Acuitas Indemnitees identified in Section 8.6), the dispute procedures set forth Sections 10.1(b) and 10.1(c) will be inapplicable as to such dispute.

(b) *Dispute Escalation*. In the event of a dispute between the Parties, the Parties will first attempt in good faith to resolve such dispute by negotiation and consultation between themselves or the Workplan Leaders. In the event that such dispute is not resolved on an informal basis within [**], any Party may, by written notice to the other, have such dispute referred to each Party's Chief Executive Officer or his or her designee (who will be a senior executive), who will attempt in good faith to resolve such dispute by negotiation and consultation for a [**] period following receipt of such written notice.

(c) *Dispute Resolution*. In the event the Chief Executive Officers of the Parties are not able to resolve such dispute as set forth above, the Chief Executive Officers will together elect whether to submit the dispute to mediation, litigation or arbitration. In the absence of such an agreement, either Party may elect to initiate litigation.

(d) *Injunctive Relief*. Notwithstanding the dispute resolution procedures set forth in this Section 10.1, in the event of an actual or threatened breach hereunder, the aggrieved Party may seek equitable relief (including restraining orders, specific performance or other injunctive relief) in any court or other forum, without first submitting to any dispute resolution procedures hereunder.

(e) *Tolling*. The Parties agree that all applicable statutes of limitation and time-based defenses (such as estoppel and laches) will be tolled while the dispute resolution procedures set forth in this Section 10.1 are pending, and the Parties will cooperate in taking all actions reasonably necessary to achieve such a result.

(f) *Prevailing Party*. The prevailing Party in any suit related to this Agreement will be entitled to recover from the losing Party all out-of-pocket fees, costs and expenses (including those of attorneys, professionals and accountants and all those arising from appeals and investigations) incurred by the prevailing Party in connection with such arbitration or suit.

10.2 Invoices and Payments. All invoices to be delivered to Verve hereunder shall be delivered in accordance with Section 10.11 or in such other manner specified by Verve from time to time. All amounts specified in, and all payments to be made by Verve hereunder will be in, U.S. dollars and will be paid by wire transfer to such bank account as Acuitas may designate at least [**] before such payment is due. Verve may withhold from payments due to Acuitas amounts for payment of any withholding tax that is required by Law to he paid to any taxing authority with respect to such payment. Verve will provide Acuitas all relevant documents and correspondence,

and will also provide to Acuitas any other cooperation or assistance on a reasonable basis as may be necessary to enable Acuitas to claim exemption from such withholding taxes and to receive a refund of such withholding tax or claim a foreign tax credit. Upon the request of Acuitas, Verve will give proper evidence from time to time as to the payment of any such tax.

10.3 Relationship of Parties. Nothing in this Agreement is intended or will be deemed to constitute a partnership, agency, employer-employee or joint venture relationship between the Parties. No Party will incur any debts or make any commitments for the other, except to the extent, if at all, specifically provided therein. There are no express or implied Third-Party beneficiaries hereunder.

10.4 Compliance with Law. Each Party will perform or cause to be performed any and all of its obligations or the exercise of any and all of its rights hereunder in good scientific manner and in compliance with all applicable Law.

10.5 Governing Law. This Agreement will be governed by and construed in accordance with the Laws of the state of New York, United States of America, without respect to its conflict of Laws rules, provided that any dispute relating to the scope, validity, enforceability or infringement of any Patents or Know-How will be governed by, and construed and enforced in accordance with, the substantive Laws of the jurisdiction in which such Patents or Know-How apply.

10.6 Counterparts; Facsimiles. This Agreement may be executed in one or more counterparts, each of which will be deemed an original, and all of which together will be deemed to be one and the same instrument. Facsimile or PDF execution and delivery of this Agreement by either Party will constitute a legal, valid and binding execution and delivery of this Agreement by such Party

10.7 Headings. All headings in this Agreement are for convenience only and will not affect the meaning of any provision hereof.

(a) ***Waiver of Rule of Construction***. Each Party has had the opportunity to consult with counsel in connection with the review, drafting and negotiation of this Agreement. Accordingly, the rule of construction that any ambiguity in this Agreement will be construed against the drafting Party will not apply.

(b) ***Interpretation.*** Whenever any provision of this Agreement uses the term "including" (or "includes"), such term will be deemed to mean "including without limitation" (or "includes without limitation"). "Herein," "hereby," "hereunder," "hereof" and other equivalent words refer to this Agreement as an entirety and not solely to the particular portion of this Agreement in which any such word is used. In this Agreement, the word "or" means "and/or". All definitions set forth herein will be deemed applicable whether the words defined are used herein in the singular or the plural. Unless otherwise provided, all references to Sections and Exhibits in this Agreement are to Sections and Exhibits of this Agreement. References to any Sections include Sections and subsections that are part of the related Section.

10.8 Further Assurances. Each Party shall take all customary and reasonable actions and do all things reasonably necessary or proper, including under applicable law, to make effective and further the intents and purposes of the transactions contemplated by this Agreement, including executing any further instruments reasonably requested by the other Party.

10.9 Binding Effect. This Agreement will inure to the benefit of and be binding upon the Parties, their Affiliates, and their respective lawful successors and assigns.

10.10 Assignment. This Agreement may not be assigned by either Party, nor may either Party delegate its obligations or otherwise transfer licenses or other rights created by this Agreement, except as expressly permitted hereunder, without the prior written consent of the other Party, which consent will not be unreasonably withheld, conditioned or delayed; provided, that either Party may assign this Agreement without such consent to an Affiliate or to its successor in connection with the sale of all or substantially all of its assets or business or that portion of its business pertaining to the subject matter of this Agreement (whether by merger, consolidation or otherwise).

10.11 Notices. All notices, requests, demands and other communications required or permitted to be given pursuant to this Agreement will be in writing and will be deemed to have been duly given upon the date of receipt if delivered by hand, email, recognized international overnight courier, or registered or certified mail, return receipt requested, postage prepaid to the following addresses:

if to Verve:	Verve Therapeutics, Inc. 500 Technology Square Cambridge, MA 02139 Email: [**] Attn: COO
With a copy to:	Wilson Sonsini Goodrich & Rosati 650 Page Mill Road Palo Alto, CA 94304 Attention: Lowell Segal Email: [**]
If to Acuitas:	Acuitas Therapeutics Inc. 6190 Agronomy Road, Suite 405 Vancouver, B.C. Canada V6T 1Z3 Attention: President and CEO Email: [**]
With a copy to:	McCarthy Tetrault LLP Suite 2400 745 Thurlow Street Vancouver, B.C. Canada V6E 0C5 Attention: Miranda Lam, Esq. Email: [**]

Either Party may change its designated address by notice to the other Party in the manner provided in this Section 10.11.

10.12 Amendment and Waiver. This Agreement may be amended, supplemented, or otherwise modified only by means of a written instrument signed by both Parties; provided that any unilateral undertaking or waiver made by one Party in favor of the other will be enforceable if undertaken in a writing signed by the Party to be charged with the undertaking or waiver. Any waiver of any rights or failure to act in a specific instance will relate only to such instance and will not be construed as an agreement to waive any rights or fail to act in any other instance, whether or not similar.

10.13 Severability. In the event that any provision of this Agreement will, for any reason, be held to be invalid or unenforceable in any respect, such invalidity or unenforceability will not affect any other provision hereof, and the Parties will negotiate in good faith to modify the Agreement to preserve (to the extent possible) their original intent.

10.14 Entire Agreement. This Agreement together with any Non-Exclusive License Agreements (including all appendices and exhibits hereto and thereto) entered into during the Term are the sole agreements with respect to their subject matter and supersede all other agreements and understandings between the Parties with respect to same.

10.15 Force Majeure. Neither Acuitas nor Verve will be liable for failure of or delay in performing obligations set forth in this Agreement (other than any obligation to pay monies when due), and neither will be deemed in breach of such obligations, if such failure or delay is due to natural disasters or any causes reasonably beyond the control of Acuitas or Verve; provided that the Party affected will promptly notify the other of the force majeure condition and will exert reasonable efforts to eliminate, cure or overcome any such causes and to resume performance of its obligations as soon as possible.

[Signature page to follow]

IN WITNESS WHEREOF, the Parties have caused this Development and Option Agreement to be executed by their respective duly authorized officers as of the Effective Date.

ACUITAS THERAPEUTICS, INC.

By: /s/ T.D. Madden
(Signature)

Name: Thomas Madden

Title: President & CEO

VERVE THERAPEUTICS, INC.

By: /s/ Andrew D. Ashe
(Signature)

Name: Andrew D. Ashe

Title: President & COO

EXHIBIT 10.12

EXECUTION COPY

Certain identified information has been excluded from the exhibit because it is both (i) not material and (ii) is the type of information that the registrant treats as private or confidential. Double asterisks denote omissions.

NON-EXCLUSIVE LICENSE AGREEMENT

by and between

ACUITAS THERAPEUTICS, INC.

and

VERVE THERAPEUTICS, INC.

dated

October 14, 2020

TABLE OF CONTENTS

TABLE OF CONTENTS
(continued)

List of Appendices

Appendix 1.35	Jointly Owned Patents
Appendix 1.44	Licensed Product including Human Genome Target(s), Genome Editing Protein Target(s) and Guide RNA(s)
Appendix 1.44	Patents within the Licensed Technology as of the License Agreement Effective Date
Appendix 9.2	Exceptions to Acuitas' Representations and Warranties in Section 9.2

Non-Exclusive License Agreement

This Non-Exclusive License Agreement ("License Agreement"), dated as of October 14, 2020 (the "License Agreement Effective Date"), is made by and between Acuitas Therapeutics, Inc., a British Columbia corporation ("Acuitas"), and Verve Therapeutics, Inc., a Delaware corporation ("Verve"). Each of Acuitas and Verve may be referred to herein as a "Party" or together as the "Parties."

WHEREAS, Acuitas has proprietary LNP Technology (as defined below);

WHEREAS, Verve has expertise and intellectual property relating to gene editing therapeutics, including mRNA Constructs (as defined below) and Genome Editing Constructs (as defined below);

WHEREAS, Acuitas and Verve are parties to that certain Amended and Restated Development and Option Agreement (dated October 6, 2020) (the "Development and Option Agreement"), pursuant to which Verve has options to take licenses under the Licensed Technology (as defined below) with respect to Verve's Genome Editing Constructs; and

WHEREAS, pursuant to the terms of the Development and Option Agreement, Verve has exercised an option with respect to the Licensed Products and the Licensed Genome Targets (as defined below) and the Parties are now entering into a licensing arrangement whereby Verve will have a license under the Licensed Technology to develop and commercialize Licensed Products (as defined below) based on such Licensed Genome Targets.

NOW, THEREFORE, in consideration of the mutual covenants contained herein, and for other good and valuable consideration, the amount and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

ARTICLE 1

Definitions

The following terms and their correlatives will have the following meanings:

1.1. "Acuitas Indemnitees" has the meaning set forth in Section 9.6(a).

1.2. "Acuitas Patents" has the meaning set forth in Section 7.2(a)(i).

1.3. "Acuitas Background Technology" has the meaning set forth in the Development and Option Agreement.

1.4. "Acuitas LNP Technology" has the meaning set forth in the Development and Option Agreement.

1.5. "Acuitas Sole Technology" has the meaning set forth in the Development and Option Agreement.

1.6. "Affiliate" of a person or entity means any other person or entity which (directly or indirectly) is controlled by, controls or is under common control with such person or entity. For the purposes of this definition, the term "control" (including, with correlative meanings, the terms "controlled by" and "under common control with") as used with respect to an entity will mean (a) in the case of a corporate entity, direct or indirect ownership of voting securities entitled to cast at least fifty percent (50%) of the votes in the election of directors, or (b) in the case of a non-corporate entity, direct or indirect ownership of at least fifty percent (50%) of the equity interests with the power to direct the management and policies of such entity, provided that if local Law restricts foreign ownership, control will be established by direct or indirect ownership of the maximum ownership percentage that may, under such local Law, be owned by foreign interests.

1.7. "Calendar Quarter" means the respective periods of three (3) consecutive calendar months ending on March 31, June 30, September 30 and December 31.

1.8. "cGMP" means current Good Manufacturing Practices as specified in Parts 210 and 211 of Title 21 of the U.S. C.F.R., ICH Guideline Q7A, or equivalent Laws of an applicable Regulatory Authority at the time of manufacture.

1.9. "CMO" has the meaning set forth in Section 2.3(a).

1.10. "Combination Product" means a product that includes at least one additional active ingredient other than a Licensed Product sold in conjunction with or used in combination with a Licensed Product (whether packaged together or packaged separately but sold together for a single price). Drug delivery vehicles and excipients shall not be deemed to be "active ingredients," except in the case where such delivery vehicle or excipient is recognized as an active ingredient in accordance with 21 C.F.R. 210.3(b)(7) or equivalent Laws in other jurisdictions, provided however, should lipid nanoparticles comprised in a Licensed Product be characterized as "active ingredients" at any time during the Term, such lipid nanoparticles will not be considered an "active ingredient" for the purposes of this definition.

1.11. "Confidential Information" has the meaning set forth in Section 8.1.

1.12. "Control" or "Controlled" means, with respect to a particular Technology, Acuitas owns or has a license to use and practice such Technology and has the right to grant a license or sublicense to such Technology without violating the terms of any agreement with any Third-Party and without owing any milestone, royalty or other monetary obligations to a Third-Party under the terms of any agreement with such Third-Party.

1.13. "Covered" and "Covering" means, with reference to a Licensed Product, that without the licenses granted to Verve hereunder, the manufacture, development or commercialization of such Licensed Product would infringe a Valid Claim of an LNP Technology Patent.

1.14. "Development and Option Agreement" has the meaning set forth in the Preamble.

1.15. "Diligent Efforts" means, with respect to the efforts to be expended by each Party, active and sustained efforts to conduct the applicable activity, or to attempt to achieve the applicable requirement or goal, in a prompt and expeditious manner, as is reasonably practicable under the circumstances and the terms of this Agreement.

1.16. "Disclosing Party" has the meaning set forth in Section 8.1.

1.17. "Escrow Agent" means the Third-Party escrow agent designated by Acuitas and reasonably acceptable to Verve, which escrow agent shall initially be [**].

1.18. "Executive Officers" has the meaning set forth in Section 11.1(b).

1.19. "Field of Use" means Genome Editing for all human therapeutic or prophylactic uses of Licensed Products.

1.20. "First Commercial Sale" means the first sale for use or consumption for which revenue has been recognized of any Licensed Product in a country after all required Marketing Authorization Approvals for commercial sale of such Licensed Product have been obtained in such country.

1.21. "FTE" means the work of a full-time person for one year, or more than one person working the equivalent of a full-time person for one year, where "full-time" is determined by the standard practices in the biopharmaceutical industry in the geographic area in which such personnel are working, but means [**] hours per year, in the performance of the agreed activities for the Technology Transfer, including scientific management oversight as reasonably required.

1.22. "FTE Costs" mean the actual FTEs employed by Acuitas in the conduct of the agreed activities for the Technology Transfer multiplied by an annual rate per FTE equal to [**] Dollars (US$[**]), which may be prorated on a daily or hourly basis as necessary. Such FTE Costs represent reimbursement for all costs of FTEs in providing such activities (including salaries and benefits, lab supplies, reagents, equipment and overhead, as well as other G&A costs).

1.23. "GAAP" means generally accepted accounting principles in the United States.

1.24. "Genome Edit(ing)" means to correct, modify, insert, delete, inactivate or repair the expression of a Human Genome Target for human therapeutic, diagnostic or prophylactic applications.

1.25. "Genome Editing Construct" means a construct consisting of [**] mRNA Constructs that each encode a [**] to Genome Edit up to [**] Human Genome Targets. For the avoidance of doubt, each Genome Editing Construct (i) may, but shall not be required to, contain Guide RNAs (whether or not formulated with Acuitas LNP Technology) in any combination or combinations and (ii) will be defined by the specific combination of [**] and each different combination of the foregoing will be a different Genome Editing Construct (provided that each Genome Editing Construct may contain [**]).

1.26. "Genome Editing Protein Target" means a Protein Target that is intended to Genome Edit the Human Genome Target.

1.27. "GMP" means current good manufacture practices as defined under regulations promulgated by the U.S. Food and Drug Administration.

1.28. "Guide RNA" means a synthetic, short ribonucleic acid sequence composed of a scaffold sequence that binds to the Genome Editing Protein Target and a sequence complementary to the site on the Human Genome Target at which the Genome Editing Protein Target is intended to Genome Edit.

1.29. "Human Genome Target" means (a) a naturally occurring human gene, including all coding, non-coding and regulatory regions thereof, as identified by the applicable transcript identifier (i.e., NCBI Refseq transcript ID), gene identifier (i.e., NCBI Refseq Gene ID), gene name and synonyms and nucleotide sequence coordinates, gene transcript and nucleotide sequence; (b) any naturally occurring non-coding region of the human genome including, but not limited to, transcriptional regulatory elements, non-protein coding RNA and intergenic regions; and with respect to a gene covered by (a) or (b) above, any variants of such gene, including the wild type and naturally occurring mutant and allelic variants, provided, however, that any such variant (i) encodes a protein [**] to the protein product of the original (reference) gene and has a coding region with greater than [**] percent ([**]%) sequence identity to the coding region of the original (reference) gene. For clarity, a nucleotide sequence may be considered to encode a protein regardless of whether such sequence contains a start codon.

1.30. "Indemnification Claim Notice" has the meaning set forth in Section 9.6(c).

1.31. "Indemnified Party" has the meaning set forth in Section 9.6(c).

1.32. "Indemnifying Party" has the meaning set forth in Section 9.6(c).

1.33. "Insolvency Legislation" has the meaning set forth in Section 10.4.

1.34. "Joint IP" means the Joint IP as such term is defined in the Development and Option Agreement, including the Jointly Owned Patents.

1.35. "Jointly Owned Patents" means the Patents listed in **Appendix 1.35** hereto, as amended from time to time.

1.36. "Know-How" means all Materials and all confidential and proprietary commercial, technical, scientific and other know-how and information, trade secrets, knowledge, technology, methods, processes, practices, formulae, instructions, skills, techniques, procedures, experiences, ideas, technical assistance, designs, drawings, assembly procedures, computer programs, specifications, data and results (including biological, chemical, pharmacological, toxicological, pharmaceutical, physical and analytical, preclinical, clinical, safety, manufacturing and quality control data and know-how, including study designs and protocols), in all cases, provided such information is confidential and proprietary, and regardless of whether patentable, in written, electronic or any other form now known or hereafter developed.

1.37. "Know-How Royalties" has the meaning set forth in Section 4.4(a).

1.38. "Late Stage Development" means, with respect to a product, that first dosing under Phase 2 Studies has been initiated.

1.39. "Law" or "Laws" means all laws, statutes, rules, regulations, orders, judgments or ordinances having the effect of law of any federal, national, multinational, state, provincial, county, city or other political subdivision.

1.40. "License Agreement" has the meaning set forth in the Preamble.

1.41. "License Agreement Effective Date" has the meaning set forth in the Preamble.

1.42. "Licensed Genome Editing Construct" means a Genome Editing Construct consisting of one or more mRNA Constructs that each encode a Genome Editing Protein Target to Genome Edit either a single specific Licensed Genome Target or [**] Licensed Genome Targets. For the avoidance of doubt, each Licensed Genome Editing Construct may, but shall not be required to, contain up to [**] Guide RNAs (whether or not formulated with Acuitas LNP Technology) in any combination or combinations.

1.43. "Licensed Genome Target" means the maximum of [**] Human Genome Targets set forth in Appendix 1.44.

1.44. "Licensed Product" means any product that (a) consists of up to [**] Licensed Genome Editing Constructs including up to [**] specified Guide RNAs intended to Genome Edit up to [**] Licensed Genome Targets as specifically described in Appendix 1.44 and (b) is derived from, incorporates, or utilizes, any LNP Technology that is Controlled by Acuitas or its Affiliates as of the License Agreement Effective Date or at any time during the Term. For clarity, each Licensed Product will consist of a specific combination of Licensed Genome Editing Constructs ([**]) that target [**] Licensed Genome Target or [**] Licensed Genome Targets.

1.45. "Licensed Product Royalty Term" has the meaning set forth in Section 4.3(d).

1.46. "Licensed Technology" means LNP Technology Controlled by Acuitas or its Affiliates, as of the License Agreement Effective Date or generated or obtained during the Term (including the Acuitas Background Technology, Acuitas Sole Technology and Acuitas' interest in any Joint IP) necessary or useful for the research, development, manufacture, use or sale of a Licensed Product. The Patents comprised in the Licensed Technology as of the License Agreement Effective Date are listed - without limiting the generality of the definition above - in **Appendix 1.44** attached hereto.

1.47. "License Maintenance Fees" means the fees set forth in Section 4.1.

1.48. "LNP" means lipid nanoparticles.

1.49. "LNP Technology" means any Technology that claims, embodies or incorporates delivery systems (and components thereof) based on or incorporating LNPs.

1.50. "LNP Technology Patent(s)" means Patents comprised in the Licensed Technology, including any future Patent which will become part of the Licensed Technology during the Term and further including Acuitas' rights in the Jointly Owned Patents, unless otherwise set forth herein.

1.51. "Losses" has the meaning set forth in Section 9.6(a).

1.52. "Major Market Country" means each of [**].

1.53. "Marketing Authorization Approval" means, with respect to a country or extra-national territory, any and all approvals (including a Biologics License Application approved by the FDA), licenses, registrations or authorizations of any Regulatory Authority necessary in order to commercially distribute, sell or market a product in such country or some or all of such extra-national territory, including any pricing or reimbursement approvals.

1.54. "Materials" has the meaning set forth in the Development and Option Agreement.

1.55. "Milestone Event" has the meaning set forth in Section 4.3.

1.56. "Milestone Payment" has the meaning set forth in Section 4.3.

1.57. "Minimum Royalty" has the meaning set forth in Section 4.4(c).

1.58. "mRNA Construct" means any mRNA that encodes a Genome Editing Protein Target and any associated non-coding sequences, including any cap sequence, 5' UTR, 3'UTR, and any polyadenylation sequences. The term "mRNA Construct" also includes the chemistry of natural and non-natural nucleic acids, and other chemical modifications associated with such mRNA and associated non-coding sequences.

1.59. "Net Sales" means, with respect to any Licensed Product, the amount received by Verve and its Affiliates and/or Sublicensees for bona fide sales of such Licensed Product to a Third-Party (other than Affiliates and Sublicensees but including distributors for resale), less:

(a) discounts (including mandated, trade, cash, quantity, prompt pay and patient program discounts), retroactive price reductions, commissions, charge-back payments and rebates granted to managed health care organizations or to federal, state and local governments, their agencies, pharmacy benefit managers, and purchasers and reimbursers or to trade customers;

(b) credits or allowances actually granted upon claims, damaged or defective goods, refunds, rejections or returns of, and for uncollectable amounts on, such Licensed Product, including such Licensed Product returned in connection with recalls or withdrawals;

(c) freight, postage, shipping, handling and insurance charges for delivery of such Licensed Product;

(d) taxes or duties levied on, absorbed or otherwise imposed on the sale of such Licensed Product, including value-added taxes, or other governmental charges otherwise imposed upon the billed amount, as adjusted for rebates and refunds;

(e) any invoiced amounts from a prior period which are not collected and are written off by Verve, its Affiliates or its or their Sublicensees, including bad debts;

(f) wholesaler and distributor administration fees and other reasonable fees paid to selling agents, group purchasing organizations, Third-Party payors, other contractees and managed care entities, in each case with respect to such Licensed Product; and

(g) other customary deductions taken in the ordinary course of business in accordance with GAAP.

Net Sales shall not include any payments among Verve, its Affiliates and Sublicensees. Net Sales shall be determined in accordance with GAAP, consistently applied.

Net Sales for any Combination Product shall be calculated on a country-by-country basis by multiplying actual Net Sales of such Combination Product by the fraction A/(A+B), where A is the weighted average price paid for the Licensed Product contained in such Combination Product sold separately in finished form in such country, and B is the weighted average invoice price paid for the other active ingredients contained in such Combination Product sold separately in finished form in such country, if such Licensed Product and such other active ingredients are each sold separately in such country.

Net Sales of the Licensed Product for any Combination Product if the Licensed Product or other active ingredients in such Combination Product are not sold separately in such country, shall be calculated by multiplying the Net Sales of the Combination Product by a fraction, the numerator of which shall be the fair market value of the Licensed Product as if sold separately (in accordance with GAAP), and the denominator of which shall be the aggregate fair market value of all the other active ingredients of such Combination Product, including the Licensed Product, as if sold separately. The fair market value of each component of a Combination Product will be a determined by a Third-Party expert selected by Verve and reasonably acceptable to Acuitas.

1.60. "Option Exercise Fee" has the meaning set forth in the Development and Option Agreement.

1.61. "Party" and "Parties" has the meaning set forth in the Preamble.

1.62. "Patent(s)" means an (a) issued patent, a patent application, and a future patent issued from any such patent application, (b) a future patent issued from a patent application filed in any country worldwide which claims priority from a patent or patent application included in (a), (c) any additions, divisions, continuations, continuations-in-part, invention certificates, substitutions, reissues, reexaminations, extensions, registrations, utility models, supplementary protection certificates and renewals based on any patent or patent application under (a) or (b), but not including any rights that give rise to regulatory exclusivity periods (other than supplementary protection certificates, which will be treated as "Patents" hereunder), and (d) any counterpart of any patent or patent application under (a), (b) or (c) filed in any country worldwide.

1.63. "Patent Costs" means the reasonable, documented, out-of-pocket costs and expenses paid to outside legal counsel, and filing and maintenance expenses, actually and reasonably incurred by a Party in prosecuting and maintaining Patents.

1.64. "Patent Royalties" has the meaning set forth in Section 4.4(a).

1.65. "Phase 1 Study" means a human clinical trial of a Licensed Product in any country, the primary purpose of which is the determination of safety and which may include the determination of metabolism and pharmacologic actions of the Licensed Product in humans, the side effects associated with increasing doses, and, if possible, to gain early evidence on effectiveness, as more fully defined in 21 C.F.R. §312.21(a) or its successor regulation, or the equivalent in any foreign country.

1.66. "Phase 2 Study" means a human clinical trial of a Licensed Product in any country, the primary purpose of which is to evaluate the effectiveness of the Licensed Product for a particular indication or indications in patients with the disease or condition under study and to determine the common short-term side effects and risks associated with the Licensed Product, as more fully defined in 21 C.F.R. §312.21(b) or its successor regulation, or the equivalent in any foreign country.

1.67. "Phase 3 Study" means a human clinical trial of a Licensed Product in any country, the primary purpose of which is to gather the additional information about effectiveness and safety that is needed to evaluate the overall benefit-risk relationship of the Licensed Product and to provide an adequate basis for physician labeling, as more fully defined in 21 C.F.R. §312.21(c) or its successor regulation, or the equivalent in any foreign country.

1.68. "Protein Target" means either (a) any naturally occurring protein encoded by a specific gene locus, as identified by the applicable transcript identifier (i.e., NCBI Refseq transcript ID), gene identifier (i.e., NCBI Refseq Gene ID), gene name and synonyms and DNA sequence coordinates, together with all variants of such protein, including the wild type, naturally occurring variants, engineered variants wherein modifications to the native amino acid sequence have been introduced (for example, mutated versions, derivatives or fragments), and species homologs and orthologs thereof, provided however that any such naturally occurring variant, engineered variant, or species homolog or ortholog possesses a substantially similar mechanism of action and biological activity to the naturally occurring human protein (for example immunogenicity in case of antigens); or (b) any protein that is not covered by subclause (a) above (together with any variants, mutated versions, derivatives or fragments of such protein, provided that any such variant, mutated version, derivative or fragment possesses substantially similar mechanism of action and biological activity as such protein) and has greater than [**] percent ([**]%) sequence identity to the reference amino acid sequence in subclause (b). For clarity, in the case of a Genome Editing Protein Target, substantially similar mechanism of action and biological activity means that any variants, mutated versions, derivatives or fragments of such protein Genome Edit the same Human Genome Target at the same site.

1.69. "Receiving Party" has the meaning set forth in Section 8.1.

1.70. "Regulatory Authority" means any national (e.g., the United States Food and Drug Administration ("FDA")), supra-national (e.g., the European Medicines Agency), regional, state or local regulatory agency, department, bureau, commission, council or other governmental authority, in any jurisdiction in the world, involved in the granting of Marketing Authorization Approval.

1.71. "Regulatory Exclusivity" means with respect to any country or other jurisdiction in the Territory, an additional market protection, other than Patent protection, granted by a Regulatory Authority in such country or other jurisdiction which confers an exclusive commercialization period during which Verve or its Affiliates or Sublicensees have the exclusive right to market and sell a Licensed Product in such country or other jurisdiction through a regulatory exclusivity right (e.g., new chemical entity exclusivity, new use or indication exclusivity, new formulation exclusivity, orphan drug exclusivity, pediatric exclusivity, or any applicable data exclusivity).

1.72. "Royalties" has the meaning set forth in Section 4.4(a).

1.73. "Royalty Term" has the meaning set forth in Section 4.3(d).

1.74. "Solely Owned Technology" has the meaning set forth in Article 5.

1.75. "Sublicensee" means any Third-Party that is granted a sublicense as permitted by Section 2.3, either directly by Verve or its Affiliates or indirectly by any other Sublicensee hereunder.

1.76. "Targets" means, collectively, a Genome Editing Protein Target, a Guide RNA, and a Human Genome Target, as the case may be, each, as identified in the appropriate nomination form and Appendix 1.44.

1.77. "Technology" means collectively Patents and Know-How.

1.78. "Technology Transfer" has the meaning set forth in Section 2.3(a).

1.79. "Technology Transfer Plan" has the meaning set forth in Section 2.3(a).

1.80. "Term" has the meaning set forth in Section 10.1.

1.81. "Territory" means worldwide.

1.82. "Third-Party" means any person or entity other than Verve, Acuitas and their respective Affiliates.

1.83. "Third-Party Claims" has the meaning set forth in Section 9.6(a).

1.84. "Third-Party Royalty Payments" has the meaning set forth in Section 4.4(b).

1.85. "Transferred Technology" has the meaning set forth in Section 2.3(a).

1.86. "Valid Claim" means a claim of (a) an issued patent included in the Licensed Technology (other than the Jointly Owned Patents) which has not expired or been abandoned and which has not been disclaimed, canceled, revoked or held invalid or unenforceable by a court or administrative agency of competent jurisdiction from which no further appeal is possible and that is not admitted to be invalid or unenforceable through reissue, disclaimer or otherwise, or (b) a pending patent application included in the Licensed Technology (other than the Jointly Owned

Patents) which claim is being actively prosecuted and which has not been (i) canceled, (ii) withdrawn from consideration, (iii) finally determined to be unallowable by the applicable governmental authority (and from which no appeal is or can be taken), (iv) abandoned, or (v) pending for more than [**] from the date of filing of such patent application.

1.87. "Verve Indemnitees" has the meaning set forth in Section 9.6(b).

1.88. "Workplan Leaders" has the meaning set forth in the Development and Option Agreement.

ARTICLE 2

License Grants; Technology Transfer

2.1 Licenses by Acuitas.

(a) License. Subject to the terms and conditions of this License Agreement, Acuitas hereby grants to Verve a non-exclusive license, with the right to sublicense only as permitted by Section 2.2(b), under the Licensed Technology, to research, develop, have developed, make, have made, keep, use and have used, sell, offer for sale, have sold, import and have imported, export and have exported and otherwise commercialize and exploit Licensed Products in the Field of Use in the Territory.

(b) Diligence. Verve will use Diligent Efforts to develop and commercialize Licensed Products pursuant to this Agreement.

2.2 Sublicensing Rights.

(a) Transfer. The licenses granted in Section 2.1 are transferable only upon a permitted assignment of this License Agreement in accordance with Section 11.11.

(b) Verve Sublicenses. The licenses granted in Section 2.1 may be sublicensed (with the right to sublicense through multiple tiers), in full or in part, by Verve, its Affiliates or Sublicensees to Verve's Affiliates and Third Parties, provided, that for any sublicense to Third Parties:

(i) Each sublicense will be in writing and on terms consistent with and subject to the terms of this License Agreement;

(ii) Verve will provide Acuitas with a copy of any sublicense agreement with a Sublicensee within [**] of execution thereof, which sublicense agreement may be redacted as necessary to protect commercially sensitive information and shall be treated as Verve Confidential Information hereunder;

(iii) Verve will be responsible for any and all obligations of such Sublicensee as if such Sublicensee were Verve hereunder; and

(iv) Any sublicense granted by Verve to any rights licensed to it hereunder shall terminate immediately upon the termination of the license from Acuitas to Verve and its Affiliates with respect to such rights, provided that such sublicensed rights shall not terminate if, as of the effective date of such termination pursuant to Sections 10.2, 10.3(a) or 10.4, a Sublicensee is not in material default of its obligations under its sublicense agreement, and within [**] of such termination, the Sublicensee agrees in writing to be bound directly to Acuitas under a license agreement substantially similar to this License Agreement with respect to the rights sublicensed hereunder, substituting such Sublicensee for Verve.

(c) Subcontractors. For clarity purposes, Verve is entitled to engage contract research organizations, contract manufacturing organizations and other service providers for the development and manufacture of Licensed Products on behalf of Verve. To the extent such contract organizations and service providers require a license to perform such subcontracted activities under applicable Laws, Verve is entitled to grant a limited research and/or manufacturing sublicense (as applicable) without an obligation to meet the conditions of Section 2.3(b)(ii) and (iv).

2.3 Technology Transfer.

(a) Technology Transfer. After the License Agreement Effective Date and promptly upon written request by Verve (and in any event within [**] following designation of the applicable CMO (as defined below), provided such CMO is able to support this timeline), Acuitas will transfer the relevant formulation process, raw materials supply and analytical characterization for the manufacture of Licensed Product (the "Transferred Technology"), to Verve or a GMP contract manufacturing organization ("CMO")) designated by Verve and subject to Acuitas' prior written consent in accordance with the Development and Option Agreement (the "Technology Transfer") pursuant to a mutually agreed plan (the "Technology Transfer Plan"). Acuitas will provide reasonable assistance to enable such CMO to manufacture such Licensed Product. Initiation of such technology transfer will be determined by Verve and will be for the then current formulation of the Licensed Product. Specifically, in the event that Additional Development Studies for a Licensed Product (as defined in the Development and Option Agreement) are undertaken, Verve will notify Acuitas once a formulation is selected for technology transfer. Acuitas will be reimbursed for such activities by Verve on an FTE basis and Verve will also be responsible for all external costs incurred by Acuitas relating to transfer of the Licensed Product formulation to such CMO provided such costs have been approved by Verve in advance. For clarity, Acuitas' Technology Transfer obligations under this Section 2.3(a) shall be limited to LNP formulations previously tested by Verve in accordance with the Workplan (as defined in the Development and Option Agreement). Once a Licensed Product formulation is transferred to such CMO, Verve will assume responsibilities for future manufacturing of Licensed Product. Acuitas will provide reasonably requested ongoing technical support if requested by Verve with such support reimbursed on a time, materials and FTE basis.

(b) Activities. Acuitas shall in particular:

(i) transfer to Verve or the CMO all documents relating to Licensed Technology necessary or useful for the manufacture of Licensed Products, including documents relating to the Transferred Technology, and which are owned by Acuitas. In the event such documents are transferred to a CMO, Verve will also be copied;

(ii) allow Verve to monitor the progress of the transfer and to confirm whether the transfer has been successfully completed;

(iii) provide training to Verve or the CMO by fully qualified and experienced employees or contractors of Acuitas in respect of the manufacture of Licensed Products. Unless otherwise agreed, the training will be provided at Verve or the CMO's site. For purposes of the training, Acuitas shall make available at least [**] experienced and competent Acuitas FTEs, the specific qualification of the Acuitas FTEs and the details of the training to be further described in the Technology Transfer Plan; and

(iv) provide ongoing technical support in relation to the Transferred Technology to Verve or the CMO, as reasonably requested by Verve from time to time.

(c) Diligence. Acuitas shall perform the Technology Transfer in a professional manner and in accordance with the Technology Transfer Plan and use Diligent Efforts to meet the objectives and timelines set forth therein. Acuitas shall ensure that Verve or the CMO is trained and empowered to perform the manufacturing. It is understood that successful Technology Transfer cannot be guaranteed and Acuitas will not be found not to have used Diligent Efforts based on the failure by Verve or the CMO to achieve any particular result, unless Acuitas contributed to or caused such failure.

(d) Intellectual Property. Any intellectual property generated during the Technology Transfer shall be governed by the intellectual property provisions of the Development and Option Agreement.

(e) Payment. Verve will reimburse Acuitas on a Calendar Quarter-by-Calendar Quarter basis for (i) FTE Costs based on the number of hours worked by Acuitas' FTEs, and (ii) any reasonable external costs approved by Verve in advance that are incurred by Acuitas, in each case in the performance of the agreed technology transfer activities for the Technology Transfer. Acuitas will send a reasonably detailed invoice to Verve no later than [**] after the end of each Calendar Quarter, which invoice shall include a summary of all activities by the name of each individual, number of hours devoted by each such individual, and the type/activity performed by each such individual during such Calendar Quarter, and all external costs incurred by Acuitas during such Calendar Quarter. Verve agrees to pay undisputed amounts in each such invoice within [**] of Verve's receipt thereof.

(f) Right of Reference. Acuitas hereby grants Verve and its Sublicensees a "right of reference," as that term is defined in 21 C.F.R. § 314.3(b), or a comparable right existing under the Laws of any other jurisdiction, to any regulatory filings owned or otherwise controlled by Acuitas or its Affiliates relating to the Transferred Technology to the extent necessary or useful necessary to obtain Marketing Authorization Approval or otherwise make regulatory filings for Licensed Products in the Field of Use in the Territory, and, upon request, shall promptly provide a signed statement to such effect in accordance with 21 C.F.R. §314.50(g)(3) or the Laws of any other jurisdiction.

2.4 Updates to Appendix 1.44. Acuitas shall notify Verve at least [**] of Patents that are added to the Licensed Technology following the License Agreement Effective Date or any Patents that are no longer Licensed Technology because they have been abandoned or discontinued in accordance with the terms of Section 6.2. **Appendix 1.44** shall be automatically updated to include any such added or deleted Patents.

ARTICLE 3

License Limitations

No licenses or other rights are granted by Acuitas hereunder to use any trademark, trade name, trade dress or service mark owned or otherwise Controlled by Acuitas or any of its Affiliates. All licenses and other rights are or shall be granted only as expressly provided in this License Agreement, and no other licenses or other rights are or shall be created or granted by either Party hereunder by implication, estoppel or otherwise.

ARTICLE 4

Payments and Royalties

4.1 License Maintenance Fees. A license maintenance fee of Seven Hundred and Fifty Thousand Dollars (US$750,000) will be payable on each anniversary of the License Agreement Effective Date until such time as the Milestone Payment for first dosing of the first patient in the first Phase 1 Study for a Licensed Product anywhere in the Territory is paid. In the year in which first dosing of the first patient in the first Phase 1 Study for a Licensed Product anywhere in the Territory Initiation is achieved, Acuitas will credit the License Maintenance Fee for that year on a pro rata basis against the Milestone Payment for such Milestone Event. For clarity, this pro rata credit will be for the remaining months in the year to which the License Maintenance Fee applies.

4.2 Milestone Payments. Verve will make milestone payments (each, a "Milestone Payment") to Acuitas upon the first occurrence of each of the milestone events (each, a "Milestone Event") by Verve or its Affiliates with respect to the Licensed Product as set forth below in TABLE 4.2. Verve will notify Acuitas of the achievement of each Milestone Event within [**] of such achievement. Each Milestone Payment will be payable to Acuitas by Verve within [**] of the achievement of the specified Milestone Event and such payments when owed or paid will be non-refundable and non-creditable. If one or more of the Milestone Events set forth below are not achieved with respect to the Licensed Product for any reason, the payment for such skipped Milestone Event will be due at the same time as the payment for the next achieved Milestone Event for the Licensed Product. For clarity, each Milestone Payment is payable a maximum of one (1) time only, and the maximum aggregate Milestone Payments under this Agreement is Nineteen Million Two Hundred Fifty Thousand Dollars (US$19,250,000).

TABLE 4.2– Milestone Events

Milestone Event	***Milestone Payment***
[**]	[**] Dollars (US$[**])
[**]	[**] Dollars (US$[**])
[**]	[**] Dollars (US$[**])
[**]	[**] Dollars (US$[**])
[**]	[**] Dollars (US$[**])
First achievement of aggregate Net Sales of Licensed Products in a calendar year in the Territory are equal to or greater than [**] Dollars (US$[**])	[**] Dollars (US$[**])

4.3 Royalties.

(a) Royalties. Subject to the Royalty Term, Verve will pay to Acuitas a royalty equal to [**] percent ([**]%) of Net Sales on annual Net Sales of all Licensed Products sold by Verve, its Affiliates, or Sublicensees in the Territory for which, but for the license granted to Verve hereunder, the manufacture or sale of such Licensed Product would infringe a Valid Claim of an LNP Technology Patent in such country ("Patent Royalties"). If, at any time during the Royalty Term, the manufacture or sale of a Licensed Product in a particular country would not infringe a Valid Claim of an LNP Technology Patent, then the Royalty rate used to calculate royalty payments on Net Sales of such Licensed Product in such country shall be the Minimum Royalty ("Know-How Royalties," and together with the Patent Royalties, the "Royalties").

(b) Third-Party Royalty Payments. If Verve or its Affiliate or Sublicensee considers it necessary or useful to obtain a license from any Third-Party under Technology relating to LNP Technology in order to develop, manufacture or commercialize a Licensed Product, the amount of Verve's Royalty obligations under Section 4.4(a) will be reduced by [**] percent ([**]%) of the amount of the royalty payments made to such Third-Party ("Third-Party Royalty Payments"), provided, however, that such reduction shall not result in less than the Minimum Royalty.

(c) Minimum Royalty. In no event will the Royalty payable by Verve to Acuitas for any Licensed Product and without regard to any Royalty reductions under subparagraph (a) and/or (b) above, be less than the Royalty payable using a royalty rate of [**] percent ([**]%) (the "Minimum Royalty").

(d) Royalty Term. The Royalty term ("Royalty Term") shall be determined on a country-by-country and Licensed Product-by-Licensed Product basis and shall commence on the First Commercial Sale of a Licensed Product in such country and shall expire on the last to occur of (i) the expiration of the last to expire Valid Claim in the Licensed Technology that Covers the Licensed Product in such country, (ii) the expiration of any period of Regulatory Exclusivity, if any, for the Licensed Product in such country, and (iii) ten (10) years from the First Commercial Sale of Licensed Product in such country (the "Licensed Product Royalty Term"). Thereafter, Verve's license under Section 2.1 will become irrevocable, fully paid-up and royalty-free on a country-by-country and Licensed Product-by-Licensed Product basis.

(e) Blended Royalty. The Parties acknowledge and agree that the Licensed Technology licensed under this License Agreement may justify Royalty rates and/or Royalty Terms of differing amounts for the sale of Licensed Products in the Territory, depending on the number of LNP Technology Patents and their respective expiry. The Parties have determined in light of such considerations and for reasons of mutual convenience that blended Royalty rates for the Licensed Technology licensed hereunder will apply during a single Royalty Term for sales of a Licensed Product in the Territory. Consequently, the Parties have agreed to adopt the Royalty rates set forth in this Section 4.4 with respect to the sales of Licensed Products in the Territory as blended Royalty rates. For the avoidance of doubt, Verve's obligation to pay Royalties under this Section 4.4 is imposed only once at the applicable Royalty rate set forth in this Section 4.3 with respect to the same unit of Licensed Product, notwithstanding that such Licensed Product may be Covered by more than one Valid Claim of an LNP Technology Patent.

4.4 Payment Terms.

(a) Manner of Payment; Invoices. All amounts specified in this License Agreement are in U.S. dollars and all payments to be made by Verve hereunder will be made in U.S. dollars by wire transfer to such bank account as Acuitas may designate. All invoices to be delivered to Verve hereunder shall be delivered in accordance with Section 11.12 or in such other manner specified by Verve from time to time.

(b) Records and Audits. Verve shall keep, and shall cause each of its Affiliates and Sublicensees, as applicable, to keep adequate books and records of accounting for the purpose of calculating all Royalties payable to Acuitas hereunder. For the [**] next following the end of the calendar year to which each shall pertain, such books and records of accounting of Verve (including those of Verve's Affiliates) shall be kept at each of their principal places of business and shall be open for inspection at reasonable times and upon reasonable notice by an independent certified accountant selected by Acuitas, and which is reasonably acceptable to Verve, for the sole purpose of inspecting the Royalties due to Acuitas under this License Agreement. In no event shall such inspections be conducted hereunder more frequently than [**] or more than [**] for the same time period. Such accountant must have executed and delivered to Verve and its Affiliates a confidentiality agreement as reasonably requested by Verve, which shall include provisions limiting such accountant's disclosure to Acuitas to only the results and basis for such results of such inspection. The results of such inspection, if any, shall be binding on both Parties absent manifest error. Any underpayments shall be paid by Verve within [**] of notification of the results of such inspection. Any overpayments shall be fully creditable against amounts payable in

subsequent payment periods, or, upon the request of Verve, paid by Acuitas to Verve within [**] of notification of the results of such inspection. Acuitas shall pay for such inspections, except that in the event there is any upward adjustment in aggregate Royalties payable for any calendar year shown by such inspection of more than [**] percent ([**]%) of the amount paid, in which case Verve shall reimburse Acuitas for any reasonable out-of-pocket costs of such accountant.

(c) Reports and Royalty Payments. For as long as Royalties are due under Section 4.4, Verve shall furnish to Acuitas a written report for each Calendar Quarter, showing the amount of Net Sales of Licensed Products and Royalties due for such Calendar Quarter. Reports shall be provided within [**] of the end of the Calendar Quarter for Net Sales generated by Verve and its Affiliates, and within [**] of the end of the Calendar Quarter for Net Sales generated by Sublicensees. Royalty payments for each Calendar Quarter shall be due at the same time as the last such written report for the Calendar Quarter. The report shall include, at a minimum, the following information for the applicable Calendar Quarter, each listed by Licensed Product and by country of sale: (i) the number of units of Licensed Products sold by Verve and its Affiliates and Sublicensees on which Royalties are owed to Acuitas hereunder; (ii) the gross amount received for such sales; (iii) Net Sales; (iv) the amounts of any credits or reductions permitted by Section 4.4; and (v) the computations for any Acuitas currency conversions pursuant to subsection (d) below. Verve will require each Sublicensee to share with Verve the information listed in the foregoing clauses as it relates to Net Sales made by such Sublicensee, and to the extent practicable, will include such Sublicensee information in such report. All such reports shall be treated as Confidential Information of Verve.

(d) Currency Exchange. With respect to Net Sales invoiced in U.S. dollars, the Net Sales and the amounts due to Acuitas hereunder will be expressed in U.S. dollars. With respect to Net Sales invoiced in a currency other than U.S. dollars, payments will be calculated based on standard methodologies employed by Verve or its Affiliates or Sublicensees for consolidation purposes for the Calendar Quarter for which remittance is made for Royalties.

(e) Taxes. Verve may withhold from payments due to Acuitas amounts for payment of any withholding tax that is required by Law to be paid to any taxing authority with respect to such payments. Verve will provide Acuitas all relevant documents and correspondence and will also provide to Acuitas any other cooperation or assistance on a reasonable basis as may be necessary to enable Acuitas to claim exemption from such withholding taxes and to receive a refund of such withholding tax or claim a foreign tax credit. Verve will give proper evidence from time to time as to the payment of any such tax. The Parties will cooperate with each other in seeking deductions under any double taxation or other similar treaty or agreement from time to time in force. Such cooperation may include Verve making payments from a single source in the U.S., where possible. Apart from any such permitted withholding and those deductions expressly included in the definition of Net Sales, the amounts payable by Verve to Acuitas hereunder will not be reduced on account of any taxes, charges, duties or other levies.

(f) Blocked Payments. In the event that, by reason of applicable Law in any country, it becomes impossible or illegal for Verve or its Affiliates or Sublicensees to transfer, or have transferred on its behalf, payments owed to Acuitas hereunder, Verve will promptly notify Acuitas of the conditions preventing such transfer and such payments will be deposited in local

currency in the relevant country to the credit of Acuitas in a recognized banking institution designated by Acuitas or, if none is designated by Acuitas within a period of [**], in a recognized banking institution selected by Verve or its Affiliate or Sublicensee, as the case may be, and identified in a written notice given to Acuitas.

(g) Interest Due. If any payment due to Acuitas under this License Agreement is overdue (and is not subject to a good faith dispute), then Verve will pay interest thereon (before and after any judgment) at an annual rate of the lesser of [**] percent ([**]%) above the prime rate as reported in The Wall Street Journal, Eastern Edition, and the maximum rate permitted by applicable Law, such interest to run from the date upon which payment of such sum became due until payment thereof in full together with such interest.

(h) Mutual Convenience of the Parties. The Royalty and other payment obligations set forth hereunder have been agreed to by the Parties for the purpose of reflecting and advancing their mutual convenience, including the ease of calculating and paying Royalties and other amounts to Acuitas.

ARTICLE 5

Ownership and Inventorship of IP

As between the Parties, and except as set forth in Section 2.3(d), each Party will own and retain all right, title and interest in and to any and all Know-How and Patents arising therefrom that are discovered, created, conceived, developed or reduced to practice solely by or on behalf of such Party under or in connection with this License Agreement ("Solely Owned Technology"). For clarity, in the event that Verve elects to undertake Additional Development Studies for a Licensed Product, ownership of Technology arising under such studies will be determined in accordance with the provisions of the Development and Option Agreement as applied to studies conducted under the Workplan. Subject to the licenses hereunder and the other terms and conditions of this License Agreement or any other agreement between the Parties, each Party will be solely responsible for the prosecution and maintenance, and the enforcement and defense, of any Patents within its Solely Owned Technology.

ARTICLE 6

Patent Prosecution and Maintenance

6.1 Generally. As between the Parties and subject to Section 6.2 below, Acuitas will have the sole right, at its sole cost, to prosecute and maintain LNP Technology Patents. The Parties will enter into a joint patent prosecution and maintenance agreement with respect to the Jointly Owned Patents, as further provided in the Development and Option Agreement.

6.2 Election Not to Prosecute or Maintain or Pay Patent Costs. If Acuitas elects not (i) to file, prosecute or maintain any LNP Technology Patents for which it is responsible under Section 6.1 in any particular country before the applicable filing deadline or continue such activities once filed in a particular country, or (ii) to pay the Patent Costs associated with prosecution or maintenance of any such LNP Technology Patents, then in each such case Acuitas

will so notify Verve, promptly in writing and in good time to enable Acuitas to meet any deadlines by which an action must be taken to preserve such LNP Technology Patent in such country, if Verve so requests. Upon receipt of each such notice by Acuitas, Verve will have the right, but not the obligation, to notify Acuitas in writing on a timely basis that Acuitas should continue the prosecution and/or maintenance of such LNP Technology Patent in the respective country, and thereafter, (a) Acuitas would prosecute and maintain such LNP Technology Patent in such country at the direction and expense of Verve and any other Acuitas Third-Party licensee of such LNP Technology Patent so electing (on a pro rata basis), (b) Acuitas would make available to Verve all documentation and correspondence with respect to such LNP Technology Patent, and (c) Verve's license to such LNP Technology Patent under Section 2.1 will automatically become irrevocable, perpetual, fully paid-up and royalty free but such LNP Technology Patent will thereafter no longer be part of the Licensed Technology in such country for all other purposes of this License Agreement (e.g., such LNP Technology Patent will not be considered for purposes of determining whether a Valid Claim exists in a particular country). Verve is entitled to discontinue the payment of Patent Costs for any LNP Technology Patents at any time, provided that it will so notify Acuitas in writing in time for such discontinuance.

6.3 Regulatory Exclusivity Periods. With respect to any Patent term extension, supplemental protection certificate or any other Patent listing or extension with respect to any LNP Technology Patent Covering a Licensed Product, the Parties will discuss and seek to reach mutual agreement, subject to applicable Law, on which LNP Technology Patents will be subject to such action, and once such agreement is reached, Acuitas will cooperate with such action. Except where required under applicable Law, without the written consent of Verve, Acuitas will not apply for, and is not authorized under this License Agreement to apply for, any Patent term extension, supplemental protection certificate or any other Patent listing or extension required for any regulatory exclusivity periods for any Licensed Product. For the avoidance of doubt, Acuitas is not restricted from applying for any Patent term extension, supplemental protection certificate or any other Patent listing or extension required for any regulatory exclusivity periods for any product but the Licensed Products.

6.4 Patent Listings. Verve shall have the sole right, in its sole discretion, to make all filings with Regulatory Authorities in the Territory for the Licensed Products in the FDA's Orange Book or Purple Book or in response to a biosimilar application under Section 351(k) of the Public Health Service Act, and under any similar or equivalent Laws in other countries or jurisdictions.

6.5 Cooperation. Each Party will reasonably cooperate with the other Party in those activities involving the LNP Technology Patents set forth in Sections 6.1 to 6.4. Such cooperation includes promptly executing all documents, or requiring inventors, subcontractors, employees and consultants and agents of Verve and Acuitas and their respective Affiliates and Sublicensees to execute all documents, as reasonable and appropriate so as to enable such activities in respect of any such LNP Technology Patents in any country.

ARTICLE 7

Patent Enforcement and Defense

7.1 Notice. To the extent not in breach of an obligation of confidentiality, each Party will promptly notify, in writing, the other Party upon learning of any actual or suspected infringement of any LNP Technology Patents by a Third-Party, or of any claim of invalidity, unenforceability, or non-infringement of any LNP Technology Patents, and will, along with such notice, supply the other Party with any evidence in its possession pertaining thereto.

7.2 Enforcement and Defense.

(a) Enforcement.

(i) As between the Parties, Acuitas will have the first right, but not the obligation, at its sole cost to seek to abate any infringement of the LNP Technology Patents other than the Jointly Owned Patents (the "Acuitas Patents") by a Third-Party, or to file suit against any such Third-Party for such infringement. If Acuitas elects not to exercise its first right to take action or to bring suit to prosecute such infringement or to continue such action or suit, it shall notify Verve in writing of such election within [**] after becoming aware of or receipt of the notice of the infringement or within [**] after the election to stop any such action or suit, as applicable. If after the expiration of the [**] period (or, if earlier, the date upon which Acuitas provides written notice that it does not plan to bring such action), Acuitas has neither obtained a discontinuance of infringement nor filed suit against any such Third-Party infringer of such Patent, or in the case of an election by Acuitas not to continue to prosecute an infringement of an Acuitas Patent, Verve shall have the right, but not the obligation, to take action or bring suit against such Third-Party infringer of Acuitas Patents to the extent the Acuitas Patents are necessary or useful for the research, development, manufacturing and commercialization of the Licensed Product but not necessary or useful for the research, development, manufacturing or commercialization of any other LNP comprising product covered by such Acuitas Patent that is licensed or optioned by Acuitas to a Third-Party or is under Late Stage Development by Acuitas, provided that Verve shall bear all of the expense of such abatement action or suit.

(ii) As between the Parties, Acuitas will have the right, but not the obligation, at its sole cost to seek to abate any infringement of the Jointly Owned Patents by a Third-Party, or to file suit against any such Third-Party for such infringement, if such infringement is with respect to the LNP Technology. As between the Parties, Verve will have the right, but not the obligation, at its sole cost to seek to abate any infringement of the Jointly Owned Patents by a Third-Party, or to file suit against any such Third-Party for such infringement, if such infringement is with respect to the Licensed Product.

(iii) Except as expressly provided under Section 7.2(a)(ii), neither Party shall seek to abate any infringement of the Jointly Owned Patents by a Third-Party, or file suit against any such Third-Party for such infringement, without the prior written consent of the other Party. For clarity, Verve shall have the sole right to enforce any Patents owned or controlled by Verve other than the LNP Technology Patents.

(b) Defense.

(i) As between the Parties, Acuitas will have the first right, but not the obligation, at its sole cost, to defend against a declaratory judgment action or other action to the extent challenging the validity or enforceability of any Acuitas Patent. Verve will have the right but not the obligation, at its sole cost, to defend against any other declaratory judgment action or other action challenging any Acuitas Patent that, on the date of first notice of such action, are not necessary or useful for the research, development, manufacturing and commercialization of any lipid nanoparticle comprising product that is licensed or optioned by Acuitas to a Third-Party or is under Late Stage Development by Acuitas. If Acuitas does not take steps to defend within a commercially reasonable time, or elects not to continue any such defense (in which case it will promptly provide notice thereof to Verve), then Verve shall have the right, but not the obligation, to defend any Acuitas Patents that cover a Licensed Product and no other product licensed or optioned by Acuitas to a Third-Party or commercialized by Acuitas provided that Verve shall bear all the expenses of such suit. If a Third-Party files a declaratory judgment or other action challenging any Jointly Owned Patent, the Parties shall reasonably cooperate in good faith to determine each Party's responsibility with respect to the defense of such declaratory judgment or other action.

(ii) In the event that any action, suit or proceeding is brought against either Party or an Affiliate of either Party, or a Sublicensee of Verve or its Affiliates, alleging the infringement of the Patents or Know-How of a Third-Party by the research, development, manufacture, use, sale, import, export, commercialization or exploitation of a Licensed Product, such Party shall promptly notify the other Party within [**] of the earlier of (x) receipt of service of process in such action, suit or proceeding, or (y) the date such Party becomes aware that such action, suit or proceeding has been instituted. Except as set forth in subsection (a) above of this License Agreement, Verve shall have the right, but not the obligation, to defend such action, suit or proceeding in the Territory at its sole cost. For clarity, Verve shall have the sole right to defend any Patents owned or controlled by Verve other than the LNP Technology Patents.

(c) Response to Infringement Claims. Notwithstanding the foregoing, any response to a Third-Party infringer's counterclaim of invalidity or unenforceability of any LNP Technology Patents shall be controlled by the Party who controls the relevant enforcement proceeding pursuant to Section 7.2(a) unless otherwise mutually agreed by the Parties.

(d) Withdrawal, Cooperation and Participation. With respect to any infringement or defensive action identified above in this Section 7.2 which may be controlled by either Verve or Acuitas:

(i) The non-controlling Party will cooperate with the Party controlling any such action (as may be reasonably requested by the controlling Party), including by (A) providing access to relevant documents and other evidence, (B) making its and its Affiliates and Sublicensees and all of their respective employees, subcontractors, consultants and agents available at reasonable business hours and for reasonable periods of time, but only to the extent relevant to such action, and (C) if necessary, being joined as a party, subject for this clause (C) to the controlling Party agreeing to indemnify such

non-controlling Party for its involvement as a named party in such action and paying those Losses incurred by such Party in connection with such joinder. The Party controlling any such action will keep the other Party updated with respect to any such action, including providing copies of all documents received or filed in connection with any such action.

(ii) Each Party will have the right to participate or otherwise be involved in any such action controlled by the other Party, in each case at the participating (i.e., non-controlling) Party's sole cost and expense. If a Party elects to so participate or be involved, the controlling Party will provide the participating Party and its counsel with an opportunity to consult with the controlling Party and its counsel regarding the prosecution of such action (including reviewing the contents of any correspondence, legal papers or other documents related thereto), and the controlling Party will take into account reasonable requests of the participating Party regarding such enforcement or defense. The foregoing shall not apply to any defensive actions described in Section 7.2(b)(ii) that do not involve claims specifically relating to an LNP Technology Patent.

(e) Settlement. Neither Party will settle or consent to an adverse judgment in any action described in this Section 7.2 and controlled by such Party, including any judgment which affects the scope, validity or enforcement of any LNP Technology Patents involved therewith, without the prior written consent of the other Party (such consent not to be unreasonably withheld, conditioned or delayed); provided, that the foregoing shall not apply to the extent that such settlement or consent to an adverse judgment does not relate to an LNP Technology Patent.

(f) Damages. Unless otherwise agreed by the Parties, all monies recovered upon the final judgment or settlement of any action which may be controlled by either Verve or Acuitas and described in Section 7.2(a) or 7.2(b) in each case will be used first to reimburse the controlling Party, and thereafter the non-controlling Party, for each of their out-of-pocket costs and expenses relating to the action, with the balance of any such recovery to be divided as follows:

(i) To the extent such recovery reflects lost profits damages or a reasonable royalty with respect to Licensed Products, Verve will retain such lost profits recovery, less the amount of Royalties payable to Acuitas by treating such lost profits recovery as "Net Sales" hereunder; and

(ii) Any other recovery based on Licensed Products will be allocated [**] percent ([**]%) to the Party controlling the action and [**] percent ([**]%) to the other Party; provided, that if such action is controlled by Verve and does not relate to an LNP Technology Patent or any other Patent claiming Joint IP, then any other recovery will be allocated [**] percent ([**]%) to Verve.

ARTICLE 8

Confidentiality

8.1 Confidential Information. Each Party ("Disclosing Party") may disclose to the other Party ("Receiving Party") and Receiving Party may acquire during the course and conduct of activities under this License Agreement, certain proprietary or confidential information of Disclosing Party in connection with this License Agreement. The term "Confidential Information" means all information of any kind, whether in written, oral, graphical, machine-readable or other form, whether or not marked as confidential or proprietary, that is disclosed or made available by or on behalf of the Disclosing Party to or on behalf of the Receiving Party in connection with this License Agreement.

8.2 Restrictions. During the Term and for [**] thereafter, or with respect to any trade secret included in the Confidential Information for so long as such trade secret is protected under applicable Laws (provided, that Receiving Party has not publicly disclosed such trade secret in breach of its obligations under this Article 8), Receiving Party will keep all Disclosing Party's Confidential Information in confidence with the same degree of care with which Receiving Party holds its own confidential information, but in no event less than reasonable care. Receiving Party will not use Disclosing Party's Confidential Information except for in connection with the performance of its obligations and exercise of its rights under this License Agreement. Receiving Party has the right to disclose Disclosing Party's Confidential Information without Disclosing Party's prior written consent to Receiving Party's Affiliates, and each of their employees, subcontractors, consultants and agents who have a need to know such Confidential Information in order to perform their obligations and exercise their rights under this License Agreement and who are under written obligation to comply with the restrictions on use and disclosure that are no less restrictive than those set forth in this Section 8.2. Receiving Party assumes responsibility for such entities and persons maintaining Disclosing Party's Confidential Information in confidence and using same only for the purposes described herein.

8.3 Exceptions. Receiving Party's obligation of nondisclosure and the limitations upon the right to use the Disclosing Party's Confidential Information will not apply to a specific portion of the Disclosing Party's Confidential Information to the extent that Receiving Party can demonstrate that such portion: (a) was known to Receiving Party or any of its Affiliates prior to the time of disclosure by the Disclosing Party without obligation of confidentiality; (b) is or becomes public knowledge through no fault or omission of Receiving Party or any of its Affiliates; (c) is obtained on a non-confidential basis by Receiving Party or any of its Affiliates from a Third-Party who to Receiving Party's knowledge is lawfully in possession thereof and under no obligation of confidentiality to Disclosing Party; or (d) has been independently developed by or on behalf of Receiving Party or any of its Affiliates without the aid, application or use of Disclosing Party's Confidential Information.

8.4 Permitted Disclosures. Receiving Party may disclose Disclosing Party's Confidential Information to the extent (and only to the extent) such disclosure is permitted under Section 8.2 or is reasonably necessary in the following instances:

(a) in order and to the extent required to comply with applicable Laws (including any securities Laws or regulations or the rules of a securities exchange applicable to Receiving Party) or with a legal or administrative proceeding;

(b) in connection with prosecuting or defending litigation;

(c) in connection with filing, prosecuting and enforcing LNP Technology Patents in connection with Receiving Party's rights and obligations pursuant to this License Agreement;

(d) to acquirers or permitted assignees, investment bankers, investors and lenders, including potential acquirers, assignees, investment bankers, investors and lenders; and

(e) in the case of Verve, to (i) subcontractors, (ii) licensees, Sublicensees, assignees and collaboration partners, or (iii) potential licensees, Sublicensees, assignees or collaboration partners, but in case (iii) only such information that is reasonably necessary or useful for the potential licensee, Sublicensee, assignee or collaboration partner to evaluate the Licensed Product and LNP/Licensed Product manufacturing processes; provided, that (1) where reasonably possible, Receiving Party will notify Disclosing Party of Receiving Party's intent to make any disclosure pursuant to subsections (a) and (b) sufficiently prior to making such disclosure so as to allow Disclosing Party adequate time to take whatever action it may deem appropriate to protect the confidentiality of the information to be disclosed, and (2) with respect to subsections (d) and (e), each of those entities are required to comply with the restrictions on use and disclosure in Section 8.2 (other than investment bankers, investors and lenders, which must be bound prior to disclosure by commercially reasonable obligations of confidentiality).

8.5 Return of Confidential Information. Upon expiry or earlier termination of this License Agreement, upon written request of a Party (such request, if made, to be made within [**] of such expiry or termination) the other Party will destroy or return (as shall be specified in such request) to the requesting Party all copies of the Confidential Information of the requesting Party; provided, that a Party may retain: (a) one copy of such Confidential Information for record-keeping purposes, for the sole purpose of ensuring compliance with this License Agreement; (b) any copies of such Confidential Information as is required to be retained under applicable Laws; (c) any copies of such Confidential Information as is necessary or useful for such Party to exercise a right or fulfill an obligation under another License Agreement, if any, or as set forth in this License Agreement; and (d) any copies of any computer records and files containing Confidential Information that have been created by such Party's routine archiving/backup procedures, in each case provided that such copies are maintained in accordance with this Article 8.

8.6 Publications. Notwithstanding anything in this License Agreement to the contrary, Verve is permitted to publish the results of its development under this License Agreement, provided, however, that it will not disclose Acuitas' Confidential Information or Joint Confidential Information in any publication by Verve of the results of any Licensed Product development by Verve without Acuitas' prior written consent, which will not be unreasonably withheld, conditioned or delayed. Verve will comply with standard academic practice regarding authorship of scientific publications and recognition of the contributions of other parties in any scientific publications.

8.7 Terms of this License Agreement; Publicity. The Parties agree that the existence and terms of the Parties' relationship and this License Agreement will be treated as Confidential Information of both Parties, and thus may be disclosed only as permitted by Sections 8.2 or 8.4. Except as required by applicable Laws (including any securities Laws or the

regulations or rules of a securities exchange) or otherwise agreed by the Parties in writing, each Party agrees not to issue any press release or public statement disclosing information relating to the existence of this License Agreement or the transactions contemplated hereby or the terms hereof without the prior written consent of the other Party.

ARTICLE 9

Warranties; Limitations of Liability; Indemnification

9.1 Representations and Warranties. Each Party represents and warrants to the other as of the License Agreement Effective Date that:

(a) it is a corporation duly organized, validly existing, and in good standing under the Laws of the jurisdiction in which it is incorporated,

(b) it has the legal right and power to enter into this License Agreement, to extend the rights and licenses granted or to be granted to the other in this License Agreement, and to fully perform its obligations hereunder,

(c) it has taken all necessary corporate action on its part required to authorize the execution and delivery of this License Agreement and the performance of its obligations hereunder,

(d) this License Agreement has been duly executed and delivered on behalf of such Party, and constitutes a legal, valid, and binding obligation of such Party that is enforceable against it in accordance with its terms,

(e) the execution, delivery and performance of this License Agreement by such Party does not violate any Law of any court, governmental body or administrative or other agency having jurisdiction over such Party, and

(f) no government authorization, consent, approval, license, exemption of or filing or registration with any court or governmental department, commission, board, bureau, agency or instrumentality, domestic or foreign, under any applicable Laws currently in effect, is necessary for the transactions contemplated by this License Agreement or for the performance of its obligations under this License Agreement.

9.2 Additional Representations of Acuitas. Except as set forth on **Appendix 9.2**, Acuitas hereby represents and warrants to Verve as of the License Agreement Effective Date as follows

(a) Impairment. Neither Acuitas nor any of its Affiliates has entered into any agreement or otherwise licensed, granted, assigned, transferred, conveyed or otherwise encumbered or disposed of any right, title or interest in or to any of its assets, including any Technology, that would in any way conflict with or impair the scope of any rights or licenses granted to Verve hereunder.

(b) Patents and Know-How. **Appendix 1.44** sets forth a complete and accurate list of all LNP Technology Patents. Acuitas Controls, and will Control during the Term, the Licensed Technology, and is entitled to grant the licenses specified herein. All Acuitas inventors of the Licensed Technology have validly assigned their rights to the Licensed Technology to Acuitas. To Acuitas' knowledge, the LNP Technology Patents have been diligently prosecuted and maintained in accordance with applicable Laws. None of the LNP Technology Patents are or have been involved in any opposition, cancellation, interference, reissue or reexamination proceeding, and to Acuitas' knowledge as of the License Agreement Effective Date, no Licensed Technology is the subject of any judicial, administrative or arbitral order, award, decree, injunction, lawsuit, proceeding or stipulation. As of the License Agreement Effective Date, neither Acuitas nor any of its Affiliates has received any notice alleging that the LNP Technology Patents are invalid or unenforceable or challenging Acuitas' ownership of or right to use the Licensed Technology.

(c) Entire LNP Technology. The Acuitas LNP Technology licensed to Verve under this License Agreement comprises all LNP Technology owned or Controlled by Acuitas.

(d) Encumbrances. Acuitas and its Affiliates are not subject to any payment obligations to Third Parties as a result of the execution or performance of this License Agreement. As of the License Agreement Effective Date, neither Acuitas nor any of its Affiliates has granted any liens or security interests on the Licensed Technology, and the Licensed Technology as licensed hereby is free and clear of any mortgage, pledge, claim, security interest, covenant, easement, encumbrance, lien or charge of any kind.

(e) Defaults. The execution, delivery and performance by Acuitas of this License Agreement and the consummation of the transactions contemplated hereby will not result in any violation of, conflict with, result in a breach of or constitute a default under any understanding, contract or agreement to which Acuitas is a party or by which it is bound, in each case as would reasonably be expected to have a material adverse effect on the rights granted to Verve hereunder.

(f) Litigation. There is no action, suit, proceeding or investigation pending or, to the knowledge of Acuitas, currently threatened in writing against or affecting Acuitas that questions the validity of this License Agreement, the right of Acuitas to enter into this License Agreement or consummate the transactions contemplated hereby or that relates to the Licensed Technology.

(g) Infringement. Neither Acuitas nor any of its Affiliates has received any notice of any claim, nor does Acuitas or its Affiliates have any knowledge of any reasonable basis for any claim, that any Patent, Know-How or other intellectual property owned or controlled by a Third-Party would be infringed or misappropriated by the practice of any Licensed Technology in connection with the production, use, research, development, manufacture or commercialization of any Licensed Product.

(h) Third-Party Infringement. To Acuitas' knowledge, no Third-Party is infringing or has infringed any Patent within the Licensed Technology or is misappropriating or has misappropriated any Know-How within the Licensed Technology.

9.3 Disclaimers. Without limiting the respective rights and obligations of the Parties expressly set forth herein, each Party specifically disclaims any guarantee that any Licensed Product will be successful, in whole or in part. EXCEPT AS OTHERWISE EXPRESSLY PROVIDED IN THIS LICENSE AGREEMENT, THE PARTIES MAKE NO REPRESENTATIONS AND EXTEND NO WARRANTY OF ANY KIND UNDER THIS LICENSE AGREEMENT, EITHER EXPRESS OR IMPLIED.

9.4 No Consequential Damages. NOTWITHSTANDING ANYTHING IN THIS LICENSE AGREEMENT OR OTHERWISE, NEITHER PARTY WILL BE LIABLE TO THE OTHER OR ANY THIRD-PARTY WITH RESPECT TO ANY SUBJECT MATTER OF THIS LICENSE AGREEMENT FOR ANY INDIRECT, PUNITIVE, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES; PROVIDED THAT THIS SECTION 9.4 WILL NOT APPLY TO BREACHES OF A PARTY'S OBLIGATIONS UNDER ARTICLE EIGHT OR THE PARTIES' INDEMNIFICATION RIGHTS AND OBLIGATIONS UNDER SECTION 9.6.

9.5 Performance by Others. The Parties recognize that each Party may perform some or all of its obligations under this License Agreement through Affiliates and Third-Party agents provided, however, that each Party will remain responsible and liable for the performance by its Affiliates and Third-Party agents and will cause its Affiliates and Third-Party agents to comply with the applicable provisions of this License Agreement in connection therewith.

9.6 Indemnification.

(a) Indemnification by Verve. Verve will indemnify Acuitas, its Affiliates and their respective directors, officers, employees and agents, and their respective successors, heirs and assigns (collectively, "Acuitas Indemnitees"), and defend and hold each of them harmless, from and against any and all losses, damages, liabilities, costs and expenses (including reasonable attorneys' fees and expenses) (collectively, "Losses") in connection with any and all suits, investigations, claims or demands of Third Parties (collectively, "Third-Party Claims") against the Acuitas Indemnitees to the extent arising from or occurring as a result of: (i) the breach by Verve of any provision of this License Agreement; (ii) any negligence or willful misconduct on the part of any Verve Indemnitee in connection with this Agreement; or (iii) the development or commercialization by or on behalf of Verve or any of its Affiliates or Sublicensees of Licensed Products, except in each case (i)-(iii) to the extent Acuitas is obligated to indemnify Verve in accordance with Section 9.6(b) of this License Agreement.

(b) Indemnification by Acuitas. Acuitas will indemnify Verve, its Affiliates, its Sublicensees and their respective directors, officers, employees and agents, and their respective successors, heirs and assigns (collectively, "Verve Indemnitees"), and defend and hold each of them harmless, from and against any and all Losses in connection with any and all Third-Party Claims against Verve Indemnitees to the extent arising from or occurring as a result of: (i) the breach by Acuitas of any provision of this License Agreement; or (ii) any negligence or willful misconduct on the part of any Acuitas Indemnitee in connection with this Agreement; or any (iii) any allegation that the use of Licensed Technology in accordance with the license and other rights granted to Verve hereunder infringes or misappropriates the Patents or other intellectual property rights of a Third Party, except in each case (i)-(iii) to the extent Verve is obligated to indemnify Acuitas in accordance with Section 9.6(a) of this License Agreement.

(c) Notice of Claim. All indemnification claims provided for in Sections 9.6(a) and 9.6(b) will be made solely by such Party to this License Agreement (the "Indemnified Party"). The Indemnified Party will promptly notify the Indemnifying Party (the "Indemnifying Party") in writing of any Losses or the discovery of any fact upon which the Indemnified Party intends to base a request for indemnification under Section 9.6(a) and 9.6(b) (each such notice, an "Indemnification Claim Notice"), provided that the failure to promptly provide such notice and details shall not relieve the Indemnifying Party of any of its indemnification obligations hereunder except to the extent that the Indemnifying Party's defense of the relevant Third-Party Claim is prejudiced by such failure. Each Indemnification Claim Notice must contain a description of the claim and the nature and estimated amount of such Loss (to the extent that the nature and amount of such Loss is known at such time). The Indemnified Party will furnish promptly to the Indemnifying Party copies of all papers and official documents received in respect of any Losses and Third-Party Claims.

(d) Defense, Settlement, Cooperation and Expenses.

(i) *Control of Defense*. At its option, the Indemnifying Party may assume the defense of any Third-Party Claim by giving written notice to the Indemnified Party within [**] after the Indemnifying Party's receipt of an Indemnification Claim Notice. Upon assuming the defense of a Third-Party Claim, the Indemnifying Party may appoint as lead counsel in the defense of the Third-Party Claim any legal counsel selected by the Indemnifying Party (the Indemnifying Party will consult with the Indemnified Party with respect to such counsel and a possible conflict of interest of such counsel retained by the Indemnifying Party). In the event the Indemnifying Party assumes the defense of a Third-Party Claim, the Indemnified Party will immediately deliver to the Indemnifying Party all original notices and documents (including court papers) received by the Indemnified Party in connection with the Third-Party Claim.

(ii) *Right to Participate in Defense*. Without limiting Section 9.6(d)(i), any Indemnified Party will be entitled to participate in, but not control, the defense of such Third-Party Claim and to employ counsel of its choice for such purpose; provided, however, that such employment will be at the Indemnified Party's own cost and expense unless (A) the Indemnifying Party has failed to assume the defense and employ counsel in accordance with Section 9.6(d)(i) (in which case the Indemnified Party will control the defense), (B) the Indemnifying Party is not diligently defending the interests of both Parties, or (C) the interests of the Indemnified Party and the Indemnifying Party with respect to such Third-Party Claim are sufficiently adverse to prohibit the representation by the same counsel of both Parties under applicable Law, ethical rules or equitable principles, in which case the Indemnifying Party will assume [**] percent ([**]%) of any such costs and expenses of counsel for the Indemnified Party.

(iii) *Settlement*. With respect to any Third-Party Claims that relate solely to the payment of money damages in connection with a Third-Party Claim and that will not (A) result in the Indemnified Party's becoming subject to injunctive or other relief, (B) include any admission or concession of liability or wrongdoing on the part of the Indemnified Party, or (C) otherwise adversely affect the business of the Indemnified Party in any manner, and as to which the Indemnifying Party will have acknowledged in writing the obligation to indemnify the Indemnified Party hereunder, the Indemnifying Party will have the sole right to agree to the entry of any judgment, enter into any settlement or otherwise dispose of such Loss, on such terms as the Indemnifying Party, in its sole discretion, will deem appropriate. With respect to all other Losses in connection with Third-Party Claims, where the Indemnifying Party has assumed the defense of the Third-Party Claim in accordance with Section 9.6(d)(i), the Indemnifying Party will have authority to agree to the entry of any judgment, enter into any settlement or otherwise dispose of such Loss provided it obtains the prior written consent of the Indemnified Party (such consent not to be unreasonably withheld, delayed or conditioned). The Indemnifying Party will not be liable for any settlement or other disposition of a Loss by an Indemnified Party that is reached without the prior written consent of the Indemnifying Party. Regardless of whether the Indemnifying Party chooses to defend or prosecute any Third-Party Claim, no Indemnified Party will admit any liability with respect to or settle, compromise or discharge, any Third-Party Claim without the prior written consent of the Indemnifying Party, such consent not to be unreasonably withheld, delayed or conditioned.

(iv) *Cooperation*. Regardless of whether the Indemnifying Party chooses to defend or prosecute any Third-Party Claim, the Indemnified Party will, and will cause each other Indemnified Party to, cooperate in the defense or prosecution thereof and will furnish such records, information and testimony, provide such witnesses and attend such conferences, discovery proceedings, hearings, trials and appeals as may be reasonably requested in connection therewith, at the Indemnifying Party's expense. Such cooperation will include access during normal business hours afforded to the Indemnifying Party to, and reasonable retention by the Indemnified Party of, records and information that are reasonably relevant to such Third-Party Claim, and making Indemnified Parties and other employees and agents available on a mutually convenient basis to provide additional information and explanation of any material provided hereunder, and the Indemnifying Party will reimburse the Indemnified Party for all its reasonable out-of-pocket costs and expenses in connection therewith.

(v) *Costs and Expenses*. Except as provided above in this Section 9.6(d), the costs and expenses, including attorneys' fees and expenses, incurred by the Indemnified Party in connection with any claim will be reimbursed on a Calendar Quarter basis by the Indemnifying Party, without prejudice to the Indemnifying Party's right to contest the Indemnified Party's right to indemnification and subject to prompt refund in the event the Indemnifying Party is ultimately held not to be obligated to indemnify the Indemnified Party.

9.7 Insurance. Each Party will maintain at its sole cost and expense, an adequate liability insurance or self-insurance program (including product liability insurance) to protect against potential liabilities and risk arising out of activities to be performed under this License Agreement and upon such terms (including coverages, deductible limits and self-insured retentions) as are customary in the respective industry of such Party for the activities to be

conducted by such Party under this License Agreement. Subject to the preceding sentence, such liability insurance or self-insurance program will insure against all types of liability, including personal injury, physical injury or property damage arising out of the manufacture, sale, use, distribution or marketing of Licensed Products. The coverage limits set forth herein will not create any limitation on a Party's liability to the other under this License Agreement. Upon the request of a Party, the other Party will provide evidence of the insurance coverage required by this Section 9.7.

ARTICLE 10

Term and Termination

10.1 Term. This License Agreement will commence as of the License Agreement Effective Date and, unless sooner terminated in accordance with the terms hereof or by mutual written consent, will continue on a Licensed Product-by-Licensed Product and a country-by-country basis, until there are no more Royalty payments owed Acuitas in such country with respect to such Licensed Product (the longest such period of time hereunder, the "Term"). Upon expiration of the Term with respect to the applicable Licensed Product in the applicable country, the license contained in Section 2.1 will become fully paid-up, royalty-free, perpetual and irrevocable with respect to such Licensed Product in such country.

10.2 Termination by Acuitas.

(a) Breach. Acuitas will have the right to terminate this License Agreement in full upon delivery of written notice to Verve in the event of a material breach by Verve of its obligations under this License Agreement, provided that such breach has not been cured within [**] after written notice thereof is given by Acuitas to Verve specifying the nature of the alleged breach.

(b) Disputed Breach. If Verve disputes in good faith the existence or materiality of a breach specified in a notice provided in accordance with Section 10.2(a), and Verve provides Acuitas notice of such dispute within such [**] period, then Acuitas shall not have the right to terminate this License Agreement under Section 10.2(a) unless and until it is finally determined, in accordance with Section 11.1, that Verve has materially breached this License Agreement and Verve has failed to cure such breach within [**] following such decision. It is understood and agreed that during the pendency of such dispute, all of the terms and conditions of this License Agreement shall remain in effect and the Parties shall continue to perform all of their respective obligations hereunder. During the pendency of any such dispute, Verve shall pay to Acuitas all Milestone Payments and Royalty payments set forth herein that may become due during such period.

10.3 Termination by Verve.

(a) Breach. Verve will have the right to terminate this License Agreement in full upon delivery of written notice to Acuitas in the event of a material breach by Acuitas of its obligations under this License Agreement, provided that such breach has not been cured within [**] after written notice thereof is given by Verve to Acuitas specifying the nature of the alleged breach.

(b) Discretionary Termination. Verve will have the right to terminate this License Agreement in full at its discretion for any reason by delivering written notice to Acuitas, such termination to be effective thirty (30) days following the date of such notice.

(c) Alternative to Termination Under Section 10.3(a).

(i) If Verve has the right to terminate this License Agreement under Section 10.3(a), then Verve may, in lieu of exercising such termination right, elect by written notice to Acuitas before the end of such applicable cure period to have this License Agreement continue in full force and effect for the Term, provided that the following will apply: starting immediately after the end of such applicable cure period, Verve may reduce by [**] percent ([**]%) the Milestone Payments and the Royalty rates subject to the Minimum Royalty.

(ii) In the event Acuitas notifies Verve within [**] days of receipt of Verve's notice of material breach that Acuitas reasonably and in good faith disputes Verve's right to terminate this License Agreement pursuant to Section 10.3(a), Verve shall instead deposit such [**] percent ([**]%) of Milestone Payments and Royalty payments into an escrow account maintained by a mutually agreeable Third-Party pending the resolution of such dispute in accordance with Section 11.1. If Acuitas raises such dispute, the informal dispute resolution process in Section 11.1(a) shall not apply, and the negotiation period for the Executive Officers in Section 11.1(a) shall be limited to [**].

(iii) In the event that it is established through the dispute resolution process that Verve did have the right to terminate this License Agreement under Section 10.3(a), then the escrowed funds shall be released to Verve and the [**] percent ([**]%) reduction shall continue to apply going forward. In the event that it is established through the dispute resolution process that Verve did not have the right to terminate this License Agreement under Section 10.3(a), then the escrowed funds shall be released to Verve and Verve will pay to Acuitas the full amount of the Milestone Payments and Royalties that would have been payable with interest payable by Verve in accordance with Section 4.4(g), and the Milestone Payments and the Royalty payments going forward shall continue to be paid in accordance with Article 4 without any reduction under this Section 10.3(c).

10.4 Termination Upon Bankruptcy. If either Party makes an assignment for the benefit of creditors, appoints or suffers appointment of a receiver or trustee over all or substantially all of its property, files a petition or commences a proceeding under any bankruptcy or insolvency act in any state or country or has any such petition or application filed against it which is not discharged within [**] of the filing thereof, then the other Party may thereafter terminate this License Agreement effective immediately upon written notice to such Party. All rights and licenses granted under or pursuant to this License Agreement by Acuitas are, and will otherwise be deemed to be, for purposes of Section 65.11(7) of the Bankruptcy and Insolvency Act, R.S.C. 1985, c. B-3 and Section 32(6) of the Companies' Creditors Arrangement Act, R.S.C. 1985, c. C-36 (the "Insolvency Legislation"), a grant of "right to use intellectual property" as

used in the Insolvency Legislation. The Parties agree that Verve and its Affiliates and Sublicensees, as licensees of such rights under this License Agreement, will retain and may fully exercise all of their rights and elections under the Insolvency Legislation subject to the payment of amounts provided for herein. Without limiting Verve's rights under the Insolvency Legislation, if Acuitas becomes insolvent or makes an assignment for the benefit of its creditors or there is filed by or against Acuitas any bankruptcy, receivership, reorganization or similar proceeding pursuant to or under the Insolvency Legislation or otherwise, Verve shall be entitled to a copy of any and all such intellectual property and all embodiments of such intellectual property, and the same, if not in the possession of Acuitas, shall be promptly delivered to it (a) before this License Agreement is disclaimed, repudiated, rescinded or terminated by or on behalf of Acuitas, within [**] after Verve's written request, unless Acuitas, or its trustee or receiver, elects within [**] to continue to perform all of its obligations under this License Agreement, or (b) after any disclaimer, repudiation, rescission or termination of this License Agreement by or on behalf of Acuitas, if not previously delivered as provided under clause (a) above. All rights of the Parties under this Section 10.4 and under the Insolvency Legislation are in addition to and not in substitution of any and all other rights, powers, and remedies that each Party may have under this License Agreement, the Insolvency Legislation, and any other applicable Laws.

10.5 Effects of Termination. Upon termination (but not expiration of the Term pursuant to Section 10.1) of this License Agreement for any reason:

(a) Cessation of Rights. Except as otherwise expressly provided herein, all rights and licenses granted by Acuitas to Verve in Section 2.1 will terminate.

(b) Sell Off. Notwithstanding the termination of Verve's licenses and other rights under this License Agreement, Verve shall retain the right to distribute, sell or otherwise dispose of its existing inventory of the Licensed Products, in each case that is intended for distribution, sale or disposition in the Territory, for a period of not more than [**] following the date of the effective termination, as though this License Agreement had not been terminated, and such distribution, sale or other disposition shall not constitute infringement of the Patents or other intellectual property or proprietary rights of Acuitas or its Affiliates. Verve's right to distribute, sell or otherwise dispose of its existing inventory of the Licensed Products pursuant to this Section 10.5(b) shall be subject to Verve's continuing obligation to pay Royalties with respect to the Net Sales.

10.6 Survival. In addition to the termination consequences set forth in Section 10.5, the following provisions will survive termination or expiration of this License Agreement: Article 1 (to the extent applicable to any other surviving provisions), Article 3, Article 5, Article 8 and Article 11, and Sections 2.1(a) (in accordance with (i) the last sentence of Section 4.4(d), to the extent applicable, (ii) Section 6.2, to the extent applicable, or (iii) the last sentence of Section 10.1 but only upon expiration of the Term), 2.3(b)(iv) (only upon the circumstances set forth therein), 4.4(b), 9.3, 9.4, 9.5, 9.6, the last sentence of Section 10.1 (only upon expiration of the Term), 10.4, 10.5 and this Section 10.6. Termination or expiration of this License Agreement will not relieve the Parties of any liability or obligation which accrued hereunder prior to the effective date of such termination or expiration nor preclude either Party from pursuing all rights and remedies it may have hereunder or at Law or in equity with respect to any breach of this License Agreement nor prejudice either Party's right to obtain performance of any obligation. All other rights and obligations will terminate upon termination or expiration of this License Agreement.

ARTICLE 11

General Provisions

11.1 Dispute Resolution.

(a) Disputes. Disputes arising under or in connection with this License Agreement will be resolved pursuant to this Section 11.1; provided, however, that in the event a dispute cannot be resolved without an adjudication of the rights or obligations of a Third-Party (other than any Verve Indemnitees or Acuitas Indemnitees identified in Section 9.6), the dispute procedures set forth Sections 11.1(b) and 11.1(c) will be inapplicable as to such dispute.

(b) Dispute Escalation. In the event of a dispute between the Parties, the Parties will first attempt in good faith to resolve such dispute by negotiation and consultation between themselves or the Workplan Leaders. In the event that such dispute is not resolved on an informal basis within [**], any Party may, by written notice to the other, have such dispute referred to each Party's Chief Executive Officer or his or her designee (who will be a senior executive "Executive Officers"), who will attempt in good faith to resolve such dispute by negotiation and consultation for a [**] period following receipt of such written notice.

(c) Dispute Resolution. In the event the Executive Officers of the Parties are not able to resolve such dispute as set forth above, the Executive Officers will together elect whether to submit the dispute to mediation, litigation or arbitration. In the absence of such an agreement, either Party may elect to initiate litigation.

(d) Injunctive Relief. Notwithstanding the dispute resolution procedures set forth in this Section 11.1, in the event of an actual or threatened breach hereunder, the aggrieved Party may seek equitable relief (including restraining orders, specific performance or other injunctive relief) in any court or other forum, without first submitting to any dispute resolution procedures hereunder.

(e) Tolling. The Parties agree that all applicable statutes of limitation and time-based defenses (such as estoppel and laches) will be tolled while the dispute resolution procedures set forth in this Section 11.1 are pending, and the Parties will cooperate in taking all actions reasonably necessary to achieve such a result.

(f) Prevailing Party. The prevailing Party in any suit related to this License Agreement will be entitled to recover from the losing Party all out-of-pocket fees, costs and expenses (including those of attorneys, professionals and accountants and all those arising from appeals and investigations) incurred by the prevailing Party in connection with such arbitration or suit.

11.2 Cumulative Remedies and Irreparable Harm. All rights and remedies of the Parties hereunder will be cumulative and in addition to all other rights and remedies provided hereunder or available by agreement, at Law or otherwise. Each Party acknowledges and agrees that breach of any of the terms or conditions of this License Agreement may cause irreparable harm and damage to the other and that such damage may not be ascertainable in money damages and that as a result thereof the non-breaching Party may be entitled to seek from a court equitable or injunctive relief restraining any breach or future violation of the terms contained herein by the breaching Party without the necessity of proving actual damages or posting bond. Such right to equitable relief is in addition to whatever remedies either Party may be entitled to as a matter of Law or equity, including money damages.

11.3 Relationship of Parties. Nothing in this License Agreement is intended or will be deemed to constitute a partnership, agency, employer-employee or joint venture relationship between the Parties. No Party will incur any debts or make any commitments for the other, except to the extent, if at all, specifically provided therein. There are no express or implied Third-Party beneficiaries hereunder (except for Verve Indemnitees and Acuitas Indemnitees for purposes of Section 9.6). For clarity, Verve does not grant to Acuitas any rights or licenses under this License Agreement to any Verve Technology or intellectual property rights.

11.4 Compliance with Law. Each Party will perform or cause to be performed any and all of its obligations or the exercise of any and all of its rights hereunder in good scientific manner and in compliance with all applicable Law.

11.5 Governing Law. This License Agreement will be governed by and construed in accordance with the Laws of the State of New York, United States, without respect to its conflict of Laws rules, provided that any dispute relating to the scope, validity, enforceability or infringement of any Patents or Know-How will be governed by, and construed and enforced in accordance with, the substantive Laws of the jurisdiction in which such Patents or Know-How apply.

11.6 Counterparts; Facsimiles. This License Agreement may be executed in one or more counterparts, each of which will be deemed an original, and all of which together will be deemed to be one and the same instrument. Facsimile or PDF execution and delivery of this License Agreement by either Party will constitute a legal, valid and binding execution and delivery of this License Agreement by such Party.

11.7 Headings. All headings in this License Agreement are for convenience only and will not affect the meaning of any provision hereof.

11.8 Waiver of Rule of Construction. Each Party has had the opportunity to consult with counsel in connection with the review, drafting and negotiation of this License Agreement. Accordingly, the rule of construction that any ambiguity in this License Agreement will be construed against the drafting Party will not apply.

11.9 Interpretation. Whenever any provision of this License Agreement uses the term "including" (or "includes"), such term will be deemed to mean "including without limitation" (or "includes without limitations"). "Herein," "hereby," "hereunder," "hereof" and other equivalent words refer to this License Agreement as an entirety and not solely to the particular portion of this License Agreement in which any such word is used. All definitions set forth herein will be deemed applicable whether the words defined are used herein in the singular or the plural. Unless otherwise provided, all references to Sections and Appendices in this License Agreement are to Sections and Appendices of this License Agreement. References to any Sections include Sections and subsections that are part of the related Section.

11.10 Binding Effect. This License Agreement will inure to the benefit of and be binding upon the Parties, their Affiliates, and their respective lawful successors and assigns.

11.11 Assignment. This License Agreement may not be assigned by either Party, nor may either Party delegate its obligations or otherwise transfer licenses or other rights created by this License Agreement, except as expressly permitted hereunder or otherwise without the prior written consent of the other Party, which consent will not be unreasonably withheld, conditioned or delayed; provided that either Party may assign this License Agreement without such consent to an Affiliate or to its successor in connection with the sale of all or substantially all of its assets or business or that portion of its business pertaining to the subject matter of this License Agreement (whether by merger, consolidation or otherwise).

11.12 Notices. All notices, requests, demands and other communications required or permitted to be given pursuant to this License Agreement will be in writing and will be deemed to have been duly given upon the date of receipt if delivered by hand, email, recognized international overnight courier, or registered or certified mail, return receipt requested, postage prepaid to the following addresses:

if to Verve:	Verve Therapeutics, Inc. 500 Technology Square Cambridge, MA 02139 Attention: COO Email: [**]
With a copy to:	Wilson Sonsini Goodrich & Rosati 650 Page Mill Road Palo Alto, CA 94304 Attention: Lowell Segal Email: [**]
If to Acuitas:	Acuitas Therapeutics Inc. 6190 Agronomy Road Suite 405 Vancouver, B.C. Canada V6T 1Z3 Attention: President and CEO Email: [**]

With a copy to: McCarthy Tetrault LLP
Suite 2400 745 Thurlow Street
Vancouver, B.C.
Canada V6E 0C5
Attention: Miranda Lam, Esq.
Email: [**]

Either Party may change its designated address by notice to the other Party in the manner provided in this Section 11.12.

11.13 Amendment and Waiver. This License Agreement may be amended, supplemented, or otherwise modified only by means of a written instrument signed by both Parties; provided that any unilateral undertaking or waiver made by one Party in favor of the other will be enforceable if undertaken in a writing signed by the Party to be charged with the undertaking or waiver. Any waiver of any rights or failure to act in a specific instance will relate only to such instance and will not be construed as an agreement to waive any rights or fail to act in any other instance, whether or not similar.

11.14 Severability. In the event that any provision of this License Agreement will, for any reason, be held to be invalid or unenforceable in any respect, such invalidity or unenforceability will not affect any other provision hereof, and the Parties will negotiate in good faith to modify the License Agreement to preserve (to the extent possible) their original intent.

11.15 Entire Agreement. This License Agreement is the sole agreement with respect to the subject matter hereof and supersedes all other agreements and understandings between the Parties with respect to same.

11.16 Force Majeure. Neither Acuitas nor Verve will be liable for failure of or delay in performing obligations set forth in this License Agreement (other than any obligation to pay monies when due), and neither will be deemed in breach of such obligations, if such failure or delay is due to natural disasters or any causes reasonably beyond the control of Acuitas or Verve; provided that the Party affected will promptly notify the other of the force majeure condition and will exert reasonable efforts to eliminate, cure or overcome any such causes and to resume performance of its obligations as soon as possible.

[*Remainder of this Page Intentionally Left Blank*]

WITNESS WHEREOF, the Parties have caused this Non-Exclusive License Agreement to be executed by their respective duly authorized officers as of the License Agreement Effective Date.

ACUITAS THERAPEUTICS, INC.

By: /s/ T.D. Madden
(Signature)

Name: Thomas Madden

Title: President & CEO

Date: October 15, 2020

VERVE THERAPEUTICS, INC.

By: /s/ Andrew D. Ashe
(Signature)

Name: Andrew D. Ashe

Title: President & COO

Date: 10/15/2020

Exhibit 10.13
Execution Version

Certain identified information has been excluded from the exhibit because it is both (i) not material and (ii) is the type of information that the registrant treats as private or confidential.

Double asterisks denote omissions.

CAS9 LICENSE AGREEMENT

by and between

THE PRESIDENT AND FELLOWS OF HARVARD COLLEGE,

THE BROAD INSTITUTE, INC.

and

VERVE THERAPEUTICS, INC.

March 14, 2019

TABLE OF CONTENTS

List of Exhibits:

CAS9 LICENSE AGREEMENT

This Cas9 License Agreement (this "**Agreement**") is entered into as of this 14th day of March, 2019 (the "**Effective Date**"), by and between, on the one hand, the President and Fellows of Harvard College, an educational and charitable corporation existing under the laws and the constitution of the Commonwealth of Massachusetts, having a place of business at Smith Campus Center, Suite 727, 1350 Massachusetts Avenue, Cambridge, MA 02138 ("**Harvard**") and The Broad Institute, Inc., a non-profit Massachusetts corporation, with a principal office at 415 Main Street, Cambridge, MA 02142 ("**Broad**," together with Harvard, the "**Licensor Institutions**" and each individually, a "**Licensor Institution**") and, on the other hand, Verve Therapeutics, Inc., a Delaware corporation, with a principal office at 26 Landsdowne Street, Cambridge, MA 02139 ("**Company**"). Company and the Licensor Institutions are each referred to herein as a "**Party**" and together, the "**Parties**."

WHEREAS, the technology claimed in the Cas9-I Patent Rights (as defined below) was discovered by researchers at the Licensor Institutions;

WHEREAS, the technology claimed in the Cas9-II Patent Rights (as defined below) was discovered by researchers at one or more of the Cas9-II Institutions (as defined below);

WHEREAS, one or more of such researchers at the Licensor Institutions is an employee of the Howard Hughes Medical Institute ("**HHMI**") and HHMI has assigned to Harvard its rights in those Cas9-I Patent Rights on which an HHMI employee is an inventor, subject to certain rights retained by HHMI as specifically described below;

WHEREAS, Harvard is a sole owner of certain of the Cas9-I Patent Rights, which are identified as "Harvard Controlled Patents" on the attached Exhibit 1.25 (the "**Harvard Controlled Patents**");

WHEREAS, the Massachusetts Institute of Technology ("**MIT**," a not-for-profit Massachusetts Corporation with a principal place of business at 77 Massachusetts Avenue, Cambridge, Massachusetts 02139) and Broad are co-owners of certain of the Cas9-I Patent Rights (the "**MIT/Broad Co-Owned Cas9-I Patent Rights**") set forth on Exhibit 1.25;

WHEREAS, Harvard, MIT and Broad are co-owners of certain of the Cas9-I Patent Rights (the "**Harvard/MIT/Broad Co-Owned Cas9-I Patent Rights**"), identified together with the MIT/Broad Co-Owned Cas9-I Patent Rights as "**Broad Controlled Patents**" on the attached Exhibit 1.25;

WHEREAS, The Rockefeller University ("**Rockefeller**," a not-for-profit New York corporation with a principal place of business at 1230 York Avenue, New York, NY 10065) and Broad are co-owners of certain of the Cas9-I Patent Rights set forth on Exhibit 1.25;

WHEREAS, Broad, MIT, Harvard and/or the University of Iowa Research Foundation ("**Iowa**," a not-for-profit corporation existing under the laws of the State of Iowa, having a place of business at 112 N. Capitol Street, 6 Gilmore Hall, Iowa City, IA 52242) are co-owners of certain of the Cas9-II Patent Rights set forth on Exhibit 1.31;

WHEREAS, (i) pursuant to that certain Operating Agreement by and among Broad, MIT and Harvard, dated July 1, 2009, MIT and Harvard have authorized Broad to act as their sole and exclusive agent for the purposes of licensing, as applicable, the MIT/Broad Co-Owned Cas9-I Patent Rights and the Harvard/MIT/Broad Co-Owned Cas9-I Patent Rights, as well as their interest in the co-owned Cas9-II Patent Rights, and MIT and Harvard have authorized Broad to enter into this Agreement on their behalf with respect to such patent rights, (ii) pursuant to that certain Joint Invention Administration Agreement by and between Broad, MIT and Iowa dated December 9, 2014, as amended August 19, 2016, MIT and Iowa have authorized Broad to act as their sole and exclusive agent for the purposes of licensing their interest in the co-owned Cas9-II Patent Rights, and MIT and Iowa have authorized Broad to enter into this Agreement on their behalf with respect to such patent rights and (iii) pursuant to that certain Inter-Institutional Agreement by and between Broad and Rockefeller dated February 13, 2017, Rockefeller has authorized Broad to act as its sole and exclusive agent for the purposes of licensing its interest in the co-owned Cas9-I Patent Rights, and Rockefeller has authorized Broad to enter into this Agreement on its behalf with respect to such patent rights;

WHEREAS, Company wishes to obtain a license under the Cas9-I Patent Rights;

WHEREAS, Company wishes to obtain a co-exclusive license in the Field under the Cas9-II Institutions' interest in the Cas9-II Group A Patent Rights and a non-exclusive license under the Cas9-II Institutions' interest in the Cas9-II Group A Patent Rights and the Cas9-II Group B Patent Rights;

WHEREAS, the Owner Institutions desire to have products based on the inventions described in the Patent Rights developed and commercialized to benefit the public; and

WHEREAS, Company has represented to the Licensor Institutions, in order to induce the Licensor Institutions to enter into this Agreement, that Company shall commit itself to the development and commercialization of such products so that public utilization shall result.

NOW, THEREFORE, the Parties hereto, intending to be legally bound, hereby agree as follows:

1. DEFINITIONS.

Whenever used in this Agreement with an initial capital letter, the terms defined in this Article 1, whether used in the singular or the plural, shall have the meanings specified below.

1.1. **"Abandoned Patent Rights"** has the meaning set forth in Section 6.3.1

1.2. **"Achieved Milestone"** has the meaning set forth in Section 4.5.1.

1.3. **"Acquisition Value"** means, with respect to a Company Sale, the sum of the Upfront Acquisition Value and the Trailing Acquisition Value. For the purpose of determining Upfront Acquisition Value or Trailing Acquisition Value, the valuation of any securities or other non-cash assets paid as consideration with respect to a Company Sale shall be determined by reference to the operative transaction agreement(s) for such Company Sale, provided that, if no such valuation is readily determinable from such operative transaction agreement(s), then:

(a) for securities primarily listed and quoted for trading on the New York Stock Exchange, the NYSE Amex Equities (formerly the American Stock Exchange), the NASDAQ Global Select Market, the NASDAQ Global Market, the NASDAQ Capital Market or other securities exchange, the per share value shall be deemed to be the average of the closing prices of such securities on such exchange or market, as applicable, over the [**] period ending [**] prior to the Company Sale Date;

(b) for securities primarily listed and quoted for trading on the OTC Bulletin Board or equivalent, the per share value shall be deemed to be the average of the closing bid prices over the [**] period ending [**] prior to the Company Sale Date;

(c) for all other securities or for assets other than securities or cash, the value shall be determined in good faith by mutual agreement of the Licensor Institutions and Company (or Company's acquirer or successor entity, as applicable). If the Parties are not able to agree in good faith on such value within [**] after payment of such securities or property, then such dispute will be handled pursuant to Section 11.7 of the Agreement.

1.4. **"Adverse Disclosure"** has the meaning set forth in Section 4.10.3.3.

1.5. **"Affiliate"** means, as to any Person, any other Person that controls, is controlled by, or is under common control with, such Person. For purposes of this definition only, "control" and, with correlative meanings, the terms "controlled by" and "under common control with" means the possession, directly or indirectly, of the power to direct the management or policies of an organization or entity, whether through the ownership of voting securities or by contract relating to voting rights or corporate governance, or otherwise. Without limiting the foregoing, control shall be presumed to exist when a Person (a) owns or directly controls more than fifty percent (50%) of the voting securities or other ownership interest of another Person or (b) possesses, directly or indirectly, the power to elect or appoint more than fifty percent (50%) of the members of the governing body of the other Person.

1.6. **"Ag Product"** means any product comprising a plant, plant tissue, plant cell, plant part or plant seed, including any organism in the microbiome used in association with such plant, plant tissue, plant cell, plant part or plant seed, that is used for agricultural purposes.

1.7. **"Agreement"** has the meaning set forth in the Preamble.

1.8. **"Anti-Dilution Shares"** has the meaning set forth in Section 4.4.2.

1.9. **"Anti-Dilution Threshold"** means (a) [**] percent ([**]%) of Company's outstanding capital stock on a Fully-Diluted Basis or (b) following an Equity Event, if applicable, [**] percent ([**]%) of Company's outstanding capital stock on a Fully-Diluted Basis.

1.10. **"Applicable Law"** means (a) with respect to a given jurisdiction, all applicable laws, rules and regulations (including any rules, regulations, guidelines or other requirements of any regulatory authorities) that may be in effect from time to time in such jurisdiction, and (b) with respect to any jurisdiction that does not have laws, rules or regulations that govern genetically modified organisms (including genetically modified crops), all applicable laws, rules and regulations (including any rules, regulations, guidelines or other requirements of any regulatory authorities) of the United States federal government that may be in effect from time to time to the extent applicable to genetically modified organisms (including genetically modified crops).

1.11. **"Asset Sale"** means the sale, lease, assignment, transfer, exclusive license or other disposition of all or substantially all of the assets of Company to one or more entities that are not wholly owned subsidiaries of Company.

1.12. **"Average Market Capitalization"** means the result of (i) the sum of the Market Capitalizations on each Trading Day during a specified period of time divided by (ii) the number of Trading Days during such specified period of time.

1.13. **"Bankruptcy Event"** means, with respect to any Person, any of the following:

(a) such Person shall commence a voluntary case or other proceeding seeking liquidation, reorganization or other relief with respect to itself or its debts under any bankruptcy, insolvency or other similar law now or hereafter in effect or seeking the appointment of a trustee, receiver, liquidator, custodian or other similar official of it or any substantial part of its property, or shall consent to any such relief or to the appointment of, or taking possession by, any such official in an involuntary case or other proceeding commenced against it, or shall make a general assignment for the benefit of creditors, or shall fail generally to pay its debts as they become due, or shall take any corporate action to authorize any of the foregoing;

(b) an involuntary case or other proceeding shall be commenced against such Person seeking liquidation, reorganization or other relief with respect to it or its debts under any bankruptcy, insolvency or other similar law now or hereafter in effect or seeking the appointment of a trustee, receiver, liquidator, custodian or other similar official of it or any substantial part of its property, and such involuntary case or other proceeding shall remain undismissed and unstayed for a period of [**]; or an order for relief shall be entered against such Person under the federal bankruptcy laws as now or hereafter in effect; or

(c) a receiver or trustee shall be appointed with respect to such Person or all or substantially all of the assets of such Person.

1.14. **"Broad"** has the meaning set forth in the Preamble.

1.15. **"Broad Confidential Information"** has the meaning set forth in Section 11.1.1.

1.16. **"Broad Controlled Patents"** has the meaning set forth in the Recitals.

1.17. **"Calendar Quarter"** means each of the periods of three (3) consecutive calendar months ending on March 31, June 30, September 30 and December 31 during the Term.

1.18. **"Calendar Year"** means any twelve (12) month period commencing on January 1.

1.19. **"Cardiovascular Disease"** means atherosclerotic cardiovascular diseases and aortic valve diseases and their prevention through lipid (cholesterol and/or triglyceride) reduction. For the avoidance of doubt, "Cardiovascular Disease" does not include any inflammatory disease or condition or any form of cancer or symptoms of any of the foregoing, or side effects of such inflammatory disease or condition or cancer or the treatment thereof.

1.20. **"Cardiovascular Disease Field"** means, solely with respect to products and processes directed to the Targets, intended for the prevention or treatment of Cardiovascular Disease (i) using gene therapy, (ii) using editing (including modifying) of Genetic Material or (iii) using targeting of Genetic Material (including targeting of Genetic Material to modify associated chromatin), either (a) ex vivo for subsequent administration to a human, in the case of the foregoing clause (ii) or (iii) of a product so edited or targeted, or (b) in vivo, by a product administered to a human, in the case of the foregoing clause (ii) or (iii) of a product that so edits or targets; provided that, the Cardiovascular Disease Field does not include (I) the prevention or treatment of Cardiovascular Disease using a small or large molecule that (A) was identified or discovered using technology Covered by the Patent Rights, (B) is Covered by (x) a Valid Claim of the Patent Rights Covering the identifying or discovering of small or large molecules, and/or (y) a product-by-process or similar Valid Claim of the Patent Rights directed to a small or large molecule so identified or discovered, and (C) is not Covered by any other Valid Claim of the Patent Rights; (II) (A) modifying animals or animal cells for the creation, making, having made, use, sale, offer for sale, having sold, exportation and importation of organs suitable for xenotransplantation into humans or (B) research and development, and commercialization and other use or exploitation, of products or services in the field of Livestock Applications; (III) production or processing of small or large molecules, including for the prevention or treatment of Cardiovascular Disease, that are made using technology Covered by the Patent Rights, unless such small or large molecules (xx) are used for (1) gene therapy, (2) editing (including modifying) of Genetic Material or (3) targeting of Genetic Material (including targeting of Genetic Material to modify associated chromatin), in the case of (2) and (3) to the extent such editing or targeting is achieved through the use of CRISPR Technology or TALE Technology (other than through the making of such small or large molecules) and in each case (1), (2) and (3) as set forth in clauses (a) and (b) above, and (yy) are not otherwise excluded from this definition of Cardiovascular Disease Field; (IV) Ag Products; and (V) any products, including without limitation any Ag Product or any product in the field of Livestock Applications, that provide nutritional benefits, unless such products (aa) are regulated by a Regulatory Authority as a drug or biologic pursuant to Section 505 of the United States Federal Food, Drug, and Cosmetic Act of 1938, as amended, Section 351 of the United States Public Health Service Act of 1944, as amended, or any successor laws, or equivalent laws or regulations in jurisdictions outside the United States and (bb) are otherwise included in this definition of Cardiovascular Disease Field. In addition, with respect to the Delivery Patent Rights, the Cardiovascular Disease Field only includes targeting of Genetic Material as set forth in clauses (a) and (b) above if such targeting is related to the use of CRISPR Technology, TALE Technology or zinc finger nuclease technology.

1.21. **“Cas9 Enabled Product”** means any product or process, other than a Licensed Product, which is or incorporates, or which is made, identified, discovered, developed, optimized, characterized, selected, derived from or determined to have utility, in whole or in part, by the use or modification of, (a) any Cas9-I Patent Rights or Cas9-II Group A Patent Rights or any technology or invention covered thereby, (b) any Cas9 Licensed Product, (c) any progeny, modification or derivative of a Cas9 Licensed Product, or (d) any living or nonliving cell, organism, microorganism (including viruses) made or modified through use of a Cas9 Licensed Product or technology covered by the Cas9-I Patent Rights or Cas9-II Group A Patent Rights, or any progeny, clone, modification or derivative of such living or nonliving cell, organism, microorganism (including viruses); provided, however, that the term “Cas9 Enabled Product” shall not include any large or small molecule that (i) was identified or discovered using a Cas9 Licensed Product or technology Covered by the Cas9-I Patent Rights or Cas9-II Group A Patent Rights and (ii) does not otherwise meet the definition of Cas9 Enabled Product (i.e., it is identified or discovered using a Cas9 Licensed Product or technology covered by the Cas9-I Patent Rights or Cas9-II Group A Patent Rights but otherwise is not, or does not incorporate, or is not made, developed, optimized, characterized, selected, derived from or determined to have utility, in whole or in part, by the use or modification of a Cas9 Licensed Product or technology covered by the Cas9-I Patent Rights or Cas9-II Group A Patent Rights in a way that would cause it to be included in the definition of Cas9 Enabled Product). For clarity, the term “Cas9 Enabled Product” shall also not include any product or process (other than a Licensed Product), for which the sole use of the Cas9-I Patent Rights or Cas9-II Group A Patent Rights or technology covered thereby in connection with such product or process was to (x) serve as a control in the development of, or comparator in the pre-clinical development of, such product or process or (y) evaluate the efficacy of such Cas9-I Patent Rights or Cas9-II Group A Patent Rights or technology covered thereby as applied to such product or process.

1.22. **“Cas9 Licensed Product”** means, on a country-by-country basis, any product or process the making, using, selling, offering for sale, exporting or importing of which product or process in the country in question is Covered by at least one Valid Claim of the Cas9-I Patent Rights or Cas9-II Group A Patent Rights in that country. If, during the Royalty Term for a given Cas9 Licensed Product, such Cas9 Licensed Product is no longer Covered by at least one Valid Claim of the Cas9-I Patent Rights or Cas9-II Group A Patent Rights in a country, and is not Covered by at least one Valid Claim of any other Patent Right in such country, then such Cas9 Licensed Product shall be deemed a Cas9 Enabled Product in such country from that time forward for the purposes of calculating Milestone Payments under Section 4.5 and Royalties under Section 4.6, unless and until such product or process is again Covered by at least one Valid Claim of the Cas9-I Patent Rights or Cas9-II Group A Patent Rights, at which time it shall again be deemed a Cas9 Licensed Product for such purposes.

1.23. **“Cas9 Patent Rights Categories”** means the CRISPR Patent Rights, the TALE Patent Rights and the Delivery Patent Rights.

1.24. **"Cas9-I Institution"** means each of the Licensor Institutions, MIT and Rockefeller individually, and "**Cas9-I Institutions**" means the Licensor Institutions, MIT and Rockefeller, collectively.

1.25. **"Cas9-I Patent Rights"** means the patents and patent applications that are listed on the attached Exhibit 1.25 and any and all divisionals, continuations, continuations-in-part (only to the extent of claims that are entitled to the priority date of and directed specifically to the subject matter claimed in the applications listed on the attached Exhibit 1.25), substitutes, counterparts and foreign equivalents thereof filed in any country, and any patents issuing thereon (but in the case of patents issuing on continuations-in-part applications, only to the claims thereof that are entitled to the priority date of and directed specifically to the subject matter claimed in the applications listed on the attached Exhibit 1.25) and any reissues, reexaminations or extensions thereof. The Cas9-I Patent Rights are the CRISPR Patent Rights, the TALE Patent Rights and the Delivery Patent Rights.

1.26. **"Cas9-II Group A Patent Rights"** means the patents and patent applications that are listed on the attached Exhibit 1.31 under the heading "Cas9-II Group A Patent Rights" and any and all divisionals, continuations, continuations-in-part (only to the extent of claims that are entitled to the priority date of and directed specifically to the subject matter claimed in the applications listed on the attached Exhibit 1.31 under the heading "Cas9-II Group A Patent Rights"), substitutes, counterparts and foreign equivalents thereof filed in any country, and any patents issuing thereon (but in the case of patents issuing on continuations-in-part applications, only to the claims thereof that are entitled to the priority date of and directed specifically to the subject matter claimed in the applications listed on the attached Exhibit 1.31 under the heading "Cas9-II Group A Patent Rights") and any reissues, reexaminations or extensions thereof; provided, however, that Cas9-II Group A Patent Rights shall exclude any and all foreign equivalents in [**] related to any patent or patent application denoted with a "+" symbol on the attached Exhibit 1.31 under the heading "Cas9-II Group A Patent Rights."

1.27. **"Cas9-II Group B Enabled Product"** means any product or process, other than a Licensed Product or Cas9 Enabled Product, which is or incorporates, or which is made, identified, discovered, developed, optimized, characterized, selected, derived from or determined to have utility, in whole or in part, by the use or modification of, (a) any Cas9-II Group B Patent Rights or any technology or invention covered thereby, (b) any Cas9-II Group B Licensed Product, (c) any progeny, modification or derivative of a Cas9-II Group B Licensed Product, or (d) any living or nonliving cell, organism, microorganism (including viruses) made or modified through use of a Cas9-II Group B Licensed Product or technology covered by the Cas9-II Group B Patent Rights, or any progeny, clone, modification or derivative of such living or nonliving cell, organism, microorganism (including viruses); provided, however, that the term "Cas9-II Group B Enabled Product" shall not include any large or small molecule that (i) was identified or discovered using a Cas9-II Group B Licensed Product or technology Covered by the Cas9-II Group B Patent Rights and (ii) does not otherwise meet the definition of Cas9-II Group B Enabled Product (i.e., it is identified or discovered using a Cas9-II Group B Licensed Product or technology covered by the Cas9-II Group B Patent Rights but otherwise is not, or does not incorporate, or is not made, developed, optimized, characterized, selected, derived from or determined to have utility, in whole or in part, by the use or modification of a Cas9-II Group B

Licensed Product or technology covered by the Cas9-II Group B Patent Rights in a way that would cause it to be included in the definition of Cas9-II Group B Enabled Product). For clarity, the term "Cas9-II Group B Enabled Product" shall also not include any product or process (other than a Cas9-II Group B Licensed Product), for which the sole use of the Cas9-II Group B Patent Rights or technology covered thereby in connection with such product or process was to (x) serve as a control in the development of, or comparator in the pre-clinical development of, such product or process or (y) evaluate the efficacy of such Cas9-II Group B Patent Rights or technology covered thereby as applied to such product or process.

1.28. **"Cas9-II Group B Licensed Product"** means, on a country-by-country basis, any product that (a) is not a Cas9 Licensed Product and (b) the making, using, selling, offering for sale, exporting or importing of which product in the country in question is Covered by at least one Valid Claim of the Cas9-II Group B Patent Rights in that country. If, during the Royalty Term for a given Cas9-II Group B Licensed Product, such Cas9-II Group B Licensed Product is no longer Covered by at least one such Valid Claim in a country, and is not Covered by at least one Valid Claim of any other Patent right in such country, then such Cas9-II Group B Licensed Product shall be deemed a Cas9-II Group B Enabled Product in such country from that time forward for the purposes of calculating Milestone Payments under Section 4.5 and Royalties under Section 4.6, unless and until such product is again Covered by at least one Valid Claim of the Cas9-II Patent Rights (other than the Cas9-II Group A Patent Rights), at which time such product shall again be deemed a Cas9-II Group B Licensed Product for such purposes.

1.29. **"Cas9-II Group B Patent Rights"** means the patents and patent applications that are listed on the attached Exhibit 1.31 under the heading "Cas9-II Group B Patent Rights" and any and all divisionals, continuations, continuations-in-part (only to the extent of claims that are entitled to the priority date of and directed specifically to the subject matter claimed in the applications listed on the attached Exhibit 1.31 under the heading "Cas9-II Group B Patent Rights"), substitutes, counterparts and foreign equivalents thereof filed in any country, and any patents issuing thereon (but in the case of patents issuing on continuations-in-part applications, only to the claims thereof that are entitled to the priority date of and directed specifically to the subject matter claimed in the applications listed on the attached Exhibit 1.31 under the heading "Cas9-II Group B Patent Rights") and any reissues, reexaminations or extensions thereof; provided, however, that Cas9-II Group B Patent Rights shall exclude any and all foreign equivalents in [**] related to any patent or patent application denoted with a "+" symbol on the attached Exhibit 1.31 under the heading "Cas9-II Group B Patent Rights."

1.30. **"Cas9-II Institution"** means each of Broad, Harvard, MIT and Iowa individually, and "**Cas9-II Institutions**" means Broad, Harvard, MIT and Iowa, collectively.

1.31. **"Cas9-II Patent Rights"** means the Cas9-II Group A Patent Rights and the Cas9-II Group B Patent Rights.

1.32. **"Challenging Party"** means any Person that brings, assumes or participates in or that knowingly, willfully or recklessly assists in bringing a Patent Challenge.

1.33. **"Change of Control"** means, with respect to Company, (a) a merger or consolidation of Company with a Third Party which results in the voting securities of Company outstanding immediately prior thereto ceasing to represent at least fifty percent (50%) of the combined voting power of the surviving entity immediately after such merger or consolidation, (b) a transaction or series of related transactions in which a Third Party, together with its Affiliates, becomes the owner of fifty percent (50%) or more of the combined voting power of Company's outstanding securities other than through issuances by Company of securities of Company in a bona fide financing transaction or series of related bona fide financing transactions, or (c) the sale or other transfer to a Third Party of all or substantially all of Company's assets or all or substantially all of Company's business to which this Agreement relates.

1.34. **"Change of Control Multiplier"** has the meaning set forth in Section 4.5.4.

1.35. **"Church IP"** means the Patent Rights identified in Exhibit 1.25 as Church IP.

1.36. **"Claims"** has the meaning set forth in Section 9.1.1.

1.37. **"Clinical Study"** means any clinical study that meets the requirements of a Phase I Clinical Study, Phase II Clinical Study or Phase III Clinical Study.

1.38. **"Closing Price"** means, with respect to a particular date, the last reported sales price on (i) such date if such date is a Trading Day, or (ii) if such date is not a Trading Day, the most recent date prior to such date that is a Trading Day**.**

1.39. **"Common Stock"** means the common stock, par value $0.001 per share, of Company. For the purpose of Section 1.115, Section 4.10.1 and related definitions, "**Common Stock**" means the equity securities of any of Company or its Affiliates, or any successor thereto, that are Public Securities.

1.40. **"Company"** has the meaning set forth in the Preamble.

1.41. **"Company Confidential Information"** has the meaning set forth in Section 11.1.1.

1.42. **"Company Notification"** has the meaning set forth in Section 3.2.1**.**

1.43. **"Company Patents"** has the meaning set forth in Section 1.129.

1.44. **"Company Sale"** means (i) an Asset Sale to one or more Person(s) in a single transaction or series of related transactions, (ii) a Merger or (iii) an acquisition of at least [**] percent ([**]%) of Company's shares by a Person or by a Group in a single transaction or a series of related transactions. Notwithstanding anything to the contrary, (a) any Person that controls, is controlled by, or is under common control with, Company shall not be a "Person" for the purpose of this definition, (b) any Group that is solely comprised of Persons that control, are controlled by, or are under common control with, Company shall not be a "Group" for the purpose of this definition, and (c) for the purpose of this definition only, "control" and, with correlative meanings, the terms "controlled by" and "under common control with" means the (1) ownership or control of more than fifty percent (50%) of the voting securities or other ownership interest of another Person or (2) the possession, directly or indirectly, of the power to elect or appoint more than fifty percent (50%) of the members of the governing body of the other Person.

1.45. **"Company Sale Date"** means the date of closing of a Company Sale.

1.46. **"Company Sale Success Payment"** means the amount equal to the sum of all Success Payments that (i) correspond to Value Triggers that are lower than or equal to the Company Sale Value Trigger and (ii) are unpaid as of the day immediately prior to the Company Sale Date. By way of example, if Company has only paid the first two Success Payments to the Licensor Institutions (excluding any share issuance pursuant to Section 4.4) as of the day immediately prior to the Company Sale Date, and the Company Sale Value Trigger is [**] dollars ($[**]), then the Company Sale Success Payment shall be [**] dollars ($[**]).

1.47. **"Company Sale Value Trigger"** means the highest Value Trigger that is lower than or equal to the Upfront Acquisition Value. By way of example, if the Upfront Acquisition Value is [**] dollars ($[**]), then the Company Sale Value Trigger is [**] dollars ($[**]).

1.48. **"Competing Program"** has the meaning set forth in Section 4.6.2.3.

1.49. **"Competing Program Notice"** has the meaning set forth in Section 4.6.2.3.

1.50. **"Confidential Information"** has the meaning set forth in Section 11.1.1.

1.51. **"Covered"** means, with respect to a given product, process, method or service, that a Valid Claim would (absent a license thereunder or ownership thereof) be infringed by the making, using, selling, offering for sale, importation or other exploitation of such product, process, method or service. With respect to a claim of a pending patent application, "infringed" refers to activity that would infringe or be covered by such Valid Claim if it were contained in an issued patent. Cognates of the word "Covered" shall have correlative meanings**.**

1.52. **"Cpf1 Agreement"** means that certain Cpf1 License Agreement between Broad and Company dated as of the Effective Date.

1.53. **"CRISPR Patent Rights"** means the (a) Cas9-I Patent Rights identified on Exhibit 1.25 as CRISPR Patent Rights and (b) Cas9-II Patent Rights.

1.54. **"CRISPR Technology"** means an enzymatically active or inactive Cas9 or Cpf1 endonuclease combined with a nucleic acid moiety that preferentially binds to a specified DNA sequence and targets the endonuclease to the DNA sequence, where either the endonuclease or nucleic acid moiety can be engineered and/or linked to an effector moiety.

1.55. **"Deductions"** means, with respect to a Company Sale, any amounts that are deducted from the gross proceeds, and thereby reduce the amount paid to the holders of capital stock of Company, including, without limitation: (i) amounts paid to investment bankers, accountants or attorneys in connection with the transaction, (ii) severance or change of control payments made to employees or directors of Company, (iii) payments made to a Third Party to pay off indebtedness, (iv) liquidation preference payments or (v) amounts placed into escrow or a similar holdback.

1.56. **“Delivery Patent Rights”** means the Cas9-I Patent Rights identified on Exhibit 1.25 as Delivery Patent Rights.

1.57. **“Developing Country**” means any country identified as a Low-income or Lower-middle-income economy in the World Bank “Country and Lending Groups” classification.

1.58. **“Development Milestones”** means, with respect to a given product, the diligence milestones for the development and commercialization of such product.

1.59. **“Development Plan”** means the plan for the development and commercialization of Licensed Products attached hereto as Exhibit 3.3, as such plan may be adjusted from time to time pursuant to Section 3.3.

1.60. **“Direct License”** has the meaning set forth in Section 10.3.1.2.

1.61. **“Dispute”** has the meaning set forth in Section 11.7.

1.62. **“Documentation and Approvals”** has the meaning set forth in Section 10.3.4.2.

1.63. **“Editas”** means Editas Medicine, Inc.

1.64. **“Editas Cas9-I Exclusive Field”** means the “Field,” as such term is defined in the Editas Cas9-I License Agreement. As of the Effective Date, the definition of “Field” in the Editas Cas9-I License Agreement is as follows (with all capitalized terms in the following definition having the respective meanings ascribed to such terms in the Editas Cas9-I License Agreement):

“***“Field”*** *[as such term is defined in the Editas Cas9-I License Agreement] means the prevention or treatment of human disease (i) using gene therapy, (ii) using editing (including modifying) of Genetic Material or (iii) using targeting of Genetic Material (including targeting of Genetic Material to modify associated chromatin), either (a) ex vivo for subsequent administration to a human, in the case of the foregoing clause (ii) or (iii) of a product so edited or targeted, or (b) in vivo, by a product administered to a human, in the case of the foregoing clause (ii) or (iii) of a product that so edits or targets; provided that, (I) the Field does not include the prevention or treatment of human disease using a small or large molecule that (A) was identified or discovered using technology Covered by the Patent Rights, (B) is Covered by (x) a Valid Claim of the Patent Rights Covering the identifying or discovering of small or large molecules, and/or (y) a product-by-process or similar Valid Claim of the Patent Rights directed to a small or large molecule so identified or discovered, and (C) is not Covered by any other Valid Claim of the Patent Rights; (II) the Field does not include (A) modifying animals or animal cells for the creation, making, having made, use, sale, offer for sale, having sold,*

exportation and importation of organs suitable for xenotransplantation into humans or (B) research and development, and commercialization and other use or exploitation, of products or services in the field of Livestock Applications; (III) with respect to the Delivery Patent Rights, the Field only includes targeting of Genetic Material as set forth in clauses (a) and (b) above if such targeting is related to the use of CRISPR, TALE or zinc finger nuclease technology; (IV) the Field does not include production or processing of small or large molecules, including for the prevention or treatment of human disease, that are made using technology Covered by the Patent Rights, unless such small or large molecules (xx) are used for (1) gene therapy, (2) editing (including modifying) of Genetic Material or (3) targeting of Genetic Material (including targeting of Genetic Material to modify associated chromatin), in the case of (2) and (3) to the extent such editing or targeting is achieved through the use of CRISPR Technology or TALE Technology (other than through the making of such small or large molecules) and in each case (1), (2) and (3) as set forth in clauses (a) and (b) above, and (yy) are not otherwise excluded from this definition of Field; (V) the Field does not include Ag Products; and (VI) the Field does not include any products, including without limitation any Ag Product or any product in the field of Livestock Applications, that provide nutritional benefits, unless such products (aa) are regulated by a Regulatory Authority as a drug or biologic pursuant to Section 505 of the United States Federal Food, Drug, and Cosmetic Act of 1938, as amended, Section 351 of the United States Public Health Service Act of 1944, as amended, or any successor laws, or equivalent laws or regulations in jurisdictions outside the United States and (bb) are otherwise included in this definition of Field."

The Licensor Institutions will promptly notify Company in writing of any modifications or amendments to the definition of "Field" in the Editas Cas9-I License Agreement, including by providing written notice of any such modification or amendment which would reduce the scope of Company's rights under this Agreement within [**] following the effective date of such modification or amendment. Notwithstanding the foregoing, Licensor Institutions will use good faith efforts to provide prior notice to Company, to the extent permitted by Editas.

1.65. **"Editas Cas9-I License Agreement"** means the Amended and Restated Cas9-I License Agreement by and between, on the one hand, Harvard and Broad and, on the other hand, Editas dated December 16, 2016, as amended from time to time.

1.66. **"Editas Cas9-II Exclusive Field"** means the "Field," as such term is defined in the Editas Cas9-II License Agreement. As of the Effective Date, the definition of "Field" in the Editas Cas9-II License Agreement is as follows (with all capitalized terms in the following definition having the respective meanings ascribed to such terms in the Editas Cas9-II License Agreement):

"***"Field"*** *[as such term is defined in the Editas Cas9-II License Agreement] means the prevention or treatment of human disease (i) using gene therapy, (ii) using editing (including modifying) of Genetic Material or (iii) using targeting of Genetic Material (including targeting of Genetic Material to modify associated chromatin), either (a) ex vivo for subsequent administration to a human, in the case of the foregoing clause (ii) or (iii) of a product so edited or targeted, or (b) in vivo, by a product administered to a*

human, in the case of the foregoing clause (ii) or (iii) of a product that so edits or targets; provided that, (I) the Field does not include the prevention or treatment of human disease using a small or large molecule that (A) was identified or discovered using technology Covered by the Patent Rights, (B) is Covered by (x) a Valid Claim of the Patent Rights Covering the identifying or discovering of small or large molecules, and/or (y) a product-by-process or similar Valid Claim of the Patent Rights directed to a small or large molecule so identified or discovered, and (C) is not Covered by any other Valid Claim of the Patent Rights; (II) the Field does not include (A) modifying animals or animal cells for the creation, making, having made, use, sale, offer for sale, having sold, exportation and importation of organs suitable for xenotransplantation into humans or (B) research and development, and commercialization and other use or exploitation, of products or services in the field of Livestock Applications; (III) the Field does not include production or processing of small or large molecules, including for the prevention or treatment of human disease, that are made using technology Covered by the Patent Rights, unless such small or large molecules (xx) are used for (1) gene therapy, (2) editing (including modifying) of Genetic Material or (3) targeting of Genetic Material (including targeting of Genetic Material to modify associated chromatin), in the case of (2) and (3) to the extent such editing or targeting is achieved through the use of CRISPR Technology or TALE Technology (other than through the making of such small or large molecules) and in each case (1), (2) and (3) as set forth in clauses (a) and (b) above, and (yy) are not otherwise excluded from this definition of Field; (IV) the Field does not include Ag Products; and (V) the Field does not include any products, including without limitation any Ag Product or any product in the field of Livestock Applications, that provide nutritional benefits, unless such products (aa) are regulated by a Regulatory Authority as a drug or biologic pursuant to Section 505 of the United States Federal Food, Drug, and Cosmetic Act of 1938, as amended, Section 351 of the United States Public Health Service Act of 1944, as amended, or any successor laws, or equivalent laws or regulations in jurisdictions outside the United States and (bb) are otherwise included in this definition of Field."

The Licensor Institutions will promptly notify Company in writing of any modifications or amendments to the definition of "Field" in the Editas Cas9-II License Agreement, including by providing written notice of any such modification or amendment which would reduce the scope of Company's rights under this Agreement within [**] following the effective date of such modification or amendment. Notwithstanding the foregoing, Licensor Institutions will use good faith efforts to provide prior notice to Company, to the extent permitted by Editas.

1.67. **"Editas Cas9-II License Agreement"** means the Cas9-II License Agreement by and between Broad and Editas dated December 16, 2016, as amended from time to time.

1.68. **"Effective Date"** has the meaning set forth in the Preamble.

1.69. **"Election Date"** has the meaning set forth in Section 4.10.3.

1.70. **"Enabled Product"** means any product or process that (a) is not a Licensed Product and (b) is a Cas9 Enabled Product or Cas9-II Group B Enabled Product.

1.71. **"Enrolled"** means that a human research subject has met the initial screening criteria for inclusion in a clinical study and has been deemed eligible to participate in such clinical study, all as provided in the applicable clinical study protocol(s) and statistical analysis plan(s). For clarity, human research subjects that have been screened for inclusion in a clinical study and deemed ineligible based on the results of screening shall not be deemed to be "Enrolled" for the purposes of this Agreement.

1.72. **"Enterprise Value"** means, with respect to an entity, the equity value of such entity as determined in a Valuation Analysis.

1.73. **"Environmental Impact"** means any release, spill, emission, leaking, injection, outcross, deposit, disposal, discharge, dispersal, leaching or migration of material (including any hazardous material, plant, plant part, plant cell, plant tissue or plant seed) into the atmosphere, soil, surface water, groundwater, sewer system or property.

1.74. **"Equity Event"** means the first to occur of the following:

(a) the first bona fide financing of Company, including the first equity financing involving the sale of Company's preferred stock (the "**Next Financing Shares**") to investors (the "**Next Financing**"), which results in a Post-Money Valuation of at least $[**], where "**Post-Money Valuation**" means the product of (i) the highest price per Next Financing Share paid by investors in the Next Financing, or otherwise the FMV of Common Stock, and (ii) the number of shares of Company capital stock outstanding following the consummation of all closings of the financing calculated on a Fully-Diluted Basis; and

(b) Company's achievement of a Market Capitalization of at least $500,000,000; and

(c) Company undergoing a Company Sale where the applicable Acquisition Value exceeds $500,000,000.

1.75. **"Equity Event Shares"** has the meaning set forth in Section 4.4.1.

1.76. **"E.U."** means the European Union, including the United Kingdom, regardless of its membership in the European Union.

1.77. **"E.U. Major Market Countries"** means the United Kingdom (regardless of its membership in the European Union), Germany, Italy, France and Spain.

1.78. **"Exchange Act"** means the United States Securities and Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder.

1.79. **"Executive Officers"** has the meaning set forth in Section 11.7.

1.80. **"FDA"** means the United States Food and Drug Administration.

1.81. **"Field"** means, solely with respect to products and processes directed to the Targets, the prevention or treatment of human disease (i) using gene therapy, (ii) using editing (including modifying) of Genetic Material or (iii) using targeting of Genetic Material (including targeting of Genetic Material to modify associated chromatin), either (a) ex vivo for subsequent administration to a human, in the case of the foregoing clause (ii) or (iii) of a product so edited or targeted, or (b) in vivo, by a product administered to a human, in the case of the foregoing clause (ii) or (iii) of a product that so edits or targets; provided that, the Field does not include (I) the prevention or treatment of human disease using a small or large molecule that (A) was identified or discovered using technology Covered by the Patent Rights, (B) is Covered by (x) a Valid Claim of the Patent Rights Covering the identifying or discovering of small or large molecules, and/or (y) a product-by-process or similar Valid Claim of the Patent Rights directed to a small or large molecule so identified or discovered, and (C) is not Covered by any other Valid Claim of the Patent Rights; (II) (A) modifying animals or animal cells for the creation, making, having made, use, sale, offer for sale, having sold, exportation and importation of organs suitable for xenotransplantation into humans or (B) research and development, and commercialization and other use or exploitation, of products or services in the field of Livestock Applications; (III) production or processing of small or large molecules, including for the prevention or treatment of human disease, that are made using technology Covered by the Patent Rights, unless such small or large molecules (xx) are used for (1) gene therapy, (2) editing (including modifying) of Genetic Material or (3) targeting of Genetic Material (including targeting of Genetic Material to modify associated chromatin), in the case of (2) and (3) to the extent such editing or targeting is achieved through the use of CRISPR Technology or TALE Technology (other than through the making of such small or large molecules) and in each case (1), (2) and (3) as set forth in clauses (a) and (b) above, and (yy) are not otherwise excluded from this definition of Field; (IV) Ag Products; and (V) any products, including without limitation any Ag Product or any product in the field of Livestock Applications, that provide nutritional benefits, unless such products (aa) are regulated by a Regulatory Authority as a drug or biologic pursuant to Section 505 of the United States Federal Food, Drug, and Cosmetic Act of 1938, as amended, Section 351 of the United States Public Health Service Act of 1944, as amended, or any successor laws, or equivalent laws or regulations in jurisdictions outside the United States and (bb) are otherwise included in this definition of Field. In addition, with respect to the Delivery Patent Rights, the Field only includes targeting of Genetic Material as set forth in clauses (a) and (b) above if such targeting is related to the use of CRISPR Technology, TALE Technology or zinc finger nuclease technology.

1.82. **"First Commercial Sale"** means the date of the first sale by Company, its Affiliate or a Sublicensee of a Licensed Product or Enabled Product to a Third Party following receipt of Regulatory Approval in the country in which such Licensed Product or Enabled Product is sold, excluding, however, any sale or other distribution for use in a clinical study, charitable purposes or compassionate use or similar limited purposes.

1.83. **"FMV of Common Stock"** means (a) if Company's shares of Common Stock are Public Securities as of the applicable determination date, the Closing Price, or (b) if Company's shares of Common Stock are not Public Securities as of the applicable determination date, the value determined by dividing (1) the Enterprise Value as determined in the most recent Valuation Analysis prior to such date by (2) the total number of issued and outstanding shares of Common Stock (assuming conversion of all outstanding stock other than common stock into common stock**)**.

1.84. **"Fully-Diluted Basis"** means, as of a specified date, the number of shares of common stock of Company then-outstanding plus the number of shares of common stock of Company issuable upon exercise or conversion of then-outstanding convertible securities or warrants, options, or other rights to subscribe for, purchase or acquire from Company any capital stock of Company (which shall be determined without regard to whether such securities or rights are then vested, exercisable or convertible) plus, without duplication, the number of shares reserved and available for future grant under any then-existing equity incentive plan of Company; provided that, for clarity, "other rights to subscribe for, purchase or acquire" shall not include (i) preemptive or other rights to participate in new offerings of securities by Company, (ii) obligations under a purchase agreement for preferred stock of Company to acquire additional shares of such preferred stock on the same terms as those purchased at an initial closing upon the passage of time or meeting (or waiver) of specified Company performance conditions or (iii) anti-dilution provisions that have not been triggered.

1.85. **"Genetic Material"** means all DNA (including without limitation DNA in and outside chromosomes) and RNA.

1.86. **"Group"** means two or more Persons acting as a partnership, limited partnership, syndicate or other group for the purposes of acquiring, holding, voting or disposing of the securities of a company.

1.87. **"Harvard"** has the meaning set forth in the Preamble.

1.88. **"Harvard Confidential Information"** has the meaning set forth in Section 11.1.1.

1.89. **"Harvard Controlled Patents"** has the meaning set forth in the Recitals.

1.90. **"Harvard/MIT/Broad Co-Owned Cas9-I Patent Rights"** has the meaning set forth in the Recitals.

1.91. **"HHMI"** has the meaning set forth in the Recitals.

1.92. **"HHMI Indemnitees"** has the meaning set forth in Section 9.1.3.

1.93. **"HHMI License"** has the meaning set forth in Section 2.2.1.

1.94. **"HHMI Names"** has the meaning set forth in Section 11.2.

1.95. **"IND"** means an FDA Investigational New Drug application, or equivalent application or submission for approval to conduct human clinical investigations filed with or submitted to a Regulatory Authority in conformance with the requirements of such Regulatory Authority.

1.96. **"Indemnitees"** has the meaning set forth in Section 9.1.1.

1.97. **"Indemnitor"** has the meaning set forth in Section 9.1.1.

1.98. **“Ineligible Sublicensees”** has the meaning set forth in Section 10.3.1.2.

1.99. **“Informed Party”** has the meaning set forth in Section 4.6.2.3.

1.100. **“Infringement”** has the meaning set forth in Section 7.2.

1.101. **“Initial Public Offering”** means a firm-commitment underwritten public offering of equity securities of Company, or any successor thereto, pursuant to an effective registration statement under the Securities Act (or any equivalent registration statement with respect to jurisdictions outside the United States) following which such equity securities shall be publicly held.

1.102. “**Initial Shares**” has the meaning set forth in Section 4.4.1.

1.103. **“Institution Names”** has the meaning set forth in Section 11.2.

1.104. **“Internal Research Purposes”** means use as a research tool for research purposes in the field of human therapeutics in Company’s or its Affiliates’ internal laboratories, provided, however, that notwithstanding the foregoing, “Internal Research Purposes” shall expressly exclude (a) any human or clinical use, including, without limitation, any administration into humans or any diagnostic or prognostic use, (b) any human germline modification, including modifying the DNA of human embryos or human reproductive cells, (c) any *in vivo* veterinary or livestock use (for clarity, the use of any animal or animal cell in preclinical research shall be included in “Internal Research Purposes”), (d) the manufacture, distribution, importation, exportation, transportation, sale, offer for sale, marketing, promotion or other exploitation or use of, or as, a testing service, therapeutic or diagnostic for humans or animals, or (e) any use or application relating to the stimulation of biased inheritance of particular genes or traits within a population of plants or animals.

1.105. **“Invoicing Entity”** has the meaning set forth in Section 1.123.

1.106. **“Iowa”** has the meaning set forth in the Recitals.

1.107. **“License Issue Fee”** has the meaning set forth in Section 4.2.1.

1.108. **“License Fees”** has the meaning set forth in Section 4.3.

1.109. **“Licensed Product”** means any product or process that is a Cas9 Licensed Product or Cas9-II Group B Licensed Product.

1.110. **“Licenses”** means (a) this Agreement and (b) the Cpf1 Agreement; **“License”** means any of the licenses set forth in the foregoing (a) or (b).

1.111. **“Licensor Institution”** and **“Licensor Institutions”** have the meanings set forth in the Preamble.

1.112. **“Licensor Institution Confidential Information”** has the meaning set forth in Section 11.1.1.

1.113. **“Litigation Expenses”** has the meaning set forth in Section 7.2.3.

1.114. **“Livestock Applications”** means (a) the modification or alteration of livestock, or of any products, cells or materials derived from livestock, or the use or provision of any processes, methods or services using livestock, or the use of any products, cells or materials derived from livestock, for the purposes of (i) affecting the fitness of such livestock, including affecting their ability to survive or reproduce, (ii) creating, expressing, transmitting, conferring, improving, or imparting a Trait of interest in such livestock, or (iii) bioproduction or bioprocessing, or (b) the use, production, alteration or modification of exotic animals, or of any products, cells, tissues or materials derived from exotic animals (including biomaterials derived from such exotic animals) in or for consumer goods or products. For the purposes of this definition, (A) “livestock” means (1) cattle, sheep, goats, buffalo, llamas, camels, swine, poultry and fowl (including egg-producing poultry and fowl), dogs, cats and equine animals, (2) animals used for food or in the production of food, (3) animals ordinarily raised or used on the farm or for home use, consumption, or profit, and (4) fish used for food, and (B) “exotic animals” means snakes, alligators, elephants, camels and other exotic animals but specifically excludes all rodents. Notwithstanding anything in this definition or elsewhere in this Agreement to the contrary, Livestock Applications does not include (i) the use of any animal or animal cell in preclinical research or (ii) the treatment of animal disease.

1.115. **“Market Capitalization”** means, in the event that the shares of Common Stock are Public Securities, with respect to a particular Trading Day, the closing price per share of Common Stock on such Trading Day multiplied by the number of shares of Common Stock outstanding as set forth on [**], in each case (a) and (b) [**] on or prior to such Trading Day. For the purpose of this definition, “Company” shall mean Company or any Affiliate of Company that issues Common Stock.

1.116. **“Merger”** means any merger or consolidation of Company with or into another Person where the pre-merger or pre-consolidation, as the case may be, stockholders of Company (or, in the event that there is a related tender offer for Company’s shares prior to the merger or consolidation by a Person or a Group that is a party to such merger or consolidation, the stockholders of Company immediately prior to the commencement of such related tender offer) do not own, immediately after such merger or consolidation, as the case may be, a majority of the total voting power represented by the outstanding voting securities of the surviving entity.

1.117. **“Milestone Event”** means any milestone event indicated in Section 4.5.1 or 4.5.2.

1.118. **“Milestone Explanation”** has the meaning set forth in Section 3.5.

1.119. **“Milestone Payment”** means any milestone payment indicated in Section 4.5.1 or 4.5.2 corresponding to any Milestone Event.

1.120. **“Milestone Plan”** has the meaning set forth in Section 3.5.

1.121. **“MIT”** has the meaning set forth in the Recitals.

1.122. **"MIT/Broad Co-Owned Cas9-I Patent Rights"** has the meaning set forth in the Recitals.

1.123. **"Net Sales"** means the gross amount billed or invoiced by or on behalf of Company, its Affiliates, Sublicensees and any Affiliates of such Sublicensees (in each case, the **"Invoicing Entity"**) or if not billed or invoiced the gross amount received by the Invoicing Entity, on sales, leases, uses or other transfers of Licensed Products or Enabled Products, less the following to the extent applicable with respect to such sales, leases or other transfers and not previously deducted from the gross invoice price: (a) customary trade, quantity or cash discounts to the extent actually allowed and taken; (b) amounts actually repaid or credited by reason of rejection, return or recall of any previously sold, leased or otherwise transferred Licensed Products or Enabled Products; (c) rebates granted or given; (d) allowances for non-collectible receivables; (e) customer freight charges that are paid by or on behalf of the Invoicing Entity; and (f) to the extent separately stated on purchase orders, invoices or other documents of sale, any sales, value added or similar taxes, custom duties or other similar governmental charges levied directly on the production, sale, transportation, delivery or use of a Licensed Product or Enabled Product that are paid by or on behalf of the Invoicing Entity, but not including any tax levied with respect to income; provided that:

(a) in no event shall the aggregate amount of all deductions made pursuant to clauses (d) and (e) above in any Calendar Quarter exceed [**] percent ([**]%) of Net Sales in such Calendar Quarter;

(b) Net Sales shall not include (a) sales or other transfers of any Licensed Product or Enabled Product used for clinical trials or other research, or (b) donations for charity or compassionate use for which an Invoicing Entity does not receive consideration;

(c) in any transfers of Licensed Products or Enabled Products between an Invoicing Entity and an Affiliate or Sublicensee of such Invoicing Entity not for the purpose of resale by such Affiliate or Sublicensee, Net Sales shall be equal to the fair market value of the Licensed Products or Enabled Products so transferred, assuming an arm's length transaction made in the ordinary course of business;

(d) in the event that (i) an Invoicing Entity receives non-cash consideration for any Licensed Products or Enabled Products, (ii) an Invoicing Entity sells Licensed Products or Enabled Products in a transaction not at arm's length with a non-Affiliate of an Invoicing Entity, or (iii) any Licensed Product or Enabled Product is sold by an Invoicing Entity at a discounted price that is substantially lower than the customary prices charged by such Invoicing Entity, Net Sales shall be calculated based on the fair market value of such consideration or transaction, assuming an arm's length transaction made in the ordinary course of business, provided that, if a Licensed Product or Enabled Product is sold under circumstances in which the discounted price is the result of market forces and not a quid pro quo for value other than the monetary consideration charged in such sale of Licensed Product or Enabled Product, such discounted price shall be deemed to be a customary price;

(e) with respect to any provision hereof requiring a calculation of fair market value, assuming an arm's length transaction made in the ordinary course of business, Invoicing Entity may use the average price of the relevant Licensed Product or Enabled Product sold for cash during the relevant period in the relevant country; and

(f) sales of Licensed Products or Enabled Products by an Invoicing Entity to its Affiliate or a Sublicensee for resale by such Affiliate or Sublicensee shall not be deemed Net Sales. Instead, Net Sales shall be determined based on the gross amount billed or invoiced by such Affiliate or Sublicensee upon resale of such Licensed Products or Enabled Products to any third party that is not an Affiliate or Sublicensee of the Invoicing Entity.

1.124. **"Next Financing"** has the meaning set forth in Section 1.74.

1.125. **"Next Financing Shares"** has the meaning set forth in Section 1.74.

1.126. **"Other IP"** has the meaning set forth in Section 7.2.

1.127. **"Owner Institution"** means each of the Cas9-I Institutions and Cas9-II Institutions individually, and "**Owner Institutions**" means the Cas9-I Institutions and the Cas9-II Institutions, collectively.

1.128. **"Party"** and **"Parties"** have the meaning set forth in the Preamble.

1.129. **"Patent Challenge"** means any direct, or indirect through the actions of another acting on Company's, its Affiliate's, or a Sublicensee's behalf or upon its or their instruction, dispute or challenge, or any knowing, willful, or reckless assistance in the dispute or challenge, of the validity, patentability, scope, priority, construction, non-infringement, inventorship, ownership or enforceability of any Patent Right or any claim thereof, or opposition or assistance in the opposition of the grant of any letters patent within the Patent Rights, in any legal or administrative proceedings, including in a court of law, before the United States Patent and Trademark Office or other agency or tribunal in any jurisdiction, or in arbitration including, without limitation, by reexamination, inter partes review, opposition, interference, post-grant review, nullity proceeding, preissuance submission, third party submission, derivation proceeding or declaratory judgment action. For clarity, a Patent Challenge shall not include (1) arguments made by Company that (a) distinguish the inventions claimed in patents or patent applications owned or controlled by Company ("**Company Patents**") from those claimed in the Patent Rights but (b) do not disparage the Patent Rights or challenge the validity, scope, or enforceability of the Patent Rights' claims under applicable patent laws, regulations or administrative rules, in each case (i) in the ordinary course of ex parte prosecution of the Company Patents or (ii) in inter partes proceedings before the United States Patent and Trademark Office or other agency or tribunal in any jurisdiction (excluding interferences or derivation proceedings), or in arbitration, wherein the Company Patents have been challenged; (2) arguments or assertions as to whether the Patent Rights Cover a given product, to the extent arising in a Suit brought by the Licensor Institutions; (3) Company payments of patent costs to another licensor or assignor of Company Patents as required by the agreement under which Company obtained rights to such patent rights, even if the licensor or assignor is engaging in behavior or presenting arguments that would themselves be considered a Patent Challenge if done by Company; or (4) Company being named as an essential party, real party in interest or other status similar to either of the foregoing, in an interference between Patent Rights and Company Patents or other adversarial proceeding similar to an interference.

1.130. **"Patent Rights"** means the Cas9-I Patent Rights and the Cas9-II Patent Rights.

1.131. **"Person"** means an individual, sole proprietorship, partnership, limited partnership, limited liability partnership, corporation, limited liability company, business trust, joint stock company, trust, unincorporated association, joint venture or other similar entity or organization, including a government or political subdivision, department or agency of a government.

1.132. **"Phase I Clinical Study"** means, as to a specific Licensed Product, a study of such product in humans designed to satisfy the requirements of 21 C.F.R. § 312.21(a), as amended from time to time, or the corresponding regulation in jurisdictions other than the United States.

1.133. **"Phase II Clinical Study"** means (a) a preliminary efficacy and safety human clinical study in any country conducted to evaluate a drug for a particular indication or indications in patients with the disease or condition under study, where at least one of the primary endpoints of such study is an efficacy endpoint, or (b) any human clinical study that satisfies the requirements of 21 C.F.R. § 312.21(b) in the United States.

1.134. **"Phase III Clinical Study"** means (a) a human clinical study in any country, whether controlled or uncontrolled, that is performed to obtain Regulatory Approval of a drug after preliminary evidence suggesting effectiveness of the drug under evaluation has been obtained, and intended to confirm with statistical significance the efficacy and safety of a drug, to evaluate the overall benefit-risk relationship of the drug and to provide an adequate basis for physician labeling, or (b) a human clinical study that satisfies the requirements of 21 C.F.R. § 312.21(c) in the United States.

1.135. **"Post-Money Valuation"** has the meaning set forth in Section 1.74.

1.136. **"Principal Trading Market"** means the Trading Market on which the Common Stock is primarily listed on and quoted for trading.

1.137. **"Prosecution"** means the preparation, filing, prosecution, issuance and maintenance of the Patent Rights, including continuations, continuations-in-part, divisionals, extensions, reexaminations, inter partes review, reissues, supplemental examination, appeals, interferences, derivation proceedings, oppositions, all other proceedings before the United States Patent and Trademark Office (including the Patent Trial and Appeal Board) and foreign patent offices, and any judicial or other appeals of the foregoing. Cognates of the word "Prosecution" have their correlative meanings.

1.138. **"Public Securities"** means securities that are listed on a national securities exchange registered under the Exchange Act or if not listed on a national securities exchange registered under the Exchange Act, quoted on NASDAQ, OTCQB or other similar quotation system.

1.139. **"Record Retention Period"** has the meaning set forth in Section 5.3.

1.140. **"Regulatory Approval"** means, with respect to a particular product or service, receipt of all regulatory clearances or approvals (which in the case of the E.U. may be through the centralized procedure) required in the jurisdiction in question for the sale of the applicable product or service in such jurisdiction, including receipt of pricing approval, if any, legally required for such sale.

1.141. **"Regulatory Authority"** means any applicable government regulatory authority involved in granting clearances or approvals for the manufacturing and marketing of a Licensed Product or Enabled Product, including, in the United States, the FDA.

1.142. **"Replacement Product"** has the meaning set forth in Section 4.5.6.

1.143. **"Resale Registration Statement"** means a registration statement on Form S-1 or Form S-3 filed by Company with the Securities and Exchange Commission under the Securities Act covering the resale by a Licensor Institution of Success Payment Shares.

1.144. **"Reviewed Patent Rights"** means, subject to Section 6.2, the Cas9-I Patent Rights and Cas9-II Group A Patent Rights within and with respect to the specific patent families identified in Exhibit 1.144 (where each patent family is listed under a distinct "Broad Reference" or "Harvard Reference" number in Exhibit 1.144).

1.145. **"Rockefeller"** has the meaning set forth in the Recitals.

1.146. **"Royalties"** has the meaning set forth in Section 4.6.1.

1.147. **"Royalty Term"** means, on a country-by-country and product-by-product basis, the period commencing on the Effective Date and ending on the later of: (a) the expiration of the last Valid Claim within the Patent Rights Covering the Licensed Product or (b) the tenth (10th) anniversary of the date of the First Commercial Sale of the Licensed Product or Enabled Product; provided that, for any Enabled Product that was a Licensed Product, the date of the First Commercial Sale in clause (b) shall be deemed to be the earlier of (i) the date of First Commercial Sale of the Enabled Product that was a Licensed Product, and (ii) the date of the First Commercial Sale of the Licensed Product that became such Enabled Product.

1.148. **"Schedule 1 Product"** means a Licensed Product or an Enabled Product, in each case for the prevention or treatment of human disease for which the prevalence is fewer than [**] patients in the U.S., or which the Licensor Institutions and Company otherwise agree in writing shall be considered a Schedule 1 Product based on their review and assessment of the available information.

1.149. **"Schedule 2 Product"** means a Licensed Product or an Enabled Product, in each case for the prevention or treatment of human disease for which the prevalence is [**] patients or greater in the U.S.

1.150. **"Section 409A"** means Section 409A of the United States Internal Revenue Code of 1986, as amended, and the rules and regulations promulgated thereunder.

1.151. **"Securities Act"** means the United States Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder.

1.152. **"Shares"** has the meaning set forth in Section 4.4.1.

1.153. **"Single Schedule 1 Product"** means all Schedule 1 Products that contain the same active ingredient and no other active ingredient, or contain the same combination of active ingredients and no other active ingredient, without regard to formulation or dosage.

1.154. **"Single Schedule 2 Product"** means all Schedule 2 Products that contain the same active ingredient and no other active ingredient, or contain the same combination of active ingredients and no other active ingredient, without regard to formulation or dosage.

1.155. **"Skipped Milestone"** has the meaning set forth in Section 4.5.1.

1.156. **"Stock Issuance Agreement"** means the Stock Issuance Agreement set forth in Exhibit 4.4.1.

1.157. **"Sublicense"** means an agreement (other than an assignment of this Agreement in compliance with Section 11.14) in which Company, an Affiliate of Company or a Sublicensee (a) grants or otherwise transfers any of the rights licensed to Company hereunder or rights relating to Licensed Products or Enabled Products, (b) agrees not to assert such rights or to sue, prevent or seek a legal remedy for the practice of same, or (c) is under an obligation to grant, assign or transfer any such rights or non-assertion, or to forbear from granting or transferring such rights, to any other Person, including by means of an option. Agreements expressly considered Sublicenses include (i) licenses, option agreements, "lock up" agreements, right of first refusal agreements, non-assertion agreements, covenants not to sue, distribution agreements that grant or otherwise transfer any rights licensed to Company hereunder, or similar agreements, and (ii) agreements that grant or otherwise transfer rights licensed to Company under this Agreement along with rights owned by the Company, an Affiliate of Company or a Sublicensee or granted to the Company, an Affiliate of Company or a Sublicensee by a Third Party, but excluded from this definition of "Sublicense" is any assignment of this Agreement in compliance with Section 11.14. For the avoidance of doubt, if a Sublicense is entered into pursuant to an option or similar agreement that is also a Sublicense, then the date of execution of the Sublicense shall be the execution date of the option or similar agreement, not the date of the exercise of the option or similar agreement.

1.158. **"Sublicense Income"** means consideration in any form that Company or an Affiliate receives from a Sublicensee (or is entitled to receive, whether or not offset against amounts payable to a Sublicensee under the Sublicense). Sublicense Income shall include any license fee, license maintenance fee, minimum royalty payment in excess of earned royalties, option fee, lump sum payment, equity securities received by Company or an Affiliate in connection with a Sublicense, distribution, joint marketing fee, milestone payments and other payments. In the event Company or an Affiliate receives non-monetary consideration in connection with a Sublicense, Sublicense Income shall be calculated based on the fair market value of such consideration at the time of the transaction assuming an arm's length transaction made in the ordinary course of business.

Sublicense Income specifically excludes the following:

(a) running royalties on Net Sales;

(b) payments made by a Sublicensee as consideration for the issuance of equity or debt securities of, or other investment in, Company or an Affiliate at fair market value, provided that if a Sublicensee pays more than fair market value (such fair market value being determined by reference to the price paid by a non-Sublicensee Third Party for the equivalent Company security or by a reasonable methodology where such non-Sublicensee Third Party price is not available) for equity or debt securities or other investment in Company or an Affiliate, then the portion in excess of fair market value shall be considered Sublicense Income;

(c) reimbursement for patent expenses (including prosecution and enforcement expenses) at the Company's or its Affiliate's out-of-pocket cost;

(d) payments to Company or an Affiliate by a Sublicensee under a Sublicense for the purpose of funding the costs of bona fide research and development of Licensed Products or Enabled Products by the Company or its Affiliates to be conducted on or following the Effective Date of this Agreement and the effective date of such Sublicense, to the extent such amounts are stipulated in the Sublicense to be allocated specifically to reimburse such costs under the Sublicense, as indicated by inclusion as specific line items in the Sublicense; provided that, to the extent such costs are not actually incurred by Company or its Affiliates, as evidenced by written documentation of the accounts of Company or its Affiliates, during such definitive periods, such amounts shall be deemed Sublicense Income; and

(e) payments made by a Sublicensee to Company or an Affiliate solely to the extent such amounts are allocated specifically in the Sublicense as consideration for a Company Sale or for an option or warrant for a Company Sale at a later date.

1.159. **"Sublicensee"** means any Third Party of Company to which Company or its Affiliate (or a direct or indirect Sublicensee of Company or its Affiliate) has granted a Sublicense.

1.160. **"Success Payment"** has the meaning set forth in Section 4.10.1.2.

1.161. **"Success Payment Shares"** has the meaning set forth in Section 4.10.3.

1.162. **"Suit"** has the meaning set forth in Section 11.8.

1.163. **"Suspension"** has the meaning set forth in Section 4.10.3.3.

1.164. **"TALE Patent Rights"** means the Cas9-I Patent Rights identified on Exhibit 1.25 as TALE Patent Rights.

1.165. **"TALE Technology"** means a Transcription Activator-Like Effector (TALE) protein DNA binding domain that preferentially binds a specified DNA sequence, and which may also be linked to an effector moiety.

1.166. **"Targets"** means the targets set forth in Exhibit 1.166.

1.167. **"Temporary Extension"** has the meaning set forth in Section 10.3.1.2.

1.168. **"Term"** means the term of this Agreement as set forth in Section 10.1.

1.169. **"Third Party"** means any Person that is not (a) an Owner Institution, (b) Company or (c) an Affiliate of Company.

1.170. **"Third Party Proposal"** has the meaning set forth in Section 3.2.1.

1.171. **"Third Party Proposed Category"** has the meaning set forth in Section 3.2.1.

1.172. **"Third Party Proposed Target"** has the meaning set forth in Section 3.2.1.

1.173. **"Total Financing Amount"** has the meaning set forth in Section 4.4.2.

1.174. **"Trading Day"** means (i) a day on which the Common Stock is listed or quoted and traded on its Principal Trading Market (other than the OTC Bulletin Board), or (ii) if the Common Stock is not listed on a Trading Market (other than the OTC Bulletin Board), a day on which the Common Stock is traded in the over-the-counter market, as reported by the OTC Bulletin Board, or (iii) if the Common Stock is not quoted on any Trading Market, a day on which the Common Stock is quoted in the over-the-counter market as reported in the "pink sheets" by Pink Sheets LLC (or any similar organization or agency succeeding to its functions of reporting prices). In the event that Common Stock are not Public Securities, Trading Day shall mean a business day in Cambridge, Massachusetts.

1.175. **"Trading Market"** means whichever of the New York Stock Exchange, the NYSE Amex Equities (formerly the American Stock Exchange), the NASDAQ Global Select Market, the NASDAQ Global Market, the NASDAQ Capital Market or the OTC Bulletin Board on which the Common Stock is listed or quoted for trading on the date in question.

1.176. **"Trailing Acquisition Value"** means with respect to a Company Sale, the amount equal to [**] after the Company Sale Date, with such amount grossed up [**], including without limitation [**].

1.177. **"Trailing Value Receipt Date"** means the date of receipt by Company or its stockholders of Trailing Acquisition Value.

1.178. **"Trait"** means any biochemical, physiological, physical or other attribute or phenotype of a cell, plant or plant component, or animal or animal component.

1.179. **"Trigger Date"** means [**].

1.180. **"Trigger Date Value Trigger"** has the meaning set forth in Section 1.179.

1.181. **"Upfront Acquisition Value"** means, with respect to a Company Sale, the amount equal to [**] in a Company Sale, with such amount grossed up [**]. Any portion of such consideration that is held back or placed into escrow as security for potential indemnification or other claims in connection with such Company Sale shall be [**] the Upfront Acquisition Value, but shall be [**] the Trailing Acquisition Value if, when and to the extent such consideration is released to Company or its stockholders.

1.182. **"Valid Claim"** means: (a) a claim of an issued and unexpired patent within the Patent Rights that has not been (i) held permanently revoked, unenforceable, unpatentable or invalid by a decision of a court or governmental body of competent jurisdiction, unappealable or unappealed within the time allowed for appeal, (ii) disclaimed or rendered unenforceable through disclaimer or otherwise, or (iii) abandoned, or (b) a pending claim of a pending patent application within the Patent Rights, which claim has not been pending for more than [**] from the first substantive office action with respect to the pending claim and has not been abandoned or finally rejected without the possibility of appeal or refiling or without such appeal having been taken or refiling having been made within the applicable time periods. Notwithstanding the foregoing, (i) the [**] pendency period set forth in clause (b) above shall only apply if, after [**] of prosecution on the merits of a given application, Company notifies the Licensor Institutions in writing that it does not believe that Licensor Institutions should continue to prosecute such application and the Licensor Institutions continue to do so at their discretion, and (ii) if the prosecution of a given application is interrupted and/or delayed (A) by a patent office or (B) due to a Patent Challenge or a patent office proceeding such as an interference, appeal or opposition, then in each case (A) and (B) the pendency of such Patent Challenge or proceeding(s) shall not be included in the [**] time period set forth above. The invalidity of a particular claim in one or more countries shall not invalidate such claim in any remaining countries. For the avoidance of doubt, a pending claim of a patent application filed pursuant to the Patent Cooperation Treaty shall be considered pending in all designated jurisdictions.

1.183. **"Valuation Analysis"** means, with respect to an entity, a valuation analysis of such entity conducted by an independent valuation expert for purposes of compliance with Section 409A and approved by the Board of Directors (or equivalent body) of such entity in good faith.

1.184. **"Value Trigger"** means each amount shown in the column labeled "Value Trigger" in Section 4.10.1.2.

2. LICENSE.

2.1 **License Grants**.

2.1.1 License Grant in the Field. Subject to Section 2.2 and the other terms and conditions of this Agreement, including the restrictions set forth in Section 2.8, each Licensor Institution hereby grants to Company, with respect to the Targets, a worldwide, royalty-bearing license, sublicensable solely in accordance with Section 2.5 below, under the (A) Cas9-I Institutions' interests in the Cas9-I Patent Rights solely to make, have made, use, have used, sell, offer for sale, have sold, export and import those Cas9 Licensed Products, the making, using, selling, offering for sale, exporting or importing of which is Covered by at least one Valid Claim of the Cas9-I Patent Rights, (B) in the case of Broad, the Cas9-II Institutions' interests in the Cas9-II Group A Patent Rights solely to make, have made, use, have used, sell, offer for sale, have sold, export and import those Cas9 Licensed Products, the making, using, selling, offering for sale, exporting or importing of which is Covered by at least one Valid Claim of the Cas9-II Group A Patent Rights, and (C) in the case of Broad, the Cas9-II Institutions' interests in the Cas9-II Group B Patent Rights solely to make, have made, use, have used, sell, offer for sale, have sold, export and import those Cas9 Licensed Products and Cas9-II Group B Licensed Products, the making, using, selling, offering for sale, exporting or importing of which is Covered by at least one Valid Claim of the Cas9-II Group B Patent Rights, in each case ((A), (B) and (C)) solely for use in the Field, except that (a) the licenses granted under this Section 2.1.1 exclude (i) the field of modifying animals or animal cells for the creation, making, having made, use, sale, offer for sale, having sold, exportation and importation of organs suitable for xenotransplantation into humans and (ii) research and development, and commercialization and other use or exploitation, of products or services in the field of Livestock Applications; and (b) the licenses granted under this Section 2.1.1 exclude (x) human germline modification, including intentionally modifying the DNA of human embryos or human reproductive cells, and (y) the stimulation of biased inheritance of particular genes or traits within a population of plants or animals. The licenses granted under this Section 2.1.1 will be (aa) co-exclusive (with Editas, or its successor or assign, or another Person (the identity of which other Person Broad will use good faith efforts to disclose to Company), who in each of the foregoing cases, for the avoidance of doubt, has the right to sublicense), with respect to the license under the Cas9-I Institutions' interests in the Cas9-I Patent Rights and the Cas9-II Institutions' interests in the Cas9-II Group A Patent Rights, and (bb) non-exclusive with respect to the license under the Cas9-II Institutions' interests in the Cas9-II Group B Patent Rights.

2.1.2 Non-Exclusive License Grant. Subject to Section 2.2 and the other terms and conditions of this Agreement, including the restrictions set forth in Section 2.8, each Licensor Institution hereby grants to Company a non-exclusive, worldwide, royalty-bearing license, sublicensable solely in accordance with Section 2.5 below, under the Cas9-I Institutions' interests in the Cas9-I Patent Rights and, in the case of Broad, the Cas9-II Institutions' interests in the Cas9-II Patent Rights (a) for Internal Research Purposes, (b) for research, development and commercialization of products (including Enabled Products) for the prevention or treatment of human disease outside of the Editas Cas9-I Exclusive Field (in the case of the Cas9-I Institutions' interests in the Cas9-I Patent Rights) and outside of the Editas Cas9-II Exclusive Field (in the case of the Cas9-II Institutions' interests in the Cas9-II Patent Rights), respectively,

and (c) with respect to the Targets, to make, have made, use, have used, sell, offer for sale, have sold, export and import Enabled Products for use within the Field; provided, however, that notwithstanding the foregoing, (x) the license granted under this Section 2.1.2 excludes (i) human germline modification, including intentionally modifying the DNA of human embryos or human reproductive cells, (ii) the stimulation of biased inheritance of particular genes or traits within a population of plants or animals, (iii) Ag Products, and (iv) any products, including without limitation any Ag Product or any product in the field of Livestock Applications, that provide nutritional benefits, unless such products (aa) are regulated by a Regulatory Authority as a drug or biologic pursuant to Section 505 of the United States Federal Food, Drug, and Cosmetic Act of 1938, as amended, Section 351 of the United States Public Health Service Act of 1944, as amended, or any successor laws, or equivalent laws or regulations in jurisdictions outside the United States and (bb) are otherwise included in the definition of Field, and (y) the license granted by Harvard under the Church IP excludes (A) the field of modifying animals or animal cells for the creation, making, having made, use, sale, offer for sale, having sold, exportation and importation of organs suitable for xenotransplantation into humans and (B) research and development, and commercialization and other use or exploitation of products or services, in the field of Livestock Applications.

2.2 **Reservation of Rights**. Notwithstanding anything herein to the contrary:

2.2.1 Government and Non-Profit Rights. Notwithstanding anything to the contrary herein, any and all licenses and other rights granted under this Agreement are limited by and subject to (a) any rights or obligations of the Owner Institutions and United States government under 35 U.S.C. §§ 200-212 and 37 CFR Part 401 et seq.; any right granted in this Agreement greater than that permitted under 35 U.S.C. §§ 200-212 and 37 CFR Part 401 et seq. shall be subject to modification as may be required to conform to the provisions of those statutes and regulations, and (b) the Owner Institutions' reservation of the right, for each of the Owner Institutions and other academic, government and non-profit entities, to make, use and practice the Patent Rights for research, teaching, or educational purposes. Further, Company acknowledges that it has been informed that certain of the Cas9-I Patent Rights were developed, at least in part, by employees of HHMI and that HHMI has a fully paid-up, non-exclusive, irrevocable, worldwide license to exercise any intellectual property rights with respect to such Cas9-I Patent Rights for research purposes, with the right to sublicense to non-profit and governmental entities (the "**HHMI License**"). For the avoidance of doubt, the HHMI License includes, but is not limited to, (i) the right to make, use, perform and practice the subject matter described in such Cas9-I Patent Rights for research, teaching, educational and scholarly purposes (including, but not limited to, the right to enter into projects permitted under 15 U.S.C. 3710a (the CRADA statute) or other sponsored research projects or collaborations whether or not such collaborations are formal or informal), in all fields in all territories at any time without restriction; and (ii) the right to research, develop, make, have made, use, distribute, import or otherwise practice such Cas9-I Patent Rights and applicable Cas9 Licensed Products as research products or research tools, or for research purposes in the Field. Any and all licenses and other rights granted under this Agreement are explicitly made subject to the HHMI License.

2.2.2 Research Reservation. Notwithstanding anything to the contrary herein, in addition to the reservation of rights under Section 2.2.1, the co-exclusive license granted to Company in the Field under Section 2.1.1 of this Agreement is subject to:

2.2.2.1 The Owner Institutions' reservation of the right, for each of them and for other not-for-profit research organizations and government agencies, to make, use, perform and practice the subject matter described in the Patent Rights for research, teaching, educational and scholarly purposes (including, but not limited to, the right to enter into projects permitted under 15 U.S.C. 3710a (the CRADA statute) or other sponsored research projects or collaborations whether or not such collaborations are formal or informal), in all fields in all territories at any time without restriction. For clarity, sponsored research funded by a commercial entity shall be considered research for purposes of this Section 2.2.2 and the HHMI License.

2.2.2.2 The Owner Institutions' reservation of the right, for each of them and for any Third Party (including non-profit and for-profit entities), to research, develop, make, have made, use, offer for sale, sell, have sold, import or otherwise exploit the Patent Rights and Licensed Products as research products or research tools, or for research purposes in the Field. Without otherwise limiting or expanding the foregoing, for the purposes of this Section 2.2.2.2, "research purposes" shall not be interpreted to include the administration of a Licensed Product into any human.

2.3 **Affiliates**. The licenses granted to Company under Section 2.1 include the right to have some or all of Company's rights or obligations under this Agreement exercised or performed by one or more of Company's Affiliates on Company's behalf; provided, however, that:

2.3.1 Company shall notify the Licensor Institutions in writing [**] in advance of any Affiliate exercising or performing any of Company's rights or obligations under this Agreement;

2.3.2 prior to any Affiliate exercising or performing any of Company's rights or obligations under this Agreement, such Affiliate shall agree in writing with Company to be bound by the terms and conditions of this Agreement as if it were Company hereunder, including specific written agreement (a) to indemnify, defend and hold Indemnitees and HHMI Indemnitees harmless, and carry insurance, under the same terms as Article 9 of this Agreement, and (b) that the Owner Institutions and HHMI are express third party beneficiaries of such writing;

2.3.3 no such Affiliate shall be entitled to grant, directly or indirectly, to any Person any right of whatever nature under, or with respect to, or permitting any use or exploitation of, any of the Patent Rights, including any right to develop, manufacture, market or sell Licensed Products (a) if doing so would result in a Sublicense of Company's rights through more than [**] tiers (including the grant of rights from Company to the applicable Affiliate) and (b) unless such grant of rights is a Sublicense and includes all applicable restrictions and conditions on the granting of Sublicenses as set forth herein;

2.3.4 any act or omission by an Affiliate of Company shall be deemed an act or omission by Company hereunder, and Company shall be responsible for each of its Affiliates complying with all obligations of Company under this Agreement (including without limitation all restrictions placed on Company herein); and

2.3.5 any assumption of rights or obligations by Affiliates of Company under this Agreement shall not relieve Company of any of its obligations under this Agreement.

2.4 **Right to Subcontract**. If Company desires to exercise any of the rights or obligations that Company may have under this Agreement by subcontracting the exercise or performance of all or any portion of such rights and obligations on Company's behalf, Company shall be entitled to do so, provided that (a) such contract service providers obtain no rights in or to the Patent Rights except for the limited purpose of performing the applicable contracted services on behalf of the Company, (b) any subcontract granted or entered into by Company as contemplated by this Section 2.4 of the exercise or performance of all or any portion of the rights or obligations that Company may have under this Agreement shall not relieve Company from any of its obligations under this Agreement, (c) any act or omission by a subcontractor of Company shall be deemed an act or omission by Company hereunder, and (d) Company shall be responsible for each of its subcontractors complying with all obligations of Company under this Agreement (including without limitation all restrictions placed on Company herein); provided that any subcontract or other agreement that, in whole or in part, grants or otherwise transfers any of the rights licensed to Company hereunder, or otherwise falls under the definition of a Sublicense, shall be deemed a Sublicense and not a subcontract hereunder and shall be subject to all restrictions and requirements applicable to Sublicenses under this Agreement.

2.5 **Sublicenses**.

2.5.1 Sublicense Rights. Company shall be entitled to sublicense (through up to [**] tiers) the rights granted to it under Section 2.1 hereof to Third Parties solely within the Field and subject to the terms of this Section 2.5, provided that Company and its Sublicensees may only sublicense their rights under Section 2.1.2 together with a sublicense of their rights under Section 2.1.1.

2.5.2 Sublicense Agreements. Company shall ensure that any Sublicense shall be on terms and conditions in compliance with, and not inconsistent with, the terms of this Agreement. Notwithstanding any Sublicense, Company shall remain primarily liable to the Licensor Institutions for all of Company's duties and obligations contained in this Agreement, and any act or omission of a Sublicensee which would be a breach of this Agreement if performed by Company shall be deemed to be a breach by Company of this Agreement. Any Sublicenses granted by Company may include the right to grant and authorize further Sublicenses (including to Affiliates of the Sublicensee), in each case subject to all applicable restrictions and conditions on the granting of Sublicenses herein. Subject to the provisions of Section 10.3.1.2 hereof, all Sublicenses shall automatically terminate effective upon termination of this Agreement unless otherwise agreed in writing by the Licensor Institutions or as provided in Section 10.3.1.2. Company shall furnish the Licensor Institutions with a fully-executed, unredacted copy of any Sublicense agreement, promptly upon execution of such Sublicense; provided that Company may redact from such copy (a) the identity of a Target selected for

research, development or commercialization under the Sublicense and (b) other proprietary non-public technical information of Company or the applicable Sublicensee. Notwithstanding the foregoing, Company shall not redact any information reasonably necessary for the Licensor Institutions to evaluate and confirm compliance of such Sublicense with the terms and conditions of this Agreement. The Licensor Institutions shall use such copies solely for the purpose of monitoring Company's and its Sublicensees' compliance with their obligations, and enforcing the Licensor Institutions' rights, under this Agreement. Any Sublicense shall require a written agreement, which shall be subject and subordinate to the terms and conditions of this Agreement, and shall contain, among other things, the following:

2.5.2.1 all provisions necessary to ensure Company's ability to perform its obligations under this Agreement;

2.5.2.2 a section requiring Sublicensee to indemnify, defend and hold Indemnitees and HHMI Indemnitees harmless, and carry insurance, under the same terms set forth in Article 9 of this Agreement;

2.5.2.3 a statement that the Licensor Institutions are intended third party beneficiaries of such Sublicense for the purpose of enforcing all patent challenge, indemnification, and insurance provisions of such Sublicense and enforcing the right to terminate such Sublicense for breach of the patent challenge, indemnification and insurance provisions of such Sublicense; and a statement that HHMI and each other Owner Institution are intended third party beneficiaries of such Sublicense for the purpose of enforcing HHMI and such Owner Institution's respective rights, including indemnification and insurance provisions, under this Agreement;

2.5.2.4 a provision stating that in the event Sublicensee directly or indirectly brings, assumes, or participates in, or knowingly, willfully or recklessly assists in bringing, a Patent Challenge then Company shall be entitled to terminate the Sublicense;

2.5.2.5 a provision specifying that, in the event of termination of the licenses set forth in Sections 2.1 in whole or in part (e.g., as to one license or the other, or termination in a particular country), any existing Sublicense agreement shall terminate to the same extent of such terminated license, subject to Sublicensee's right to receive a Direct License from the Licensor Institutions in accordance with Section 10.3.1.2 hereof;

2.5.2.6 a provision prohibiting the Sublicensee from sublicensing its rights under such Sublicense agreement (a) if doing do would result in a Sublicense of Company's rights through more than [**] tiers and (b) unless such further sublicense includes all applicable restrictions and conditions on the granting of Sublicenses as set forth herein;

2.5.2.7 a provision requiring Sublicensee to comply with Section 8.1 (Compliance with Law) and Section 11.2 (Use of Name) of this Agreement; and

2.5.2.8 a provision prohibiting the Sublicensee from assigning the Sublicense agreement without the prior written consent of the Licensor Institutions, except that Sublicensee may assign the Sublicense agreement without such prior written consent to the same extent Company may assign this Agreement under Section 11.14.

2.6 **U.S. Manufacturing**. Company agrees that any Licensed Products used or sold in the United States that are subject to 35 U.S.C. §§ 201-211 and the regulations promulgated thereunder, as amended, or any successor statutes or regulations shall, to the extent required by law, be manufactured substantially in the United States.

2.7 **No Other Grant of Rights**. Except as expressly provided herein, nothing in this Agreement shall be construed to confer any ownership interest, license or other rights upon Company or its Affiliates or Sublicensees by implication, estoppel or otherwise as to any technology, intellectual property rights, products or biological materials of the Licensor Institutions or MIT, or any other entity, regardless of whether such technology, intellectual property rights, products or biological materials are dominant, subordinate or otherwise related to any Patent Rights.

2.8 **Additional Limitations on Exercise of License Rights**.

2.8.1 Germline Modification. Company will not use the Patent Rights for human germline modification, including intentionally modifying the DNA of human embryos or human reproductive cells.

2.8.2 Gene-Drive Applications. Company will not use the Patent Rights for the stimulation of biased inheritance of particular genes or traits within a population of plants or animals.

2.8.3 General Restriction. Without limiting the foregoing Sections 2.8.1 and 2.8.2, Company will not use the Patent Rights except in accordance with the terms of the licenses granted under Section 2.1.

3. DEVELOPMENT AND COMMERCIALIZATION.

3.1 **Diligence; Development Milestones**. Company shall use commercially reasonable efforts or shall cause at least one of its Affiliates or Sublicensees to use commercially reasonable efforts: (a) to research and develop Cas9 Licensed Products within the Field; (b) to introduce Cas9 Licensed Products within the Field into the commercial market; and (c) to market Cas9 Licensed Products within the Field following such introduction into the market and make such Cas9 Licensed Products reasonably available to the public. In addition, Company, by itself or through any of its Affiliates or Sublicensees, shall achieve each of the Development Milestones specified in Exhibit 3.1 within the corresponding time period specified in Exhibit 3.1.

3.2 **Inclusive Innovation Model**.

3.2.1 If at any time after the second anniversary of the Effective Date a Third Party makes a bona fide proposal (a "**Third Party Proposal**") to the Licensor Institutions for developing (a) a product within the Field, but outside the Cardiovascular Disease Field, with respect to a specific Target (which specific Target, the "**Third Party Proposed Target**") or (b) a product within the Field, but outside the Cardiovascular Disease Field, and within a specific Cas9 Patent Rights Category (the "**Third Party Proposed Category**") that, in each case, may require or for which a license under any of the Patent Rights for which Company's license hereunder is co-exclusive is desired, then in each case ((a) or (b)), if the Licensor Institutions are interested in having such product developed and commercialized, the Licensor Institutions may notify Company of the Third Party Proposal, and shall include in such notification information regarding the Third Party Proposal, including the Third Party Proposed Target or Third Party Proposed Category, as applicable, specified in such Third Party Proposal and, to the extent permitted by such Third Party, the identity of the Third Party that provided the Third Party Proposal (which identity shall be deemed to be Licensor Institution Confidential Information). Within [**] after the receipt of such notification from the Licensor Institutions, Company shall notify the Licensor Institutions regarding whether it or any of its Affiliate or Sublicensees is (or is interested in) developing Cas9 Licensed Products in the Field with respect to the Third Party Proposed Target specified in the Third Party Proposal or within the Third Party Proposed Category specified in the Third Party Proposal, as applicable (the "**Company Notification**").

3.2.2 If Company notifies the Licensor Institutions within such [**] period that it or any of its Affiliates or Sublicensees is currently developing or is interested in developing Cas9 Licensed Products in the Field with respect to the Third Party Proposed Target specified in the Third Party Proposal or within the Third Party Proposed Category specified in the Third Party Proposal, as applicable, the Parties will negotiate in good faith and agree, during the [**] following the Company Notification (or such longer time as will be agreed to by the Parties in writing), upon a development plan with respect to the development and commercialization of such Third Party Proposed Target or Third Party Proposed Category, as applicable, which development plan will be similar to the Development Plan with respect to other Licensed Products developed by Company, subject to necessary adjustments, and will include reasonable milestones. If the Parties agree on such development plan and milestones within such [**] period, Company shall maintain its co-exclusive license(s) hereunder with respect to such Third Party Proposed Target or Third Party Proposed Category, as applicable, but shall be obligated (a) to use commercially reasonable efforts to develop and commercialize at least one Cas9 Licensed Product in the Field with respect to such Third Party Proposed Target or Third Party Proposed Category, as applicable, in accordance with such new development plan and (b) to meet the milestones in such development plan with at least one such Cas9 Licensed Product. For the avoidance of doubt, Company's development plan for the Third Party Proposed Target or Third Party Proposed Category may be for development and commercialization within or outside the Cardiovascular Disease Field.

3.2.3 If (a) Company fails to send the Company Notification to the Licensor Institutions under Section 3.2.2 within [**] following its receipt of a notice from the Licensor Institutions regarding a Third Party Proposal, (b) the Parties do not agree on a development plan and milestones that are acceptable to the Licensor Institutions, in their reasonable judgment, within the time period set forth in Section 3.2.2, or (c) the Parties agree on such a development plan and milestones within such time period, but Company thereafter fails to comply in any material respect with such mutually agreed development and commercialization obligations, and fails to cure such noncompliance after notice from the Licensor Institutions within the time

periods specified in Section 3.5 (applied *mutatis mutandis*), then in each case ((a)-(c)), (y) the Licensor Institutions will be free to terminate Company's rights under Section 2.1 with respect to the Third Party Proposed Target or Third Party Proposed Category, as applicable, specified in the applicable Third Party Proposal, and (z) the Licensor Institutions will be free to grant to Third Parties licenses within the Field (i) under the Patent Rights that are exclusively or co-exclusively licensed to Company with respect to the Third Party Proposed Target or (ii) under the Patent Rights that are exclusively or co-exclusively licensed to Company within the Third Party Proposed Category, as applicable, provided that such Third Party licenses do not grant rights to commercialize products intended for use in the Cardiovascular Disease Field.

3.2.4 If Company states in the Company Notification that it and its Affiliates and Sublicensees are not (and are not interested in) developing Cas9 Licensed Products with respect to the Third Party Proposed Target specified in the Third Party Proposal or within the Third Party Proposed Category specified in the Third Party Proposal, as applicable, but that it wishes to grant a Sublicense to such Third Party with respect to the Third Party Proposed Target or the Third Party Proposed Category, as applicable, then (a) Broad will use good faith efforts to promptly disclose to Company, to the extent permitted by such Third Party, the identity of the Third Party that provided the Third Party Proposal (which identity shall be deemed to be Licensor Institution Confidential Information) and (b) Company will have [**] (or such longer time as will be agreed to by the Parties in writing) to negotiate and enter into such a Sublicense agreement with such Third Party in the Field; provided, however, that if Company demonstrates that it and such Third Party have entered into a term sheet with respect to such a Sublicense agreement during such [**], Company will be entitled to extend the period for the execution of a binding Sublicense agreement by an additional [**] (or such longer time as will be agreed to by the Parties in writing).

3.2.5 If Company fails to enter into such a Sublicense agreement within such [**] period or such [**] period (or such longer time as will be agreed to by the Parties in writing), as applicable, Company shall promptly (but in any event within [**] of the end of such period) provide the Licensor Institutions in writing an explanation for such failure along with the proposed terms last offered by Company to the prospective Sublicensee. If the Licensor Institutions determine in their good faith judgment that the terms last offered by Company to such Third Party *were* commercially reasonable, the Licensor Institutions shall notify Company of such determination. Alternatively, if the Licensor Institutions determine in their good faith judgment that the terms last offered by Company to such Third Party *were not* commercially reasonable, the Licensor Institutions shall notify Company of such determination, including Licensor Institutions' reasoning therefor. In either case, the Licensor Institutions shall provide Company with an additional [**] to enter into a Sublicense with such Third Party. If Company reasonably believes that its entry into a Sublicense agreement with such Third Party on commercially reasonable terms would require Company to make payments under this Agreement with respect to such Sublicense agreement in excess of the payments that Company would receive under such Sublicense agreement, then (a) Company shall promptly notify the Licensor Institutions thereof, and (b) the Parties shall promptly discuss in good faith potential solutions to address such outcome. In any event, if Company fails to enter into an agreement with such Third Party within such additional [**] period, then (y) the Licensor Institutions will be free to terminate Company's rights under Section 2.1 with respect to the Third Party Proposed Target or

Third Party Proposed Category, as applicable, specified in the applicable Third Party Proposal, and (z) the Licensor Institutions will be free to grant to Third Parties licenses within the Field (i) under the Patent Rights that are exclusively or co-exclusively licensed to Company with respect to the Third Party Proposed Target or (ii) under the Patent Rights that are exclusively or co-exclusively licensed to Company within the Third Party Proposed Category, as applicable, provided that such Third Party licenses do not grant rights to commercialize products intended for use in the Cardiovascular Disease Field.

3.3 **Development Plan; Adjustments**. The Development Plan for the development and commercialization of Licensed Products and Enabled Products is attached hereto as Exhibit 3.3. Company shall be entitled, from time to time, to make such commercially reasonable adjustments to the Development Plan as Company believes, in its good faith judgment, are needed in order to improve Company's ability to meet the Development Milestones in Exhibit 3.1.

3.4 **Reporting**. Within [**] after the end of each Calendar Year, Company shall furnish the Licensor Institutions with:

3.4.1 (i) a written report summarizing its, its Affiliates' and its Sublicensees' efforts during the prior year to develop and commercialize Cas9 Licensed Products within the Field and (ii) a written report summarizing its, its Affiliates' and its Sublicensees' efforts during the prior year to develop and commercialize Cas9-II Group B Licensed Products within the Field, including: (a) research and development activities, including information regarding specific Licensed Products and Enabled Products in development and their therapeutic applications; (b) status of applications for Regulatory Approvals; (c) commercialization efforts; and (d) marketing efforts; which report must contain a sufficient level of detail for the Licensor Institutions to assess whether Company is in compliance with its obligations under Article 3 and a discussion of intended efforts for the then-current year. Together with each report prepared and provided under this Section 3.4.1, Company shall provide the Licensor Institutions with a copy of the then-current Development Plan which shall include sufficient detail to enable the Licensor Institutions to assess what Licensed Products and Enabled Products are in development and the status of such development; and

3.4.2 (i) a brief written report summarizing its, its Affiliates' and its Sublicensees' efforts during the prior year to develop and commercialize Cas9 Licensed Products and Cas9 Enabled Products for the prevention or treatment of human disease outside the Field and (ii) a brief written report summarizing its, its Affiliates' and its Sublicensees' efforts during the prior year to develop and commercialize Cas9-II Group B Licensed Products and Cas9-II Group B Enabled Products for the prevention or treatment of human disease outside the Field.

3.5 **Failure to Meet Development Milestone; Opportunity to Cure**. If Company believes that, despite using commercially reasonable efforts, it will not achieve a Development Milestone, it may notify the Licensor Institutions in writing in advance of the relevant deadline. Company shall include with such notice (a) a reasonable explanation of the reasons for such failure (lack of finances or development preference for a non-Cas9 Licensed Product shall not constitute reasonable basis for such failure) ("**Milestone Explanation**") and (b) a reasonable, detailed, written plan for promptly achieving a reasonable extended and/or amended milestone, which plan shall include information, if applicable, regarding which Licensor Institution's Cas9-I Patent Rights or Cas9-II Patent Rights Cover any Cas9 Licensed Product that will achieve such milestone ("**Milestone Plan**").

3.5.1 If Company so notifies the Licensor Institutions, but fails to provide the Licensor Institutions with both a Milestone Explanation and Milestone Plan, then Company shall have an additional [**] or until the original deadline of the relevant Development Milestone, whichever is later, to meet such milestone. Company's failure to do so shall constitute a material breach of this Agreement and the Licensor Institutions shall have the right to terminate this Agreement upon written notice to Company, subject to Section 3.5.6.

3.5.2 If Company so notifies the Licensor Institutions and provides the Licensor Institutions with a Milestone Explanation and Milestone Plan, both of which are reasonably acceptable to Broad (and Harvard, if any Harvard Controlled Patent Covers the Licensed Product that is the subject of the Milestone Plan), then Exhibit 3.1 shall be amended automatically to incorporate the extended and/or amended milestone set forth in the Milestone Plan.

3.5.3 If Company so notifies the Licensor Institutions and provides the Licensor Institutions with a Milestone Explanation and Milestone Plan, but the Milestone Explanation is not reasonably acceptable to Broad (and Harvard, if any Harvard Controlled Patent Covers the Licensed Product that is the subject of the Milestone Explanation) (e.g., Company asserts lack of finances or development preference for a non-Licensed Product), then the Licensor Institutions shall notify Company that the Milestone Explanation is not acceptable and explain to Company why the Milestone Explanation is not acceptable and Company shall have an additional [**] or until the original deadline of the relevant Development Milestone, whichever is later, to meet such milestone. Company's failure to do so shall constitute a material breach of this Agreement and the Licensor Institutions shall have the right to terminate this Agreement upon written notice to Company, subject to Section 3.5.6.

3.5.4 If Company so notifies the Licensor Institutions and provides the Licensor Institutions with a Milestone Explanation and Milestone Plan, but the Milestone Plan is not reasonably acceptable to Broad (and Harvard, if any Harvard Controlled Patent Covers the Licensed Product that is the subject of the Milestone Plan), then the Licensor Institutions shall notify Company that the Milestone Plan is not reasonably acceptable, explain to Company why the Milestone Plan is not reasonably acceptable and shall provide Company with suggestions for a reasonably acceptable Milestone Plan. Company shall have one opportunity to provide the Licensor Institutions with a Milestone Plan reasonably acceptable to Broad (and Harvard, if any Harvard Controlled Patent Covers the Licensed Product that is the subject of the Milestone Plan) within [**] of the notice from the Licensor Institution(s) described in the previous sentence, during which time Broad (and Harvard, if any Harvard Controlled Patent Covers the Licensed Product that is the subject of the Milestone Plan) agree(s) to work with Company in its effort to develop a reasonably acceptable Milestone Plan. If, within such [**], Company provides the Licensor Institutions with a Milestone Plan reasonably acceptable to Broad (and Harvard, if any Harvard Controlled Patent Covers the Licensed Product that is the subject of the Milestone Plan), then Exhibit 3.1 shall be amended automatically to incorporate

the extended and/or amended milestone set forth in the Milestone Plan. If, within such [**], Company fails to provide a Milestone Plan reasonably acceptable to Broad (and Harvard, if any Harvard Controlled Patent Covers the Licensed Product that is the subject of the Milestone Plan), then Company shall have an additional [**] or until the original deadline of the relevant Development Milestone, whichever is later, to meet such milestone. Company's failure to do so shall constitute a material breach of this Agreement and the Licensor Institutions shall have the right to terminate this Agreement upon written notice to Company, subject to Section 3.5.6.

3.5.5 For clarity, if Company fails to achieve a Development Milestone and does not avail itself of the procedure set forth in this Section 3.5, then the Licensor Institutions shall have the right to terminate this Agreement upon written notice to Company, subject to Section 3.5.6. Disputes arising under Section 3.5 shall not be subject to resolution by the Executive Officers under Section 11.7.

3.5.6 If the Licensor Institutions elect to terminate this Agreement pursuant to this Section 3.5, then, notwithstanding anything to the contrary in this Section 3.5, Company's rights under this Agreement shall not terminate under this Section 3.5, and this Agreement shall remain in effect, solely with respect to a particular Target if, at the time the Licensor Institutions have the right to terminate, Company provides evidence reasonably acceptable to the Licensor Institutions that Company (a) is not in breach of its diligence obligations in accordance with Exhibit 3.1 with respect to such particular Target, without opportunity to cure such breach in accordance with this Section 3.5, and (b) is (i) researching and developing Cas9 Licensed Products within the Field directed to such Target, or is causing at least one of its Affiliates or Sublicensees to do so; (ii) if applicable, using commercially reasonable efforts, or is causing at least one of its Affiliates or Sublicensees to use commercially reasonable efforts, to introduce Cas9 Licensed Products within the Field directed to such Target into the commercial market; and (iii) if applicable, using commercially reasonable efforts, or is causing at least one of its Affiliates or Sublicensees to use commercially reasonable efforts, to market Cas9 Licensed Products within the Field directed to such Target following such introduction into the market and make such Cas9 Licensed Products reasonably available to the public; and, thereafter, for the remainder of the Term, Company continues, or causes at least one of its Affiliates or Sublicensees to continue, to develop and commercialize Cas9 Licensed Products directed to the particular Target in accordance with the foregoing clauses (i)-(iii). For clarity, the Parties agree and acknowledge that this Section 3.5.6 does not create an obligation to achieve Development Milestones under Section 3.1 with respect to Licensed Products in the Field directed to more than [**] Targets, consistent with the conditions set forth in Exhibit 3.1; provided, however, that if Company fails to meet a Diligence Milestone specified in Exhibit 3.1, the Licensor Institutions may terminate this Agreement in accordance with this Section 3.5.6.

4. CONSIDERATION FOR GRANT OF LICENSE.

4.1 **Division of Consideration**. Each element of consideration set forth in this Article 4 shall be provided by Company to each Licensor Institution in split amounts, with [**] percent ([**]%) of the applicable consideration paid to Harvard and [**] percent ([**]%) of the applicable consideration paid to Broad in accordance with the payment methods set forth in Article 5 hereof.

4.2 **License Issue Fee**.

4.2.1 Cash Consideration. Company shall pay to the Licensor Institutions a non-refundable license fee ("**License Issue Fee**") of one hundred and twenty-five thousand dollars ($125,000), due and payable within [**] after the Effective Date.

4.3 **License Maintenance Fees**. Company shall pay to the Licensor Institutions the annual license maintenance fees ("**License Fees**") in the table below pursuant to this Section 4.3.

Date	License Fee
[**] anniversary of the Effective Date	$ [**]
[**] anniversary of the Effective Date	$ [**]
[**] anniversary of the Effective Date and each anniversary of the Effective Date thereafter	$ [**]

Each such License Fee shall be due and payable on January 1st of the Calendar Year to which such fee applies, and [**] percent ([**]%) of the amount of each such License Fee shall be creditable against any Royalties due and payable under Section 4.6 below with respect to Licensed Products or Enabled Products sold in the same Calendar Year in which such License Fee was due.

4.4 **Issuance of Equity**.

4.4.1 Initial and Equity Event Issuances. Subject to the execution and delivery by the Parties of the Stock Issuance Agreement, Company shall, as partial consideration for the licenses granted hereunder, issue to the Licensor Institutions, (i) as of the Effective Date an aggregate of 1,278,161 shares of Common Stock, representing [**] percent ([**]%) of Company's outstanding capital stock on a Fully-Diluted Basis as of the date of such issuance and after giving effect to such issuance (the "**Initial Shares**") and (ii) contingent upon and effective as of an Equity Event, such additional number of shares of Common Stock (the "**Equity Event Shares**") such that the sum of the Initial Shares, any then-outstanding Anti-Dilution Shares issued pursuant to Section 4.4.2 and the Equity Event Shares represents [**] percent ([**]%) of Company's outstanding capital stock on a Fully-Diluted Basis as of the date of such issuance and after giving effect to such issuance (the Initial Shares, the Anti-Dilution Shares and the Equity Event Shares, collectively, the "**Shares**"). The Licensor Institutions hereby agree that, as a condition to and effective as of the issuance of the Shares, the Licensor Institutions, will execute that certain Right of First Refusal and Co-Sale Agreement and Voting Agreement by and among the Company and the stockholders set forth therein, each dated August 7, 2018, as a common stockholder of Company.

4.4.2 Anti-Dilution Issuances. Until the cumulative arm's length investment in Company reaches $[**] (the "**Total Financing Amount**"), Company will issue to the Licensor Institutions, on a pro rata basis, from time to time and for no additional consideration, additional shares of Common Stock of Company (the "**Anti-Dilution Shares**") as will cause the Licensor Institutions to own pursuant to this Agreement and the Cpf1 Agreement an aggregate percentage of Company's outstanding capital stock on a Fully-Diluted Basis that is equal to the Anti-Dilution Threshold as measured at the time such Total Financing Amount is reached and as calculated after giving effect to the anti-dilutive issuance to the Licensor Institutions. Company shall provide the Licensor Institutions with evidence of the issuance of such Anti-Dilution Shares promptly after their issuance.

4.5 **Milestone Payments.**

4.5.1 Development Milestone Payments. Company shall pay to the Licensor Institutions the Milestone Payments set forth in this Section 4.5.1 with respect to each Single Schedule 1 Product or each Single Schedule 2 Product, as applicable, to achieve each Milestone Event, regardless of whether such Milestone Event is achieved by Company, an Affiliate of Company or a Sublicensee:

Milestone Event	*Schedule 1 Milestone Payment (in Dollars)*	*Schedule 2 Milestone Payment (in Dollars)*
[**]	[**]	[**]
[**]	[**]	[**]
[**]	[**]	[**]
[**]	[**]	[**]
[**]	[**]	[**]
[**]	[**]	[**]

* Milestone Events subject to Change of Control Multiplier in accordance with Section 4.5.4.
† For the purposes of this Section 4.5.1, "[**]" means [**].

Company shall notify the Licensor Institutions in writing within [**] following the achievement of each Milestone Event described in Section 4.5.1, and shall make the appropriate Milestone Payment within [**] after the achievement of such Milestone Event. Each Milestone Payment is payable only once for each Single Schedule 1 Product or Single Schedule 2 Product, as applicable. The Milestone Events set forth in Section 4.5.1 are intended to be successive; for example, if a Single Schedule 1 Product is not required to undergo the event associated with a particular Milestone Event for such Single Schedule 1 Product (a "**Skipped Milestone**"), then such Skipped Milestone shall be deemed to have been achieved upon the achievement by such Single Schedule 1 Product of the next successive Milestone Event ("**Achieved Milestone**"); provided that the Milestone Events based on [**] shall not be deemed to be successive with [**]

(i.e., if the Milestone Event for [**] occurs prior to the Milestone Event for [**], the Milestone Event for [**] shall not be deemed a Skipped Milestone). Payment for any Skipped Milestone that is owed in accordance with the provisions of this Section 4.5.1 shall be due within [**] after the achievement of the Achieved Milestone.

4.5.2 Sales Milestone Payments. Company shall pay to the Licensor Institutions, within [**] of the end of the Calendar Year in which the following sales Milestone Events are first achieved, the following Milestone Payments on a Schedule 1 Product-by-Schedule 1 Product or Schedule 2 Product-by-Schedule 2 Product basis, regardless of whether such Milestone Event is achieved by Company, an Affiliate of Company or a Sublicensee, or a combination thereof:

Milestone Event	*Milestone Payment (in Dollars)*
$[**] dollars in aggregate Net Sales	$ [**]
$[**] dollars in aggregate Net Sales	$ [**]

4.5.3 Adjustment for Enabled Products. The Milestone Payments set forth in Section 4.5.1 or Section 4.5.2 above shall be reduced by [**] percent ([**]%) for any Schedule 1 Product or Schedule 2 Product that is an Enabled Product.

4.5.4 Change of Control Multiplier. In the event that a Change of Control of Company occurs at any time during the Term, the Milestone Payments for those Milestone Events designated by an asterisk (*) in Section 4.5.1 that have not yet been paid by Company shall be increased by [**] percent ([**]%) (the "**Change of Control Multiplier**").

4.5.5 Milestone Payments for Schedule 1 Products and Schedule 2 Products. In the event that a Licensed Product or Enabled Product is both a Schedule 1 Product and a Schedule 2 Product, then Company shall pay the applicable Milestone Payment based on whether the achievement of each Milestone Event first occurred with respect to development, regulatory approval or sales of a Licensed Product or Enabled Product as a Single Schedule 1 Product or Single Schedule 2 Product, with simultaneous achievement being deemed to have first occurred with respect to a Licensed Product or Enabled Product as a Single Schedule 2 Product. If achievement of a Milestone Event first occurs with respect to development, regulatory approval or sales of a Licensed Product or Enabled Product as a Single Schedule 1 Product, Company shall pay the difference between the applicable Milestone Payment for a Single Schedule 2 Product and the applicable Milestone Payment for a Single Schedule 1 Product, if such Licensed Product or Enabled Product thereafter achieves such Milestone Event with respect to development, regulatory approval or sales as a Single Schedule 2 Product. If achievement of a Milestone Event first occurs with respect to development, regulatory approval or sales of a Licensed Product or Enabled Product as a Single Schedule 2 Product, no additional Milestone Payments shall be due if such Licensed Product or Enabled Product thereafter achieves such Milestone Event with respect to development, regulatory approval or sales as a Single Schedule 1 Product. For clarity, under no circumstances shall Company pay Milestone Payments for a Licensed Product or Enabled Product that are more than the Milestone Payments set forth for a Single Schedule 2 Product.

4.5.6 Replacement Products. If (A) development of a Licensed Product is terminated after any Milestone Payment set forth in Section 4.5.1 or Section 4.5.2, as applicable, has been made with respect to such Licensed Product and (B) another Licensed Product is selected to replace the terminated Licensed Product and the selected Licensed Product is for the same, substantially similar or closely related indication and targets the same Target as the terminated Licensed Product ("**Replacement Product**"), then there shall be no payment due upon achievement of the same milestone by such Replacement Product for which the Licensor Institutions already received a Milestone Payment for the original Licensed Product.

4.6 **Royalties**.

4.6.1 Royalty Rates. Company shall pay to the Licensor Institutions running royalties ("**Royalties**") on Net Sales of Licensed Products and Enabled Products during the applicable Royalty Term at the applicable royalty rate set forth below within [**] following the last day of the Calendar Quarter in which such Royalty accrues. The Parties acknowledge that Royalties shall be determined on a Licensed Product-by-Licensed Product or Enabled Product-by-Enabled Product basis, as applicable, and on a country-by-country basis. If the manufacture, use, performance or sale of any Licensed Product is Covered by more than one Valid Claim of the Patent Rights, multiple Royalties shall not be due as a result of being so Covered.

4.6.1.1 Royalty Rates for Cas9 Licensed Products (adjusted for Cas9-II Group B Licensed Products as set forth in Section 4.6.1.3). Company shall pay to the Licensor Institutions a royalty on the aggregate annual Net Sales of Cas9 Licensed Products, as applicable, as follows:

Royalty Tiers	*Royalty Rate*
The portion of aggregate annual Net Sales up to and including [**] dollars ($[**])	[**]%
The portion of aggregate annual Net Sales greater than [**] dollars ($[**]) and less than [**] dollars ($[**])	[**]%
The portion of aggregate annual Net Sales greater than [**] dollars ($[**])	[**]%

For clarity, upon expiration of the last Valid Claim within the Patent Rights Covering the applicable Licensed Product above, such Licensed Product shall be deemed an Enabled Product for which the Royalty rates set forth in Section 4.6.1.2 shall apply for the remainder of the Royalty Term.

4.6.1.2 Royalty Rates for Cas9 Enabled Products (adjusted for Cas9-II Group B Enabled Products as set forth in Section 4.6.1.3).

Royalty Tier	*Royalty Rate*
The portion of aggregate annual Net Sales up to and including [**] dollars ($[**])	[**]%
The portion of aggregate annual Net Sales greater than [**] dollars ($[**]) and less than [**] dollars ($[**])	[**]%
The portion of aggregate annual Net Sales greater than [**] dollars ($[**])	[**]%

4.6.1.3 Adjustment for Cas9-II Group B Patent Right Products. The applicable royalty rate set forth in Section 4.6.1.1 shall be reduced by [**] percent ([**]%) for each Cas9-II Group B Licensed Product. The applicable royalty rate set forth in Section 4.6.1.2 shall be reduced by [**] percent ([**]%) for each Cas9-II Group B Enabled Product. If during a Calendar Quarter, a Licensed Product or an Enabled Product is a Cas9-II Group B Licensed Product or Cas9-II Group B Enabled Product (as applicable) for only a part of the Calendar Quarter, then the royalty rate adjustment set forth in this Section 4.6.1.3 shall be applied on a pro rata basis based on the part of such Calendar Quarter during which such Licensed Product or Enabled Product (as applicable) is a Cas9-II Group B Licensed Product or Cas9-II Group B Enabled Product (as applicable).

4.6.2 Royalty Offset.

4.6.2.1 Royalties Under Multiple Agreements. On a product-by-product basis, with respect to a Licensed Product or an Enabled Product (each as defined in the Cpf1 Agreement) or with respect to a Licensed Product or Enabled Product (each as defined in this Agreement), if Company is required to pay Royalties (as defined in the Cpf1 Agreement or this Agreement, as applicable) under both (i) this Agreement and (ii) the Cpf1 Agreement, then Company shall be entitled to credit [**] percent ([**]%) of the Royalties (as defined in the Cpf1 Agreement) payable under the Cpf1 Agreement prior to the application of any royalty offset set forth in the Cpf1 Agreement against the Royalties payable under Section 4.6.1. As a condition of the offset in this Section 4.6.2.1, in the event that Company takes a credit against Royalties payable under this Agreement pursuant to this Section 4.6.2.1, then in the royalty reports due to the Licensor Institutions under Section 5.1.1 at the time such credit is taken, Company shall include a calculation of the credit taken and, with the first such royalty report on which such credit is taken, the basis for Company's determination of such credit.

4.6.2.2 Third Party IP. On a product-by-product basis, if Company is legally required by a future court order, settlement agreement, contract, or other legally binding written commitment to make payments to a Third Party of running royalties on net sales of Licensed Products or Enabled Products for a license under or the use of patent rights held by

such Third Party that Cover such Licensed Products or Enabled Products and that are necessary for the commercialization of such Licensed Products or Enabled Products, then Company shall be entitled to credit up to [**] percent ([**]%) of such running royalties actually paid by Company to such Third Party against the Royalties payable under this Agreement, provided that if such running royalties are also creditable against payments under the Cpf1 Agreement, then such credit shall be applied to this Agreement and the Cpf1 Agreement on a pro rata basis based on the amount of Royalties (as defined in this Agreement or the Cpf1 Agreement, as applicable) payable under each applicable agreement. For clarity, the aggregate amount credited under the preceding sentence shall in no event exceed [**] percent ([**]%) of the applicable running royalties actually paid by Company to the applicable Third Party. As a condition of the offset in this Section 4.6.2.2, Company shall use commercially reasonable efforts to include a provision in any agreement with such Third Party executed after the Effective Date requiring that payment of royalties by Company to such Third Parties must be offset as a result of Royalties payable under this Agreement by at least the same percentage of net sales as the Licensor Institutions have offset against their Royalties pursuant to this Section 4.6.2. In the event Company determines that the use of such Third Party patent rights is necessary for the commercialization of Licensed Products or Enabled Products, and takes a credit against Royalties payable under this Agreement, then in the royalty reports due to the Licensor Institutions under Section 5.1.1 at the time such credit is taken, Company shall include a calculation of the credit taken and, with the first such royalty report on which such credit is taken, the basis for Company's determination of commercial necessity.

4.6.2.3 Co-Exclusive Adjustment. On a Target-by-Target basis, (a) if Editas (or an Editas sublicensee) publicly discloses that it has initiated a research or development program that uses technology covered by the Patent Rights and is directed to a Target (a "**Competing Program**"), then Company, Broad or Harvard may notify the other two parties of such Competing Program or (b) if Company, Broad's Office of Strategic Alliances and Partnering or Harvard's Office of Technology Development (the **"Informed Party"**) receives credible information that Editas (or an Editas sublicensee) has initiated a Competing Program directed to a Target and such Competing Program has not been publicly disclosed, then the Informed Party shall notify the other two parties of such Competing Program, in each case subject to the Informed Party's (and if the Informed Party is Broad's Office of Strategic Alliances and Partnering, then Broad's, and if the Informed Party is Harvard's Office of Technology Development, then Harvard's) confidentiality obligations to Third Parties (each such notice under the foregoing clauses (a) and (b), a "**Competing Program Notice**"). Upon a party's receipt of a Competing Program Notice, (i) the Milestone Payments and royalties payable to the Licensor Institutions under Section 4.5 and Section 4.6 with respect to the Target that is the subject of the Competing Program that is the subject of such Competing Program Notice shall be reduced by [**] percent ([**]%), and (ii) if Company has made Milestone Payments or royalty payments under Section 4.5 or Section 4.6 of this Agreement with respect to the Target that is the subject of the Competing Program that is the subject of such Competing Program Notice prior to the receipt of the Competing Program Notice, then Company shall be entitled to offset the foregoing deduction against future Milestone Payments or royalties payable to the Licensor Institutions pursuant to Section 4.5 and Section 4.6, subject to Section 4.6.2.4. Disputes arising under this Section 4.6.2.3 shall be referred to the Executive Officers for resolution under Section 11.7, and there shall be no reduction in Milestone Payments or royalties under this Section 4.6.2.3 during the pendency of any such dispute.

4.6.2.4 Minimum Royalty. Notwithstanding anything to the contrary herein (a) on a product-by-product basis, in no event shall payments to the Licensor Institutions under this Agreement be reduced pursuant to this Section 4.6.2 such that the Licensor Institutions receive less than (i) [**] percent ([**]%) of the applicable rate set forth in Section 4.6.1, if Company is entitled to offset Royalties under this Agreement pursuant to Section 4.6.2.3 and either or both of Section 4.6.2.1 or Section 4.6.2.2, or (ii) otherwise, [**] percent ([**]%) of the applicable rate set forth in Section 4.6.1, and (b) any amounts that are not offset during a reporting period shall not be creditable against payments arising in subsequent reporting periods.

4.6.3 Patent Challenge. In the event that Company or any of its agents, Affiliates or Sublicensees is or becomes a Challenging Party, then (a) Company shall provide the Licensor Institutions with at least [**] notice prior to taking any such action, (b) Company shall pay all reasonable costs, fees and expenses associated with such Patent Challenge that are incurred by the Owner Institutions and their trustees, managers, officers, agents, employees, faculty, affiliated investigators, personnel, and staff, including reasonable attorneys' fees and all reasonable costs associated with administrative, judicial or other proceedings, within [**] after receiving an invoice from the Licensor Institutions for same; (c) the co-exclusive licenses granted in this Agreement may, as of the date of initiation of said challenge or opposition, (i) upon notice by Broad to Company with respect to Broad Controlled Patents or Cas9-II Patent Rights, be converted by Broad at its option into a non-exclusive license for the remainder of the Term or (ii) upon notice by Harvard to Company with respect to Harvard Controlled Patents, be converted by Harvard at its option into a non-exclusive license for the remainder of the Term, and in such events described in the foregoing subsections (i) and (ii), the relevant Owner Institutions shall have the right to grant licenses under their respective Patent Rights to any Person, subject to the then-existing non-exclusive license provided herein; (d) any fees, royalties, milestones or revenues payable to the Licensor Institutions under Section 4.2 through Section 4.7 shall double in amount if and when any Patent Right survives the Patent Challenge such that it remains valid in whole or in part; and (e) at any time after the Patent Challenge is brought, Broad may, at its option, terminate this Agreement according to Section 10.2 with respect to Broad Controlled Patents or Cas9-II Patent Rights and Harvard may, at its option, terminate this Agreement according to Section 10.2 with respect to Harvard Controlled Patents; provided that if any of subsections (a) through (e) are held invalid or unenforceable for any reason, such invalidity or unenforceability shall not affect any of the other said subsections. Notwithstanding any provision of this Agreement to the contrary, Company shall not have the right to assume or participate in the defense, settlement or other disposition of such Patent Challenge through its status as licensee under this Agreement, but shall pay associated costs, fees and expenses as provided in this Section 4.6.3. The Parties agree that any challenge or opposition to a Patent Right by Company may be detrimental to the Owner Institutions, and that the above provisions shall constitute reasonable liquidated damages to reasonably compensate the Owner Institutions for any loss they may incur as a result of Company taking such action.

4.7 **Sublicense Income**. Subject to Section 4.8, Company shall pay to the Licensor Institutions, within [**] following the last day of the Calendar Quarter in which such Sublicense Income is received by Company, a percentage of Sublicense Income within [**] following the last day of the Calendar Quarter in which such Sublicense Income is received by Company, in accordance with the rates set forth in this Section 4.7; provided, however, that, for the purpose of calculating payments under this Section 4.7, Company may deduct from the aggregate Sublicense Income received by Company in a given Calendar Quarter an amount equal to the total payments made by Company to the Licensor Institutions under Article 6 in such Calendar Quarter. For the avoidance of doubt, in the event any Sublicensee transfers rights granted or transferred by the Licensor Institutions under this Agreement along with rights owned by the Company or granted to the Company by a Third Party, Company shall pay to the Licensor Institutions the following percentages of all Sublicense Income received by Company or its Affiliates under such Sublicense without deduction from or apportionment of any part of such consideration. Company agrees that all rights relevant to making, using, selling, offering to sell or importing particular Licensed Products or Enabled Products shall be included in or deemed to be included in the same Sublicense under which the rights granted or otherwise transferred to Company hereunder are granted with respect to such Licensed Products or Enabled Products for the purpose of calculating Sublicense Income.

4.7.1 [**] percent ([**]%) of Sublicense Income received with respect to a Sublicense executed prior to the date on which the Company has [**];

4.7.2 [**] percent ([**]%) of Sublicense Income received with respect to a Sublicense executed on or after the date on which the Company has [**];

4.7.3 [**] percent ([**]%) of Sublicense Income received with respect to a Sublicense executed on or after the date on which the [**].

4.8 **Sublicense Income Offset**. On a Sublicense-by-Sublicense and Calendar Quarter-by-Calendar Quarter basis, if Company is required to pay Sublicense Income (as defined in the Cpf1 Agreement or this Agreement, as applicable) under both (a) this Agreement and (b) the Cpf1 Agreement under the same Sublicense in a given Calendar Quarter, then Company shall be entitled to credit [**] percent ([**]%) of the Sublicense Income (as defined in the Cpf1 Agreement) payable under the Cpf1 Agreement with respect to such Sublicense in such Calendar Quarter prior to the application of any applicable offset set forth in the Cpf1 Agreement against the Sublicense Income payable under Section 4.7 with respect to such Sublicense in such Calendar Quarter; provided that in no event will Sublicense Income payments under this Agreement be reduced pursuant to this Section 4.8 by more than [**] percent ([**]%) of the payments that would otherwise be payable pursuant to Section 4.7.

4.9 **Complex Consideration**. Company acknowledges and agrees that the Parties have chosen to apply set royalty rates and milestone payments to the rights granted under this Agreement for Company's convenience in calculating and paying royalties and milestones. In doing so, Company acknowledges and agrees that certain royalty rates and milestones payments chosen incorporate discounts reflecting that certain products and processes may not be Covered by the Valid Claims of the Patent Rights but may be based upon, derived from or use the Patent Rights or other licensed intellectual property rights, so that Company, unless explicitly provided otherwise in this Agreement, shall not be entitled to a reduction in the royalty rate or milestone payment, even if it does not at all times need or use a license to specific Patent Rights, until the end of the Royalty Term for such product or process.

4.10 **Additional Consideration**.

4.10.1 Success Payments.

4.10.1.1 Notice. Company shall notify the Licensor Institutions of any payment payable to the Licensor Institutions under this Section 4.10.1 no later than [**] after the applicable Trigger Date. Such notice shall include the date of such Trigger Date and (a) in the case of a Trigger Date that is not a Company Sale Date or a Trailing Value Receipt Date, a determination of the Average Market Capitalization as of such Trigger Date or (b) in the case of a Trigger Date that is a Company Sale Date or a Trailing Value Receipt Date, the Upfront Acquisition Value and Trailing Acquisition Value received, as applicable.

4.10.1.2 Achievement of Value Triggers. Following a Trigger Date that is not a Company Sale Date or a Trailing Value Receipt Date, Company shall pay to the Licensor Institutions the payment indicated in the column labeled "Success Payment" (each such payment, a "**Success Payment**") opposite the Trigger Date Value Trigger associated with such Trigger Date:

Value Trigger	Success Payment (in Dollars)
[**]	[**]
[**]	[**]
[**]	[**]
[**]	[**]
[**]	[**]
$10 billion	[**]

* These Success Payments only apply if a Licensed Product Covered by a Valid Claim of the Patent Rights under this Agreement, or a Licensed Product Covered by a Valid Claim of the Patent Rights under the Cpf1 Agreement (as those terms are defined in the Cpf1 Agreement), in each case, developed by or on behalf of Company or its Affiliate or Sublicensee (as defined under this Agreement or the Cpf1 Agreement, as applicable) is or has been the subject of a Clinical Study in connection with such development as of the applicable Trigger Date.

For the avoidance of doubt, more than one Success Payment may become due and payable based on the Average Market Capitalization determined on any single Trigger Date. By way of example under the immediately preceding sentence, if the Average Market Capitalization on the first Trigger Date is [**] dollars ($[**]), then Company shall pay to the Licensor Institutions aggregate Success Payments equal to [**] dollars ($[**]). For the avoidance of doubt, the maximum amount payable by Company to the Licensor Institutions pursuant to this Section 4.10.1.2 shall be thirty-one million two hundred and fifty thousand dollars ($31,250,000).

4.10.2 Company Sale Payments. Notwithstanding anything to the contrary herein, if Company undergoes a Company Sale, then (a) the Licensor Institutions shall receive the applicable Company Sale Success Payment no later than the earlier of (i) [**] after the Company Sale Date and (ii) the first business day following the date upon which Company, its stockholders or its payment agent, as the case may be, first receives payment of the consideration with respect to such Company Sale, (b) no later than [**] after any Trailing Value Receipt Date on which the applicable Acquisition Value is greater than or equal to a Value Trigger that corresponds to a Success Payment that previously has not become due and payable, the Licensor Institutions shall receive such unpaid Success Payment and (c) no Success Payments shall become due hereunder on the basis of Average Market Capitalization equaling or exceeding a Value Trigger. Any payments payable under this Section 4.10.2 must be paid solely in cash or in Public Securities of the Company's successor or acquirer, or a combination thereof. With respect to any (i) Company Sale or (ii) Asset Sale to an Affiliate of Company, Company shall cause the acquirer, successor, assignee or licensee of Company or of Company's assets, as applicable, to assume Company's obligations hereunder.

4.10.3 Manner and Timing of Payment of Success Payments. Any Success Payment provided herein that is payable with respect to a Trigger Date and that is not paid in connection with a Company Sale pursuant to Section 4.10.2, may be paid by Company, in its sole discretion, in cash or in a grant to the Licensor Institutions of a number of shares of Common Stock (any such shares, "**Success Payment Shares**"), or a combination thereof. Company shall notify the Licensor Institutions of its election with regard to the form of payment of a Success Payment no later than [**] after the applicable Trigger Date (the "**Election Date**"). If Company elects to pay any Success Payment (or portion thereof) in cash, Company shall pay to the Licensor Institutions such Success Payment within [**] following the applicable Election Date.

4.10.3.1 Issuance of Success Payment Shares. If Company elects to pay any Success Payment (or portion thereof) in Success Payment Shares, Company shall issue a number of Success Payment Shares equal to the quotient determined by dividing the applicable Success Payment amount (or portion thereof) by the FMV of Common Stock on the day immediately prior to the date of issuance of such Success Payment Shares to the Licensor Institutions, in the names of the Licensor Institutions or each of their respective designees, upon instruction by the Licensor Institutions and in accordance with such instructions, within [**] following such Election Date and in accordance with such instructions. Notwithstanding the foregoing, Company may defer any such issuance of Success Payment Shares until the date that is [**] after the date of the Initial Public Offering of Company, provided that in the event of any such deferral, (i) the applicable Success Payment amount shall accrue interest from the applicable Election Date to the later of (A) the date on which such Success Payment and all accrued interest thereon is paid in full, if such Success Payment is paid in cash, or (B) otherwise, the date on which all such Success Payment Shares are issued and covered by an effective Resale Registration Statement, at the rate of [**] percent ([**]%) per annum (compounded quarterly),

and (ii) Company shall, prior to the date that is [**] after the date of the Initial Public Offering of Company, (x) issue a number of Success Payment Shares equal to the quotient determined by dividing the applicable Success Payment (or portion thereof) plus the accrued interest by the FMV of Common Stock on the day immediately prior to the date of issuance of such Success Payment Shares to the Licensor Institutions, in the names of the Licensor Institutions or each of their respective designees, upon instruction by the Licensor Institutions and in accordance with such instructions, or (y) pay to the Licensor Institutions in cash an amount equal to the applicable Success Payment plus the accrued interest.

4.10.3.2 Securities Act Registration. All Success Payment Shares issued under this Section 4.10.3 shall be registered under the Securities Act and covered by an effective Resale Registration Statement at the time of issuance, if the Common Stock is then publicly traded. All expenses related to the registration, qualification or compliance with registration of the Success Payment Shares shall be borne by Company.

4.10.3.3 Resale Registration Statement. Any Resale Registration Statement shall include a "final" prospectus, including the information required by Item 507 of Regulation S-K of the Securities Act, as provided by the Licensor Institutions covered by such Resale Registration Statement. Notwithstanding the foregoing, [**], Company shall [**] to Company [**] to Company [**] to the Company [**]. Notwithstanding anything to the contrary in this Agreement, if the filing, initial effectiveness or continued use of a Resale Registration Statement at any time would require Company to make an Adverse Disclosure (as defined below), Company may, upon giving prompt written notice of such action to the Licensor Institutions, delay the filing or initial effectiveness of, or suspend use of, the Resale Registration Statement (a "**Suspension**"); provided, however, that (a) Company shall not be permitted to exercise a Suspension more than [**] period for a period not to exceed [**] and (b) the applicable Success Payment shall accrue interest from the applicable Election Date until the later of (i) the date on which such Success Payment and all accrued interest is paid in full, if such Success Payment is paid in cash, or (ii) otherwise, the date on which all such Success Payment Shares are issued and covered by an effective Resale Registration Statement, at the rate of [**] percent ([**]%) per annum (compounded quarterly). In the case of a Suspension, the Licensor Institutions agree to suspend use of the applicable prospectus in connection with any sale or purchase of, or offer to sell or purchase, Success Payment Shares, upon receipt of the notice referred to above. Company shall immediately notify the Licensor Institutions in writing upon the termination of any Suspension, amend or supplement the prospectus, if necessary, so it does not contain any untrue statement or omission and furnish to the Licensor Institutions such numbers of copies of the prospectus as so amended or supplemented as the Licensor Institutions may reasonably request. If Company does not terminate a Suspension within [**] following the date on which it notifies the Licensor Institutions thereof, then the Licensor Institutions may request in writing that Company file a Resale Registration Statement with respect to the Success Payment Shares, in which case, subject to the terms of this Section 4.10.3.3, Company shall, within [**] following such request, (A) file a Resale Registration Statement with respect to the Success Payment Shares (the number of which Success Payment Shares will be calculated to account for any accrued interest with respect to the Success Payment) or (B) pay to the Licensor Institutions in cash an amount equal to the applicable Success Payment plus the accrued interest thereon. "**Adverse Disclosure**" means public disclosure of material non-public information that,

in the good faith judgment of the board of directors of Company: (x) would be required to be made in any registration statement filed with the Securities and Exchange Commission by Company so that such registration statement, from and after its effective date, does not contain an untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein not misleading; (y) would not be required to be made at such time but for the filing, effectiveness or continued use of such registration statement; and (iii) Company has a bona fide business purpose for not disclosing publicly.

4.11 **Share Issuance Limitation**. In no event shall Company issue to the Licensor Institutions shares of Common Stock (i) if and to the extent that such issuance would result in a change of control (within the meaning of NASDAQ Listing Rule 5635(b), as amended from time to time), or (ii) if and to the extent such issuance would result in the issuance of more than nineteen and nine-tenths percent (19.9%) of the Common Stock, for the purposes of the NASDAQ Listing Rule 5635(d)(1), as amended from time to time.

4.12 **Non-Circumvention**. Company shall not undertake any reorganization, transfer of assets, consolidation, merger, dissolution, issue or sale of securities, or any other voluntary action for the purpose of avoiding the observance or performance of its payment obligations under Sections 4.10.1 and 4.4.2 and any related definitions.

5. REPORTS; PAYMENTS; RECORDS.

5.1 **Reports and Payments**.

5.1.1 Reports. Within [**] after the conclusion of each Calendar Quarter commencing with the first Calendar Quarter in which Net Sales are generated or Sublicense Income is received, Company shall deliver to the Licensor Institutions a report containing the following information (in each instance, with a product-by-product and country-by-country breakdown and, in the case of the requirement under Section 5.1.1(c), to the extent such itemized listing of allowable deductions is available from Sublicensees under the terms of the relevant Sublicenses):

(a) the number of units of Licensed Products and Enabled Products sold, leased, performed or otherwise transferred, by Invoicing Entities for the applicable Calendar Quarter;

(b) the gross amount billed or invoiced for Licensed Products and Enabled Products sold, leased, performed or otherwise transferred by Invoicing Entities during the applicable Calendar Quarter;

(c) a calculation of Net Sales for the applicable Calendar Quarter, including an itemized listing of allowable deductions;

(d) a reasonably detailed accounting of all Sublicense Income received during the applicable Calendar Quarter;

(e) the total amount payable to the Licensor Institutions in dollars on Net Sales and Sublicense Income for the applicable Calendar Quarter, together with the exchange rates used for conversion; and

(f) a list of [**] the Licensed Products.

Company shall use reasonable efforts to include in each Sublicense a provision requiring the Sublicensee to provide the information required under this Section 5.1.1.

Each such report shall be certified on behalf of Company as true, correct and complete in all material respects with respect to the information required under Sections 5.1.1(a) through (f), and with respect to the information provided under Section 5.1.1(f), Company shall certify that based solely on its commercially reasonable efforts to determine such information, Company believes such information is true, correct and complete in all material respects. If no amounts are due to Licensor Institutions for a particular Calendar Quarter, the report shall so state.

5.2 **Payment Currency**. All payments due under this Agreement shall be paid in United States dollars. Conversion of foreign currency to United States dollars shall be made as of the last working day of the applicable Calendar Quarter at the applicable conversion rate existing in the United States (as reported in the *Wall Street Journal*) or, solely with respect to Sublicensees, at another commercially reasonable, publicly available, applicable conversion rate as may be provided in a Sublicense. Such payments shall be without deduction of exchange, collection or other charges.

5.3 **Records**. Company shall maintain, and shall cause its Affiliates and Sublicensees to maintain, complete and accurate records of Licensed Products and Enabled Products that are made, used, sold, performed, leased or transferred under this Agreement, any amounts payable to the Licensor Institutions in relation to such Licensed Products or Enabled Products, and all Sublicense Income received by Company and its Affiliates, which records shall contain sufficient information to permit the Licensor Institutions to confirm the accuracy of any reports or notifications delivered under Section 5.1. Company, its Affiliates and/or its Sublicensees, as applicable, shall retain such records relating to a given Calendar Year for at least [**] after the conclusion of that Calendar Year (the "**Record Retention Period**").

5.3.1 Audit of Company and Affiliates. During the Record Retention Period, the Licensor Institutions shall have the right, at their expense, to cause an independent, certified public accountant (or, in the event of a non-financial audit, other appropriate auditor) chosen by the Licensor Institutions and reasonably acceptable to Company to inspect such records of Company and its Affiliates during normal business hours for the purposes of verifying the accuracy of any reports and payments delivered under this Agreement and Company's compliance with the terms hereof. Such accountant or other auditor, as applicable, shall not disclose to the Licensor Institutions any information other than information relating to the accuracy of reports and payments delivered under this Agreement. The Parties shall reconcile any underpayment or overpayment within [**] after the accountant delivers the results of the audit. If any audit performed under this Section 5.3.1 reveals an underpayment in excess of [**] percent ([**]%) in any Calendar Year, Company shall reimburse the Licensor Institutions for all amounts incurred in connection with such audit. The Licensor Institutions may exercise their rights under this Section 5.3.1 [**] per audited entity, [**] and only with reasonable prior notice to the audited entity.

5.3.2 Audit of Sublicensees. During the Record Retention Period, the Licensor Institutions shall have the right, at their expense, to require Company to make available to an independent, certified public accountant (or, in the event of a non-financial audit, other appropriate auditor) chosen by the Licensor Institutions and reasonably acceptable to Company, during normal business hours, such information as Company has in its possession with respect to reports and payments from Sublicensees for the purposes of verifying the accuracy of any reports and payments delivered under this Agreement and Company's compliance with the terms hereof. If such information as Company has in its possession is not sufficient for such purposes, the Licensor Institutions shall have the right, at their expense, to cause Company to exercise its right under a Sublicense to cause an independent, certified public accountant (or, in the event of a non-financial audit, other appropriate auditor) chosen by the Licensor Institutions and reasonably acceptable to Company to inspect such records of Sublicensee during normal business hours for the purposes of verifying the accuracy of any reports and payments delivered under this Agreement and Company's compliance with the terms hereof. Such accountant or other auditor, as applicable, shall not disclose to the Licensor Institutions any information other than information relating to the accuracy of reports and payments delivered under this Agreement and then only to the extent such accountant or other auditor may disclose such information to Company under the terms of the relevant Sublicense. If Company does not have the right to conduct an audit of such Sublicensee for the relevant Calendar Year, Company and the Licensor Institutions shall meet and use reasonable efforts to agree on an appropriate course of action. The Parties shall reconcile any underpayment or overpayment within [**] after the accountant delivers the results of the audit. If any audit performed under this Section 5.3.2 reveals an underpayment to the Licensor Institutions in excess of [**] percent ([**]%) in any Calendar Year, Company shall reimburse the Licensor Institutions for all amounts incurred in connection with such audit. The Licensor Institutions may exercise their rights under this Section 5.3.2 [**] per Sublicensee, [**] and only with reasonable prior notice to Company and any audited Sublicensee.

5.4 **Late Payments**. Any payments by Company that are not paid on or before the date such payments are due under this Agreement shall bear interest at the lower of (a) [**] percent ([**]%) per month and (b) the maximum rate allowed by law. Interest shall accrue beginning on the first day following the due date for payment and shall be compounded quarterly. Payment of such interest by Company shall not limit, in any way, the Licensor Institutions' right to exercise any other remedies the Licensor Institutions may have as a consequence of the lateness of any payment.

5.5 **Payment Method**. Each payment due to any Licensor Institution under this Agreement shall be paid by check or wire transfer of funds to an account(s) in accordance with written instructions provided by such Licensor Institution. If made by wire transfer, such payments shall be marked so as to refer to this Agreement.

5.6 **Withholding and Similar Taxes**. All amounts to be paid to the Licensor Institutions pursuant to this Agreement shall be without deduction of exchange, collection, or other charges, and, specifically, without deduction of withholding or similar taxes imposed on Company or other government imposed fees or taxes imposed on Company, except as permitted in the definition of Net Sales.

6. PATENT PROSECUTION.

6.1 **Prosecution of Patent Rights**. As between the Parties, Broad and Harvard shall each have and exercise in their sole discretion exclusive control over the Prosecution of the respective Patent Rights that each controls. The Licensor Institutions shall keep Company reasonably informed regarding the Prosecution of the respective Reviewed Patent Rights that each controls. Without limiting the foregoing, each of Broad and Harvard shall: (a) provide Company a reasonable opportunity to review and comment on all material submissions and correspondence with respect to the respective Reviewed Patent Rights that each controls prior to filing of such material submissions and correspondence; provided, however, that copies of patent applications within the respective Reviewed Patent Rights will not be provided prior to filing, and (b) consider in good faith Company's comments and recommendations with respect thereto; provided, however, that final decision-making authority with respect to the Prosecution of all Patent Rights shall vest in the Licensor Institutions.

6.2 **Fees and Expenses.**

6.2.1 **Reviewed Patent Rights Fee**. Subject to Section 6.3.1, Company shall pay to the Licensor Institutions within [**] following the end of each Calendar Year a fee equal to (a) [**] dollars ($[**]) for the first [**] patent families within the Reviewed Patent Rights (where each patent family is listed under a distinct "Broad Reference" or "Harvard Reference" number in Exhibit 1.144) and (b) [**] dollars ($[**]) per patent family for each additional patent family in excess of [**] within the Reviewed Patent Rights (where each patent family is listed under a distinct "Broad Reference" or "Harvard Reference" number in Exhibit 1.144). Company may elect to revise the scope of the Reviewed Patent Rights, either by (i) including one or more additional patent families within the Patent Rights to Exhibit 1.144 or by (ii) substituting one or more patent families in Exhibit 1.144 with one or more other patent families within the Patent Rights, in each of which case ((i) and (ii)) Company will notify the Licensor Institutions in writing of such election and the Parties will amend this Agreement to update Exhibit 1.144 in accordance with such election within [**] following the Licensor Institutions' receipt of the applicable notice; provided, however, that Company may not elect to substitute patent families in Exhibit 1.144 pursuant to the foregoing clause (ii) more than [**]. Notwithstanding the foregoing, Company may elect, at any time upon the issuance of [**] prior written notice to the Licensor Institutions, to relinquish its rights under Section 6.1 with respect to the Prosecution of certain Reviewed Patent Rights. Upon receipt of such notice by the Licensor Institutions, such Patent Rights shall no longer be deemed Reviewed Patent Rights under this Agreement; provided, however, that, subject to Section 6.3.1, Company shall continue to reimburse the Licensor Institutions for all expenses incurred after the Effective Date (A) in the Prosecution of any claims or actions specifically requested by Company or any of its representatives with respect to any of such Patent Rights or (B) with respect to the Prosecution of any such Patent Rights that are no longer licensed under the Editas Cas9-I License Agreement or the Editas Cas9-II License Agreement (to the extent such expenses have not been reimbursed by a Third Party).

6.2.2 **Expenses for Company-Requested Actions**. Subject to Section 6.3.1, in addition to the payment obligations set forth in Section 6.2.1, Company shall reimburse each Licensor Institution for all documented, out-of-pocket expenses, including [**] after the Effective Date [**] (to the extent such expenses have not been reimbursed by a Third Party) within [**] after the date of each invoice from the applicable Licensor Institution for such expenses.

6.2.3 **Expenses for Patent Rights Abandoned by Editas**. In the event that any Patent Right is no longer licensed under the Editas Cas9-I License Agreement or the Editas Cas9-II License Agreement, the Licensor Institutions shall notify Company thereof within [**] of the effective date of such change to the relevant Editas license agreement. Unless Company informs the Licensor Institutions in writing within [**] following its receipt of the applicable notice that it does not wish to pay for the Prosecution of such Patent Right in one or more jurisdictions (in which case such Patent Right shall be deemed to be an Abandoned Patent Right in such jurisdiction(s)) Company shall, subject to Section 6.3.1, reimburse each Licensor Institution (to the extent not reimbursed by a Third Party) for all documented, out-of-pocket expenses, including [**] under this Section 6.2.3 within [**] after the date of each invoice from the applicable Licensor Institution for such expenses, up to the maximum of the greater of, on a patent family-by-patent family (where each patent family is listed under a distinct "Broad Reference" or "Harvard Reference" number) and annual basis, (a) [**] dollars ($[**]) and (b) an amount equal to the aggregate out-of-pocket expenses (including [**].

6.3 **Abandonment**.

6.3.1 **Abandonment by Company**. If Company decides that it does not wish to pay for the Prosecution of any Patent Rights in a particular country under Section 6.2.2 or Section 6.2.3 (such Patent Rights in such country, the "**Abandoned Patent Rights**"), Company shall provide the Licensor Institutions with prompt written notice of such election. [**] after receipt of such notice by the Licensor Institutions, Company shall be released from its obligations to reimburse the Licensor Institutions under Section 6.2 for the expenses incurred thereafter as to such Abandoned Patent Rights; provided, however, that expenses authorized prior to the receipt by the Licensor Institutions of such notice shall be deemed incurred prior to the notice. In the event of Company's election not to pay for the Prosecution of any Abandoned Patent Rights in a particular country, any license granted to Company hereunder with respect to such Abandoned Patent Rights shall terminate (solely with respect to such Abandoned Patent Right and such country), and Company shall have no rights hereunder to exploit such Abandoned Patent Rights in such country. The Licensor Institutions shall be free, without further notice or obligation to Company, to grant rights in and to such Abandoned Patent Rights to Third Parties in the Field without limitation.

6.3.2 **Abandonment by Licensor Institutions**. Except with respect to the Cas9-II Group B Patent Rights, each Licensor Institution agrees to maintain any application or patent within the Patent Rights that it controls for as long as (a) Company continues to meet its obligation to reimburse expenses associated with such application or patent in accordance with Section 6.2, (b) there is a good faith basis for doing so, and (c) doing so is consistent with the applicable Licensor Institution's prosecution strategy. For the avoidance of doubt, this Section 6.3.2 shall not apply and shall not limit the Licensor Institutions' right to cease Prosecution of a given application within the Patent Rights in lieu of a divisional, continuation or continuation-in-part application that is also within the Patent Rights.

6.4 **Large Entity Designation.** The Parties hereby agree that the Licensor Institutions shall pay the fees prescribed for large entities to the USPTO with respect to the Patent Rights.

6.5 **Marking**. Company shall, and shall cause its Affiliates and Sublicensees to, mark all Licensed Products sold, performed or otherwise disposed of in such a manner as to conform with the patent laws and practice of the country to which such products are shipped or in which such products are sold for purposes of ensuring maximum enforceability of the Patent Rights in such country.

7. ENFORCEMENT OF PATENT RIGHTS.

7.1 **Notification**. As between the Parties, and subject to any confidentiality obligations of Company owed to any Third Party, Company shall inform (i) Broad promptly in writing of any alleged infringement of the Broad Controlled Patents and Cas9-II Patent Rights by a Third Party that Company becomes aware of, along with any available evidence thereof, and (ii) Harvard promptly in writing of any alleged infringement of the Harvard Controlled Patents by a Third Party that Company becomes aware of, along with any available evidence thereof. A Licensor Institution shall inform Company promptly in writing of any alleged infringement of any Patent Rights within the Field by a Third Party that such Licensor Institution becomes aware of, along with any available evidence thereof.

7.2 **Licensor Institutions' Enforcement Right**.

7.2.1 As between the Parties, except as otherwise set forth in this Article 7, Broad and Harvard shall each have the sole right, but shall not be obligated, at their sole discretion, to prosecute at their own expense all infringements of the respective Patent Rights that each controls. So long as Company remains the co-exclusive licensee of any Patent Rights with respect to a Licensed Product in the Field, as between the Parties, Company shall, subject to the terms of this Article 7, have the first right, but not the obligation, to institute infringement suits under such Patent Rights with respect to such Licensed Product in the Field where Company reasonably determines that a Third Party is marketing or has specific plans and is preparing to market an infringing product in any country that competes with such Licensed Product in the Field ("**Infringement**"); provided, however, that pursuant to the Editas Cas9-I License Agreement or the Editas Cas9-II License Agreement, Editas may have certain existing, independent first rights to institute infringement suits under certain of the Patent Rights, and thus, notwithstanding anything to the contrary in this Agreement, Company's rights under this Section 7.2 are subject to an obligation to coordinate with Editas, as set forth in Section 7.2.2, and are subject and subordinate to the rights of Editas existing as of the Effective Date, as may be amended from time to time, subject to Sections 8.2.1 and 8.2.2. Notwithstanding anything to the contrary contained herein with respect to any Infringement, if Company owns one or more

issued patents that cover the allegedly infringing product ("**Other IP**"), Company shall not initiate action under the Patent Rights unless it (x) also asserts [**] of such Other IP or (y) obtains written consent from the Licensor Institutions, which consent shall not be unreasonably withheld. Company shall use the same degree of diligence in prosecuting such Infringement as it uses or would use in prosecuting infringement of its own patent rights.

7.2.2 Before Company commences an action with respect to any Infringement:

7.2.2.1 Company shall deliver a written notice to Editas informing it of such Infringement and Company shall use reasonable efforts to coordinate its enforcement efforts with respect to such Infringement with Editas for a period not to exceed [**] following the delivery of such notice (or such other period that the Parties may agree upon);

7.2.2.2 Company shall provide evidence to the Licensor Institutions that (a) it has delivered such written notice to Editas and has used reasonable efforts to coordinate its enforcement efforts with respect to such Infringement with Editas during such [**] period (or such other period that the Parties may agree upon), and (b) it has good faith basis for initiating action with respect to such Infringement, and further, Company shall briefly summarize to Licensor Institutions whether and, if so, how Company and Editas will coordinate enforcement efforts, or whether Company will (subject to any obligation to obtain the consent of the Licensor Institutions, as set forth in Section 7.2.1) independently enforce the Patent Rights with respect to such Infringement, as applicable; and

7.2.2.3 Company shall consult with the applicable Owner Institutions with respect to its proposed course of action to address the Infringement and shall consider in good faith the views of the applicable Owner Institutions, and potential effects on the public interest in making its decision whether to take such action, especially with regard to the locally-affordable availability of Licensed Products or equivalents thereof, e.g., generic products, in Developing Countries. Notwithstanding the foregoing or anything to the contrary contained in this Agreement, Company agrees that the relevant Licensor Institution(s) shall hold final decision-making authority, to be exercised in good faith, on a case-by-case basis, as to whether Company shall be permitted to enforce the Patent Rights in any Developing Country.

7.2.3 Subject to Editas' rights described in Section 7.2.1, should Company elect (and, where consent of a Licensor Institution is required, be permitted) to take action against an actual or potential infringer of Patent Rights, Company shall select counsel reasonably acceptable to the applicable Owner Institutions, shall keep the applicable Owner Institutions reasonably informed of the progress of the action and shall give the Owner Institutions a reasonable opportunity in advance to consult with Company and offer their views about major decisions affecting the action. Company shall give careful consideration to those views, but shall have the right to control the action; provided, however, that if Company fails to defend in good faith the validity and/or enforceability of the Patent Rights in the action, or if Company's co-exclusive license to a Valid Claim in the suit terminates pursuant to Section 10.2, or if infringement in the Field terminates, the Owner Institutions may elect to take control of the action pursuant to Section 7.3. The expenses of Company with respect to any suit or suits that Company elects to bring in accordance with this Section 7.2 shall be paid for entirely by Company. If required under Applicable Law to establish standing for the initiation or

maintenance of such infringement action by Company, (a) the relevant Owner Institutions shall, upon request of Company or as required by a court or procedural rules, or may voluntarily, join or be joined as a party to such action, provided that no Owner Institution shall be the first named party in such action, (b) Company shall hold the Owner Institutions free, clear and harmless from and against any and all costs and expenses, including attorneys' fees, incurred in conjunction with the prosecution, adjudication, defense, management or settlement of, or joinder to, such suits and any related appeals, remands or other related proceedings ("**Litigation Expenses**"), and (c) Company shall reimburse any and all Litigation Expenses incurred by the Owner Institutions within [**] after receiving an invoice (including a copy of detailed time and expense entries from attorneys) from the applicable Owner Institutions for the same. Company shall not compromise or settle such litigation without the prior written consent of the applicable Owner Institutions, which shall not be unreasonably withheld. In the event that Company exercises its right to institute an action against any Infringement pursuant to this Section 7.2, out of any sums recovered in such suit or in settlement thereof, it shall first reimburse the Owner Institutions for any unreimbursed Litigation Expenses and then reimburse itself for all of its litigation expenses necessarily incurred in the prosecution of any such action. The remainder of any sums recovered shall be divided as follows: (i) Company shall receive an amount equal to its lost profits or a reasonable royalty on the infringing sales, or whichever measure of damages the court shall have applied; (ii) the Licensor Institutions shall receive an amount equal to the royalties and other amounts that Company would have paid to the Licensor Institutions if Company had sold the infringing products or services rather than the infringer, provided that (A) amounts payable under clause (ii) shall in no event exceed the amounts payable under clause (i) above and (B) in the event that the remainder of any sums recovered is insufficient to fully satisfy both of the foregoing clauses (i) and (ii) then Company and the Licensor Institutions shall receive a pro rata share of such remainder in relative proportion to the amounts that would have been payable to Company and the Licensor Institutions under clauses (i) and (ii); and (iii) the balance, if any, remaining after Company and the Licensor Institutions have been compensated under the foregoing clauses (i) and (ii) shall be shared by the Parties as follows: [**] percent ([**]%) to Company and [**] percent ([**]%) to the Licensor Institutions.

7.3 **Suit by Owner Institutions**. If Company has the right but does not take action in the prosecution, prevention or termination of any Infringement pursuant to Section 7.2 above, and has the right but has not commenced negotiations with the suspected infringer for the discontinuance of said Infringement, within [**] after receipt of notice from Licensor Institutions of the existence of such Infringement, the Owner Institution that owns the Patent Right subject to the Infringement may elect to do so. The Owner Institutions shall give due consideration to Company's reasons for not initiating a lawsuit or otherwise making or prosecuting a claim. Subject to Section 7.4, any and all expenses, including reasonable attorneys' fees, incurred by Owner Institutions with respect to the prosecution, adjudication or settlement of a suit in accordance with this Section 7.3, including any related appeals, shall be paid for entirely by the applicable Owner Institutions. In the event that an Owner Institution exercises its right to initiate or maintain an action against any Infringement pursuant to this Section 7.3, it shall retain all sums recovered in such suit or in settlement thereof.

7.4 **Own Counsel**. The Party initiating the suit shall have the sole and exclusive right to elect counsel for any suit initiated by it pursuant to Section 7.2 or Section 7.3; provided that such counsel is reasonably acceptable to the other Party. The other Party shall have the right to participate in and be represented by counsel of its own selection and at its own expense in any suit instituted under this Article 7 by the first Party for Infringement.

7.5 **Cooperation**. Each Party agrees to cooperate fully in any action under this Article 7 that is controlled by the other Party, including executing legal papers and cooperating in the prosecution as may be reasonably requested by the controlling Party; provided that the controlling Party reimburses the cooperating Party promptly for any costs and expenses incurred by the cooperating Party in connection with providing such requested cooperation within [**] after receiving an invoice from the cooperating Party for the same.

7.6 **Patent Validity Challenge**. Each Party shall promptly notify the other Party in the event it receives notice of any legal or administrative action by any Third Party against a Patent Right, including any opposition, nullity action, revocation, *inter partes* review, post-grant review, compulsory license proceeding, or declaratory judgment action. All such proceedings shall be Prosecution of the Patent Rights and controlled by the Owner Institutions in a manner consistent with Section 6.1; provided however, that if any such proceeding is part of or occurs due to any action or activities of Company or its Affiliates or Sublicensees, then Company will be responsible for reimbursing the Owner Institutions for one hundred percent (100%) of the out-of-pocket expenses incurred by the applicable Owner Institution in defending such action (to the extent such expenses have not been reimbursed by a Third Party).

8. WARRANTIES; LIMITATION OF LIABILITY.

8.1 **Compliance with Law**. Company represents and warrants that it shall comply, and shall ensure that its Affiliates and Sublicensees comply, with all Applicable Law, including all local, state, federal and international laws and regulations applicable to the development, manufacture, use, sale, performance and importation of Licensed Products and Enabled Products. Without limiting the foregoing, Company represents and warrants, on behalf of itself and its Affiliates and Sublicensees, that it shall comply with all applicable United States laws and regulations controlling the export of certain commodities and technical data, including without limitation all Export Administration Regulations of the United States Department of Commerce. Among other things, these laws and regulations prohibit or require a license for the export of certain types of commodities and technical data to specified countries. Company hereby gives written assurance that it shall comply with, and shall cause its Affiliates to comply with (and shall contractually obligate its Affiliates and Sublicensees to comply with), all applicable United States export control laws and regulations, that it bears sole responsibility for any violation of such laws and regulations by itself or its Affiliates or Sublicensees, and that it shall indemnify, defend, and hold Indemnitees and HHMI Indemnitees harmless (in accordance with Section 9.1) for the consequences of any such violation.

8.2 **Representations, Warranties and Covenants**.

8.2.1 By Broad. Broad represents and warrants that (A) Broad has the authority and right to enter into and perform its obligations under this Agreement and grant the licenses granted by Broad to Company herein, (B) as of the Effective Date, to the best of the knowledge of Broad's Office of Strategic Alliances and Partnering, the execution, delivery and performance

of this Agreement by Broad does not conflict with, or constitute a breach of, any order, judgment, agreement or instrument to which it is a party or is otherwise bound, and (C) as of the Effective Date, to the best of the knowledge of Broad's Office of Strategic Alliances and Partnering, no consent of any Third Party, including without limitation any governmental authority, is required for Broad to execute, deliver and perform under this Agreement, including without limitation to grant the licenses granted by Broad to Company herein, except for such consents as may have been obtained prior to the Effective Date. Further, Broad will not, during the Term and to the knowledge of Broad's Office of Strategic Alliances and Partnering, enter into any agreement (or amend or modify any existing agreement in any manner) that is inconsistent with the co-exclusive rights and licenses granted to Company in the Field hereunder and subject to the terms and conditions of this Agreement.

8.2.2 By Harvard. Harvard represents and warrants that (A) Harvard has the authority and right to enter into and perform its obligations under this Agreement and grant the licenses granted by Harvard to Company herein, (B) as of the Effective Date, to the best of the knowledge of Harvard's Office of Technology Development, the execution, delivery and performance of this Agreement by Harvard does not conflict with, or constitute a breach of, any order, judgment, agreement or instrument to which it is a party or is otherwise bound, and (C) as of the Effective Date, to the best of the knowledge of Harvard's Office of Technology Development, no consent of any Third Party, including without limitation any governmental authority, is required for Harvard to execute, deliver and perform under this Agreement, including without limitation to grant the licenses granted by Harvard to Company herein, except for such consents as may have been obtained prior to the Effective Date. Further, Harvard will not, during the Term and to the knowledge of Harvard's Office of Technology Development, enter into any agreement (or amend or modify any existing agreement in any manner) that is inconsistent with the co-exclusive rights and licenses granted to Company in the Field hereunder and subject to the terms and conditions of this Agreement.

8.2.3 By Company. Company represents and warrants that Company has the authority and right to enter into and perform its obligations under this Agreement. The Company further represents and warrants that as of the Effective Date (A) to the best of Company's knowledge, the execution, delivery and performance of this Agreement by Company does not conflict with, or constitute a breach of, any order, judgment, agreement or instrument to which it is a party or, to its knowledge, is otherwise bound, and (B) to the best of Company's knowledge, no consent of any Third Party, including without limitation any governmental authority, is required for Company to execute, deliver and perform under this Agreement, except for such consents as may have been obtained prior to the Effective Date.

8.3 **Disclaimer**.

8.3.1 NOTHING CONTAINED HEREIN SHALL BE DEEMED TO BE A WARRANTY BY ANY OWNER INSTITUTION THAT IT CAN OR WILL BE ABLE TO OBTAIN PATENTS ON PATENT APPLICATIONS INCLUDED IN THE PATENT RIGHTS, OR THAT ANY OF THE PATENT RIGHTS WILL AFFORD ADEQUATE OR COMMERCIALLY WORTHWHILE PROTECTION.

8.3.2 NO OWNER INSTITUTION MAKES ANY WARRANTIES WHATSOEVER AS TO THE COMMERCIAL OR SCIENTIFIC VALUE OF THE PATENT RIGHTS. NO OWNER INSTITUTION MAKES ANY REPRESENTATION THAT THE PRACTICE OF THE PATENT RIGHTS OR THE DEVELOPMENT, MANUFACTURE, USE, SALE OR IMPORTATION OF ANY LICENSED PRODUCT, OR ANY ELEMENT THEREOF, WILL NOT INFRINGE ANY PATENT OR PROPRIETARY RIGHTS.

8.3.3 EXCEPT AS OTHERWISE EXPRESSLY PROVIDED IN THIS AGREEMENT, NEITHER COMPANY NOR ANY OWNER INSTITUTION MAKES ANY WARRANTY WITH RESPECT TO ANY TECHNOLOGY, PATENTS, GOODS, SERVICES, RIGHTS OR OTHER SUBJECT MATTER OF THIS AGREEMENT AND COMPANY AND THE OWNER INSTITUTIONS EACH HEREBY DISCLAIMS WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT WITH RESPECT TO ANY AND ALL OF THE FOREGOING.

8.4 **Limitation of Liability**.

8.4.1 Except with respect to matters for which Company is obligated to indemnify Indemnitees under Article 9, no Party shall be liable to any other Party with respect to any subject matter of this Agreement under any contract, negligence, strict liability or other legal or equitable theory for (a) any indirect, incidental, consequential or punitive damages or lost profits or (b) cost of procurement of substitute goods, technology or services.

8.4.2 The Owner Institutions' aggregate liability for all damages of any kind arising out of or relating to this Agreement or its subject matter under any contract, negligence, strict liability or other legal or equitable theory shall not exceed the amounts paid to the Licensor Institutions under this Agreement (including the value of the Shares and, if applicable, Success Payment Shares issued pursuant to this Agreement, in each case calculated at the time of sale, or other disposition in connection with a Company Sale, of the applicable Share or Success Payment Share by the applicable Owner Institution).

9. INDEMNIFICATION AND INSURANCE.

9.1 **Indemnification**.

9.1.1 Indemnity. Company shall, and shall cause its Affiliates and Sublicensees to, indemnify, defend and hold harmless each Owner Institution and each of their current and former directors, governing board members, trustees, officers, faculty, affiliated investigators, medical and professional staff, employees, students, and agents and their respective successors,

heirs and assigns (collectively, the "**Indemnitees**") from and against any liability, cost, expense, damage, deficiency, loss or obligation of any kind or nature (including reasonable attorneys' fees and other costs and expenses of litigation or defense) to which any Indemnitee may become subject as a result of any Third Party claim, suit, investigation, action, demand or judgment based upon, arising out of, or otherwise relating to this Agreement or any Sublicense or subcontract, including (a) any such cause of action relating to product liability concerning any product, process, or service made, used, sold or performed pursuant to any right or license granted under this Agreement and (b) any such cause of action relating to any Environmental Impact involving or arising from a Licensed Product or Enabled Product (collectively, "**Claims**"), except to the extent any such Claim results from or arises out of the gross negligence or willful misconduct of an Indemnitee or material breach of this Agreement by the Licensor Institutions. Company and each of its Affiliates and Sublicensees are referred to as "**Indemnitor**" below.

9.1.2 Procedures. The Indemnitees agree to provide Company with prompt written notice of any Claim for which indemnification is sought under this Agreement. Indemnitor agrees, at its own expense, to provide attorneys reasonably acceptable to the Licensor Institutions and the applicable indemnified Owner Institution to defend against any such Claim. The Indemnitees shall cooperate with Indemnitor, at Indemnitor's expense, in such defense and shall permit Indemnitor to conduct and control such defense and the disposition of such Claim (including without limitation all decisions relative to litigation, appeal, and settlement); provided, however, that any Indemnitee shall have the right to retain its own counsel, at the expense of Indemnitor, if representation of such Indemnitee by the counsel retained by Indemnitor would be inappropriate because of actual or potential differences in the interests of such Indemnitee and any other party represented by such counsel. The Licensor Institutions and the applicable indemnified Owner Institution agree to use diligent efforts to select counsel, and to cause any other Indemnitees affiliated with their respective institutions to select counsel, that minimizes the number of counsel retained by all Indemnitees if representation of an Indemnitee by the counsel retained by Indemnitor would be inappropriate because of actual or potential differences in the interests of such Indemnitee and any other party represented by such counsel. Indemnitor agrees to keep counsel(s) for Indemnitees informed of the progress in the defense and disposition of such claim and to consult with the Licensor Institutions and the applicable indemnified Owner Institution with regard to any proposed settlement. Company shall not settle any Claim that has an adverse effect on the rights of any Indemnitee hereunder that is not immaterial or that admits any liability by or imposes any obligation on any Indemnitee without the prior written consent of such Indemnitee, which consent shall not be unreasonably withheld, conditioned or delayed. An Indemnitee may not settle any Claim without the prior written consent of Company, which consent shall not be unreasonably withheld, conditioned or delayed.

9.1.3 HHMI Indemnity. HHMI, and its trustees, officers, employees, and agents (collectively, "**HHMI Indemnitees**"), shall be indemnified, defended by counsel acceptable to HHMI, and held harmless by Company, from and against any liability, cost, expense, damage, deficiency, loss or obligation, of any kind or nature (including without limitation, reasonable attorneys' fees and other costs and expenses of defense) based upon, arising out of, or otherwise relating to any Third Party claim (collectively, "**HHMI Claims**"), based upon, arising out of, or otherwise relating to this Agreement or any Sublicense, including without limitation any cause of

action relating to product liability. The previous sentence shall not apply to any HHMI Claim that is determined with finality by a court of competent jurisdiction to result solely from the gross negligence or willful misconduct of an HHMI Indemnitee. Notwithstanding Section 8.4 or any other provision of this Agreement, Company's obligation to defend, indemnify and hold harmless the HHMI Indemnitees under this paragraph shall not be subject to any limitation or exclusion of liability or damages or otherwise limited in any way.

9.2 **Insurance**.

9.2.1 Beginning at the time any Licensed Product or Enabled Product is being commercially distributed or sold (other than for the purpose of obtaining Regulatory Approval) by Company, or by an Affiliate, Sublicensee or agent of Company, Company shall, at its sole cost and expense, procure and maintain commercial general liability insurance in amounts not less than [**] dollars ($[**]) per incident and [**] dollars ($[**]) annual aggregate and naming the Indemnitees and HHMI Indemnitees as additional insureds. During clinical trials of any such Licensed Product or Enabled Product, Company shall, at its sole cost and expense, procure and maintain commercial general liability insurance in such equal or lesser amount as the Licensor Institutions or any other Owner Institution shall require, naming the Indemnitees and HHMI Indemnitees as additional insureds. Such commercial general liability insurance shall provide (a) product liability coverage and (b) broad form contractual liability coverage for Company's indemnification obligations under this Agreement.

9.2.2 If Company elects to self-insure all or part of the limits described above in Section 9.2.1 (including deductibles or retentions that are in excess of [**] dollars ($[**]) annual aggregate) such self-insurance program must be acceptable to the Owner Institutions and their respective insurers in their sole discretion. The minimum amounts of insurance coverage required shall not be construed to create a limit of Company's liability with respect to its indemnification obligations under this Agreement.

9.2.3 Company shall provide each Owner Institution with written evidence of such insurance upon request of such Owner Institution. Company shall provide each Owner Institution with written notice at least [**] prior to the cancellation, non-renewal or material change in such insurance. If Company does not obtain replacement insurance providing comparable coverage within such [**] period, the Licensor Institutions shall have the right to terminate this Agreement effective at the end of such [**] period without notice or any additional waiting periods.

9.2.4 Company shall maintain such commercial general liability insurance beyond the expiration or termination of this Agreement during: (a) the period that any Licensed Product or Enabled Product is being commercially distributed, sold or performed by Company, or an Affiliate, Sublicensee or agent of Company; and (b) a reasonable period after the period referred to in (a) above, which in no event shall be less than [**].

10. TERM AND TERMINATION.

10.1 **Term**. The term of this Agreement shall commence on the Effective Date and, unless earlier terminated as provided in this Article 10, shall continue in full force and effect until the expiration of the last to expire Valid Claim (the "**Term**"). Upon such expiration, the Company shall have a worldwide, perpetual, irrevocable, fully paid up, sublicensable license under the rights and licenses granted to Company under Section 2.1, subject to Section 10.4.

10.2 **Termination**.

10.2.1 Joint Action of Licensor Institutions. The Licensor Institutions' rights to terminate this Agreement set forth in this Section 10.2 shall be joint, not several. Neither Licensor Institution acting alone shall have the right to terminate this Agreement; provided, however, that each Licensor Institution shall severally be entitled to terminate the licenses granted to Company herein under such Licensor Institution's respective rights in the Patent Rights to the same extent Licensor Institutions are entitled to terminate this Agreement pursuant to Sections 10.2.3.2, 10.2.4 and 10.2.5 hereof.

10.2.2 Termination Without Cause. Company may terminate this Agreement without cause upon four (4) months' prior written notice to the Licensor Institutions.

10.2.3 Termination for Default.

10.2.3.1 In the event that either Party commits a material breach of its material obligations under this Agreement and fails to cure such breach within [**] (or [**] in the case of failure to make any payment) after receiving written notice thereof from the other Party, the other Party may terminate this Agreement immediately upon written notice to the Party in breach.

10.2.3.2 If Company defaults in its material obligations under Section 9.2 to procure and maintain insurance, or if Company has in any event failed to comply with the notice requirements contained therein, and fails to cure such default (i) within [**] after receiving written notice thereof from Broad, then Broad may terminate this Agreement immediately, with respect to Broad Controlled Patents and Cas9-II Patent Rights, upon written notice to Company and (ii) within [**] after receiving written notice thereof from Harvard, then Harvard may terminate this Agreement immediately, with respect to Harvard Controlled Patents, upon written notice to Company. If such default of Company's material obligations under Section 9.2 arises as a result of a breach by a Sublicensee of the terms of a Sublicense, Company may cure such breach by purchasing additional insurance that covers the gaps in coverage created by virtue of such Sublicensee's breach. For clarity, under this Section 10.2.3.2, each Licensor Institution shall severally be entitled to terminate the licenses granted to Company herein under such Licensor Institution's respective rights in the Patent Rights, pursuant to Section 10.2.1.

10.2.3.3 The Licensor Institutions shall be entitled to terminate this Agreement in accordance with the provisions of Sections 3.2 and 3.5.

10.2.3.4 Notwithstanding the foregoing provisions of this Section 10.2.3, if Company disputes a material breach or other default alleged by the Licensor Institutions pursuant to Section 10.2.3.1 or 10.2.3.2 by written notice to the Licensor Institutions within the relevant cure period, then the Licensor Institutions shall not have the right to terminate this Agreement unless it has been determined, in accordance with Section 11.7, that this Agreement was materially breached and Company fails to cure such material breach or default within the relevant cure period after such determination.

10.2.4 Termination for Patent Challenge. If Company or any of its Affiliates or Sublicensees directly or indirectly brings, assumes or participates in, or knowingly, willfully or recklessly assists in bringing a Patent Challenge (except as required under a court order or subpoena), then the following shall apply: (a) if Company or any of its Affiliates is the party so bringing, assuming, participating in or assisting in such Patent Challenge, then (i) Broad shall be entitled to immediately terminate this Agreement with respect to Broad Controlled Patents and Cas9-II Patent Rights upon written notice to Company and (ii) Harvard shall be entitled to immediately terminate this Agreement with respect to Harvard Controlled Patents upon written notice to Company, and (b) if a Sublicensee is the party so bringing, assuming, participating in or assisting in such Patent Challenge, then (i) (x) Broad shall be entitled to immediately terminate the rights hereunder with respect to Broad Controlled Patents and Cas9-II Patent Rights as and to the extent sublicensed to a Sublicensee upon written notice to Company and (y) Harvard shall be entitled to immediately terminate the rights hereunder with respect to Harvard Controlled Patents as and to the extent sublicensed to a Sublicensee upon written notice to Company and (ii) (x) Broad shall grant Company a period not to exceed [**] from the date of notice by Broad to Company of its intention to terminate the Agreement with respect to Broad Controlled Patents and Cas9-II Patent Rights due to such Sublicensee bringing, assuming, participating in or assisting in a Patent Challenge, during which period Company may terminate any and all agreements with such Sublicensee that contain a Sublicense with respect to Broad Controlled Patents and Cas9-II Patent Rights and (y) Harvard shall grant Company a period not to exceed [**] from the date of notice by Harvard to Company of its intention to terminate the Agreement with respect to Harvard Controlled Patents due to such Sublicensee bringing, assuming, participating in or assisting in a Patent Challenge, during which period Company may terminate any and all agreements with such Sublicensee that contain a Sublicense with respect to Harvard Controlled Patents. If, pursuant to the foregoing clause (ii), Company terminates such agreement(s) during such [**] period, then (A) Broad shall not be entitled to terminate this Agreement with respect to Broad Controlled Patents and Cas9-II Patent Rights by virtue of such Sublicensee bringing, assuming, participating in or assisting in such Patent Challenge and (B) Harvard shall not be entitled to terminate this Agreement with respect to Harvard Controlled Patents by virtue of such Sublicensee bringing, assuming, participating in or assisting in such Patent Challenge. However, if Company does not terminate such agreement(s) during such [**] period, then (I) Broad shall be entitled to immediately terminate this Agreement with respect to Broad Controlled Patents and Cas9-II Patent Rights upon written notice to Company thereof and (II) Harvard shall be entitled to immediately terminate this Agreement with respect to Harvard Controlled Patents upon written notice to Company thereof. For clarity, under this Section 10.2.4, each Licensor Institution shall severally be entitled to terminate the licenses granted to Company herein under such Licensor Institution’s respective rights in the Patent Rights, pursuant to Section 10.2.1.

10.2.5 Bankruptcy. Broad may terminate this Agreement with respect to Broad Controlled Patents and Cas9-II Patent Rights, and Harvard may terminate this Agreement with respect to Harvard Controlled Patents, upon notice to Company if Company becomes subject to a Bankruptcy Event or in the event of dissolution or cessation of operations of the Company. For clarity, under this Section 10.2.5, each Licensor Institution shall severally be entitled to terminate the licenses granted to Company herein under such Licensor Institution's respective rights in the Patent Rights, pursuant to Section 10.2.1.

10.2.6 Termination without Prejudice. The Licensor Institutions' right of termination in this Section 10.2 shall be in addition and without prejudice to, and shall not constitute a waiver of, any right of the Licensor Institutions for recovery of any monies then due to it hereunder or any other right or remedy the Licensor Institutions may have at law, in equity or under this Agreement.

10.3 **Effect of Termination**.

10.3.1 Termination of Rights. Upon expiration or termination of this Agreement by either Party pursuant to any of the provisions of Section 10.2:

10.3.1.1 the rights and licenses granted to Company under Article 2 shall terminate, all rights in and to and under the Patent Rights shall revert to the Licensor Institutions and neither Company nor its Affiliates may make any further use or exploitation of the Patent Rights; and

10.3.1.2 all existing Sublicenses shall automatically terminate [**] following the effective date of termination of this Agreement; provided that, if any Sublicensee is (i) an Affiliate of Company or (ii) in material default of any material provision of the applicable Sublicense such that Company would have the right to terminate the Sublicense ((i) and (ii) together, "**Ineligible Sublicensees**") then the applicable Sublicense to which such Sublicensee is a party shall terminate effective immediately upon termination of this Agreement. Upon termination of this Agreement pursuant to any of the provisions of Section 10.2, (A) Company shall promptly provide notice of such termination to any Sublicensee, (B) each Sublicensee that is not an Ineligible Sublicensee shall have the right to enter into a separate license agreement directly with the Licensor Institutions (a "**Direct License**") on substantially the same non-economic terms and conditions set forth in the Sublicense and on economic terms providing for the payment by such Sublicensee to the Licensor Institutions of the consideration that otherwise would have been payable to the Licensor Institutions if the applicable Sublicense and this Agreement were still simultaneously in effect, adjusted as if a Change of Control of Company had occurred (i.e., the Change of Control Multiplier shall automatically apply in accordance with Section 4.5.4 as of the effective date of termination of this Agreement, resulting in any Milestone Payments that have not accrued at such time being increased by [**]%), and (C) the Licensor Institutions shall automatically grant each such Sublicensee a temporary continuation (to expire upon the earlier of (x) execution of the Direct License or (y) the date that is [**] following termination of this Agreement) of the rights and obligations such Sublicensee had as a Sublicensee under this Agreement (a "**Temporary Extension**"); provided that, under both the Direct License and the Temporary Extension, (a) the Licensor Institutions shall not have (i) any obligations that are greater than or inconsistent with the obligations of the Licensor Institutions under this Agreement or the nature of the Licensor Institutions as an academic and non-profit entity or (ii) any fewer rights than it has under this Agreement; (b) there shall be no representations, warranties, expenses or liabilities of or on any Owner Institution that are not

included in this Agreement; (c) all obligations arising prior to execution of the Direct License and grant of the Temporary Extension shall remain the responsibility of Company and the Licensor Institutions shall be released from any and all liability relating to such obligations; (d) the terms of such Direct License and Temporary Extension shall provide for payment to the Licensor Institutions of the same consideration that would have been payable to the Licensor Institutions if the applicable Sublicense and this Agreement were still simultaneously in effect, adjusted as if a Change of Control of Company had occurred (i.e., the Change of Control Multiplier shall automatically apply in accordance with Section 4.5.4 as of the effective date of termination of this Agreement); and (e) such modifications shall be included as are reasonably necessary to accommodate the functional and structural differences between Company and the Licensor Institutions. By way of example and not limiting the foregoing clause (d), if the Sublicense required payment to Company of a license fee and the Licensor Institutions would have been entitled to receive a percentage of such payment under Section 4.7 of the Agreement, then the Licensor Institutions shall continue to be entitled, under the Temporary Extension or Direct License, to the same share of that same license fee payment under the Sublicense that the Licensor Institutions would have received had this Agreement and the Sublicense been simultaneously in effect. If any Sublicensee desires to enter into a Direct License, it shall wholly be the responsibility of that Sublicensee to notify the Licensor Institutions of such desire no later than [**] after the effective date of termination of this Agreement. If the Licensor Institutions and the applicable Sublicensee, for any reason, do not enter into a Direct License within [**] after the effective date of termination of the Agreement, the applicable Sublicense and Temporary Extension, and all rights granted thereunder, shall automatically terminate.

10.3.2 Accruing Obligations. Termination or expiration of this Agreement shall not relieve the Parties of obligations accruing prior to such termination or expiration, including obligations to pay amounts accruing hereunder up to the date of termination or expiration. After the date of termination or expiration (except in the case of termination by the Licensor Institutions pursuant to Section 10.2), Company, its Affiliates and Sublicensees may sell Licensed Products then in stock; provided that Company shall pay the applicable Royalties and other payments to the Licensor Institutions in accordance with Article 4, provide reports and audit rights to the Licensor Institutions pursuant to Article 5 and maintain insurance in accordance with the requirements of Section 9.2. The Parties agree that the obligations in Section 4.10.1 shall accrue immediately upon execution of this Agreement by both Parties, regardless of the events, invoice and payment timing details set forth therein.

10.3.3 Enabled Products. After the date of termination or expiration of this Agreement, Company and its Affiliates may continue to sell and provide Enabled Products, provided that (a) for the remaining duration of any Royalty Term applicable to any such Enabled Product, Company shall pay the applicable Royalties and other payments to the Licensor Institutions in accordance with Article 4, provide reports and audit rights to the Licensor Institutions pursuant to Article 5, and (b) Company shall maintain insurance in accordance with the requirements of Section 9.2.

10.3.4 Disposition of Company Developments. In the event this Agreement is terminated prior to expiration of the Term, Company shall consider in good faith with the Licensor Institutions during the [**] period after such termination, whether and on what terms Company will:

10.3.4.1 provide to the Owner Institutions a copy of, and, if requested by the Owner Institutions, grant the Owner Institutions a sublicensable license to, all patents and patent applications of the Company or its Affiliates that improve or are otherwise related to the Patent Rights or that cover a Licensed Product that any of the Owner Institutions are interested in pursuing either themselves or through a licensee; provided that the terms of any such license shall be consistent with Company's obligations under contract and Applicable Law and its officers' and directors' fiduciary obligations. In the case where Harvard is granted a license to any such patents and patent applications of Company or its Affiliates pursuant to this Section 10.3.4.1, such license shall extend to any HHMI employees conducting research at Harvard and/or Broad.

10.3.4.2 provide the Owner Institutions with access to and, at the Owner Institutions' request and expense, deliver to the Owner Institutions a copy of all documents, filings, data and other information in Company's or its Affiliates' possession and control as of the date of such termination (other than documents, filings, data and other information owned by Sublicensees or Third Parties) to the extent pertaining solely to any of the Patent Rights or Licensed Products, including all records required by Regulatory Authorities to be maintained with respect to Licensed Products, all regulatory filings, approvals, reports, records, correspondence and other regulatory materials (including any related to reimbursement or pricing approvals), and all documents, data and other information related to clinical trials and other studies of Licensed Products (collectively, "**Documentation and Approvals**"), if and to the extent that the provision of, access to and delivery of such Documentation and Approvals shall be consistent with Company's obligations under contract and Applicable Law; and

10.3.4.3 permit the Owner Institutions and their licensees to utilize, reference, cross reference, have access to, and incorporate in applications and filings (including with any Regulatory Authority in furtherance of applications for regulatory approval) the Documentation and Approvals if and to the extent that the foregoing right to utilize, reference, cross reference, have access to, incorporate such Documentation and Approvals shall be consistent with Company's obligations under contract and Applicable Law; provided, however, that notwithstanding anything in the foregoing to the contrary, the right to utilize, reference, cross reference, have access to, incorporate such Documentation and Approvals shall not be deemed or construed as a grant of any license or other right under any patent or patent application owned or controlled by Company, its Affiliates or any Third Party.

10.3.4.4 It is understood that all of the foregoing provisions of Sections 10.3.4.1-10.3.4.3 shall be subject to agreement by Company and the applicable Owner Institution on the terms and conditions thereof, as first described above in this Section 10.3.4. It is further understood that, following a Company Sale, any patent, patent application, other intellectual property right or Documentation and Approvals owned or controlled prior to such Company Sale by the acquirer or any of its Affiliates shall not be subject to the terms of this Section 10.3.4.

10.4 **Survival**. The Parties' respective rights, obligations and duties under Articles 5, 9, 10 and 11, Sections 8.3 and 8.4, as well as any rights, obligations and duties which by their nature extend beyond the expiration or termination of this Agreement, shall survive any expiration or termination of this Agreement. In addition, (i) Section 11.18 and (ii) Company's obligations under (a) Section 4.4.2, (b) Section 4.7, with respect to Sublicenses granted prior to expiration or termination of the Agreement, and (c) Sections 4.5, 4.6 and 4.10, shall in each case survive such expiration or termination.

11. MISCELLANEOUS.

11.1 **Confidentiality**.

11.1.1 "**Licensor Institution Confidential Information**" means (a) any information related to Prosecution of Cas9-I Patent Rights provided to Company by or on behalf of Harvard ("**Harvard Confidential Information**"); (b) any information related to Prosecution of Patent Rights provided to Company by or on behalf of Broad ("**Broad Confidential Information**"); (c) any information or material in tangible form that is marked as "confidential" or proprietary by a Licensor Institution at the time it is sent to Company; and (c) information that is furnished orally by a Licensor Institution if such Licensor Institution identifies such information as "confidential" or proprietary in writing by a memorandum delivered to Company within [**] after the date of disclosure. "**Company Confidential Information**" means (i) the Development Plan; (ii) any reports or notices prepared by Company and provided to the Licensor Institutions pursuant to Sections 3.4, 4.5.1, 4.5.2, 4.10 and 5.1.1; and (iii) any copies of Sublicenses, or information extracted therefrom, provided by Company to the Licensor Institutions under Section 2.5.2. The terms of this Agreement constitute the Confidential Information of both Parties. The Parties agree the terms of this Agreement may be shared with the Owner Institutions and HHMI. "**Confidential Information**" means the Licensor Institution Confidential Information and the Company Confidential Information, as applicable.

11.1.2 For the Term of this Agreement and a period of [**] thereafter, (a) Company shall maintain in confidence and shall not disclose (i) to any third party any Licensor Institution Confidential Information, (ii) to Broad any Harvard Confidential Information, without the prior written consent of Harvard, and (iii) to Harvard any Broad Confidential Information without the prior written consent of Broad and (b) the Licensor Institutions shall maintain in confidence and shall not disclose to any third party any Company Confidential Information, provided that the Licensor Institutions may disclose to the Owner Institutions and HHMI (A) this Agreement including any Exhibits and Sublicenses, or information extracted therefrom, and (B) such Confidential Information of Company as an Owner Institution or HHMI, as the case may be, reasonably requests, provided that any disclosure under the foregoing clauses (A) and (B) shall be made in confidence to the Owner Institutions or HHMI, as the case may be. Each Party shall take all reasonable steps to protect the Confidential Information of the other Party with the same degree of care used to protect its own confidential or proprietary information. Neither Party shall use the Confidential Information of the other Party for any purpose other than those contemplated by this Agreement. The foregoing obligations under this Section 11.1.2 shall not apply to:

(i) information that is known to the receiving Party or independently developed by the receiving Party prior to the time of disclosure without use of or reference to the other Party's Confidential Information, in each case, to the extent evidenced by contemporaneous written records;

(ii) information that is independently developed by the receiving Party at or after the time of disclosure without use of or reference to the other Party's Confidential Information, to the extent evidenced by contemporaneous written records;

(iii) information disclosed to the receiving Party by a Third Party that has a right to make such disclosure; or

(iv) information that is publicly disclosed at or prior to the time of disclosure hereunder or becomes patented, published or otherwise part of the public domain as a result of acts by the furnishing Party or a Third Party obtaining such information as a matter of right.

11.1.3 Permitted Disclosures. Notwithstanding anything in this Section 11.1 to the contrary, either Party may disclose Confidential Information of the other Party to the extent such disclosure is reasonably necessary in the following instances:

11.1.3.1 prosecuting or defending litigation in accordance with Article 7 of this Agreement;

11.1.3.2 making filings with the Securities and Exchange Commission or foreign equivalent, any stock exchange or market, or any Regulatory Authorities, which shall include publicly disclosing or filing this Agreement as a "material agreement" in accordance with Applicable Law or applicable stock exchange regulations;

11.1.3.3 complying with Applicable Law or submitting information to governmental authorities, including without limitation any Regulatory Authority, and including without limitation any order of a court or agency of competent jurisdiction, including without limitation any Regulatory Authority; provided that if either Party is required by Applicable Law to make any public disclosure of Confidential Information of the other Party, to the extent the Party so required may legally do so, it will give reasonable advance notice to the other Party of such disclosure and will use its reasonable efforts to secure confidential treatment of such Confidential Information prior to its disclosure (whether through protective orders or otherwise); and

11.1.3.4 to its Affiliates and its and their prospective and actual acquirers, licensees, sublicensees, distributors, investors, lenders and underwriters, and (a) its and their employees, consultants, agents, and advisors, on a need to know basis, each of whom prior to disclosure must be bound by written obligations of confidentiality and non-use of substantially equivalent or greater scope and duration than those set forth in this Article 11, (b) its and their accountants and lawyers, on a need to know basis, each of whom prior to disclosure must be bound by written or legally enforceable professional ethical obligations of confidentiality and

non-use of substantially equivalent or greater scope and duration than those set forth in this Article 11, (c) co-owners of any of the Patent Rights, each of whom prior to disclosure must be bound by written obligations of confidentiality and non-use, and (d) HHMI (provided that HHMI receives such information in confidence); provided that the scope of Confidential Information that may be disclosed by Company to any Person under this Section 11.1.3.4 is limited to the terms of this Agreement and any notices given hereunder and not any other Licensor Institution Confidential Information unless otherwise agreed to in writing by the Licensor Institutions. In addition, notwithstanding anything in this Section 11.1 to the contrary, Broad and Harvard may disclose to (i) any other co-owner of any of the Patent Rights and (ii) HHMI or any other financial sponsor of the Licensor Institutions with respect to the Patent Rights the existence and terms of this Agreement (including all Exhibits and Schedules), provided that any such disclosure shall be made in confidence.

11.1.4 Additional Permitted Disclosure. In addition to the rights set forth elsewhere in this Article 11, each Licensor Institution and Company shall have the right to disclose to Third Parties without an obligation of confidentiality all or part of a redacted copy of this Agreement, or the substance thereof, in the form filed by Company to comply with its obligations under the Securities Act or the Exchange Act or the rules or regulations of a Trading Market. The Party intending to make such disclosure shall use good faith efforts to notify the other Party in advance of any such disclosure. In the event that such advance notice is not provided by a Party that makes such disclosure, such Party shall notify the other Party of such disclosure promptly after such disclosure is made.

11.2 **Use of Name**. Except as provided below, Company shall not, and shall ensure that its Affiliates and Sublicensees shall not, use or register the name "The Broad Institute, Inc.," "Wyss Institute for Biologically Inspired Engineering at Harvard University," "President and Fellows of Harvard College," "Massachusetts Institute of Technology," "Lincoln Laboratory," the "University of Iowa Research Foundation," the "University of Iowa" or "The Rockefeller University" or any variation, adaptation, or abbreviation thereof (alone or as part of another name) or any logos, seals, insignia or other words, names, symbols or devices that identify the Owner Institutions or any Owner Institution's school, unit, division or affiliate ("**Institution Names**") for any purpose except with the prior written approval of, and in accordance with restrictions required by, the applicable Owner Institution, as applicable. Without limiting the foregoing, Company shall, and shall ensure that its Affiliates and Sublicensees shall, cease all use of Institution Names as permitted under or in connection with this Agreement on the termination or expiration of this Agreement except as otherwise approved in writing by the applicable Owner Institution. This restriction shall not apply to any information required by law to be disclosed to any governmental entity. Company shall not use or register the name "Howard Hughes Medical Institute" or any variation, adaptation, or abbreviation thereof (alone or as part of another name) or any logos, seals, insignia or other words, names, symbols or devices that identify HHMI or any unit of HHMI ("**HHMI Names**") or of any HHMI employee (including [**]) in a manner that reasonably could constitute an endorsement of a commercial product or service; but that use for other purposes, even if commercially motivated, is permitted provided that (1) the use is limited to accurately reporting factual events or occurrences, and (2) any reference to an HHMI Name or any HHMI employees (including [**]) in press releases or similar materials intended for public release is approved by HHMI in advance.

11.3 **Press Release**. Notwithstanding the provisions of Section 11.2, in addition to (and not in limitation of) the disclosure permitted under Section 11.1.4, the Parties shall agree on a public communications plan that shall define the nature and scope of the information relating to this Agreement and the relationship between the Parties that shall be disclosed publicly and may issue a press release in such form as is consistent with such communications plan and mutually acceptable to the Parties (and any other Owner Institution to the extent of any reference to such Owner Institution in such press release). Each Party agrees that it will not issue a press release or other public statement without obtaining the prior written approval of the other Party. Any use of HHMI Names or the name of any HHMI employee (including [**]) in any such press release must be approved by HHMI in advance.

11.4 **No Security Interest**. Company shall not enter into any agreement under which Company grants to or otherwise creates in any third party a security interest in this Agreement or any of the rights granted to Company herein. Any grant or creation of a security interest purported or attempted to be made in violation of the terms of this Section 11.4 shall be null and void and of no legal effect.

11.5 **Entire Agreement**. This Agreement is the sole agreement with respect to the subject matter hereof and, except as expressly set forth herein, supersedes all other agreements and understandings between the Parties with respect to the same. For the avoidance of doubt, this Agreement shall not supersede the Cpf1 Agreement.

11.6 **Notices**. Unless otherwise specifically provided, all notices required or permitted by this Agreement shall be in writing and may be delivered personally, or may be sent by facsimile, expedited delivery or certified mail, return receipt requested, to the following addresses of a Party, unless the other Party is subsequently notified of any change of address in accordance with this Section 11.6:

If to Company (other than invoices):	Verve Therapeutics, Inc. 26 Landsdowne Street Cambridge, MA 02139
If to Company (invoices only):	Verve Therapeutics, Inc. 26 Landsdowne Street Cambridge, MA 02139
If to Licensor Institutions:	The Broad Institute, Inc. Chief Operating Officer 415 Main Street Cambridge, MA 02142 Facsimile: [**] Attn: [**] AND Office of Technology Development Harvard University Richard A. and Susan F. Smith Campus Center, Suite 727 1350 Massachusetts Avenue Cambridge, Massachusetts 02138 Facsimile: [**] Attn: [**]

Any notice shall be deemed to have been received as follows: (a) by personal delivery or expedited delivery, upon receipt; (b) by facsimile, one business day after transmission or dispatch; (c) by certified mail, as evidenced by the return receipt. If notice is sent by facsimile, a confirming copy of the same shall be sent by mail to the same address.

11.7 **Dispute Resolution**. The Parties agree that, in the event of any dispute arising out of or relating to this Agreement (other than disputes arising under Section 3.5 or relating to nonpayment of amounts due to the Licensor Institutions hereunder or disputes affecting the rights or property of HHMI) (a "**Dispute**"), either Party by written notice to the other Party may have such issue referred for resolution to the Chief Executive Officer of Company, the Chief Technology Development Officer of Harvard and the Chief Operating Officer of Broad (collectively, the "**Executive Officers**"). The Executive Officers shall meet promptly to discuss the matter submitted and to determine a resolution. If the Executive Officers are unable to resolve the Dispute within [**] after it is referred to them, then the Parties may pursue all other rights and remedies available to them under this Agreement, including the right to terminate the Agreement, and the matter may be brought by a Party as a Suit in a court of competent jurisdiction in accordance with Section 11.8 hereof.

11.8 **Governing Law and Jurisdiction**. This Agreement will be governed by, and construed in accordance with, the substantive laws of the Commonwealth of Massachusetts, without giving effect to any choice or conflict of law provision, except that questions affecting the construction and effect of any patent shall be determined by the law of the country in which the patent shall have been granted in any competent forum in such country. Any action, suit or other proceeding arising under or relating to this Agreement (a "**Suit**") shall be brought in a court of competent jurisdiction in the Commonwealth of Massachusetts, and the Parties hereby consent to the sole jurisdiction of the state and federal courts sitting in the Commonwealth of Massachusetts. Each Party agrees not to raise any objection at any time to the laying or maintaining of the venue of any Suit in any of the specified courts, irrevocably waives any claim that Suit has been brought in any inconvenient forum and further irrevocably waives the right to object, with respect to any Suit, that such court does not have any jurisdiction over such Party.

11.9 **Binding Effect**. This Agreement shall be binding upon and inure to the benefit of the Parties and their respective legal representatives, successors and permitted assigns.

11.10 **Headings**. Section and subsection headings are inserted for convenience of reference only and do not form a part of this Agreement.

11.11 **Counterparts**. The Parties may execute this Agreement in three (3) or more counterparts, each of which shall be deemed an original.

11.12 **Amendment; Waiver**. This Agreement may be amended, modified, superseded or canceled, and any of the terms may be waived, only by a written instrument executed by each Party or, in the case of waiver, by the Party waiving compliance. The delay or failure of either Party at any time or times to require performance of any provisions hereof shall in no manner affect the rights at a later time to enforce the same. No waiver by either Party of any condition or of the breach of any term contained in this Agreement, whether by conduct, or otherwise, in any one or more instances, shall be deemed to be, or considered as, a further or continuing waiver of any such condition or of the breach of such term or any other term of this Agreement.

11.13 **No Agency or Partnership**. Nothing contained in this Agreement shall give either Party the right to bind the other, or be deemed to constitute either Party as agent for or partner of the other or any third party.

11.14 **Assignment and Successors**. This Agreement may not be assigned by Company, whether by operation of law or otherwise, without the consent of the Licensor Institutions, except that Company may assign or transfer the Agreement without the consent of the Licensor Institutions, to a successor in interest of all or substantially all of Company's assets or business related to the Licensed Products or the Agreement, whether by merger, consolidation, sale of assets, or Change of Control or other transaction, provided that (a) the Company shall provide the Licensor Institutions with a written notice of such assignment or Change of Control including the identity of the assignee, transferee or controlling party, and a copy of the assignment and assumption agreement or other documentary evidence sufficient to demonstrate Company's compliance with this Section 11.14 within [**] after such assignment or Change of Control, and (b) such assignee or transferee agrees in writing to assume the obligations to the Licensor Institutions and HHMI that are being assigned or transferred. An uncured failure of an assignee to agree to be bound by the terms hereof or an uncured failure of Company to notify the Licensor Institutions and provide copies of assignment documentation as specified above shall be grounds for termination of this Agreement for default. Any attempted assignment in contravention of this Section 11.14 shall be null and void.

11.15 **Force Majeure**. Neither Party shall be responsible for delays resulting from causes beyond the reasonable control of such Party, including fire, explosion, flood, war, strike, or riot, provided that the nonperforming Party uses commercially reasonable efforts to avoid or remove such causes of nonperformance and continues performance under this Agreement with reasonable dispatch whenever such causes are removed.

11.16 **Interpretation**. Each Party hereto acknowledges and agrees that: (a) it and/or its counsel reviewed and negotiated the terms and provisions of this Agreement and has contributed to its revision; (b) the rule of construction to the effect that any ambiguities are resolved against the drafting Party shall not be employed in the interpretation of this Agreement; (c) the terms and provisions of this Agreement shall be construed fairly as to both Parties hereto and not in favor of or against either Party, regardless of which Party was generally responsible for the preparation of this Agreement; (d) all references herein to "dollars" or "$" shall mean United States Dollars; and (e) the use of "include," "includes," or "including" herein shall not be limiting and "or" shall not be exclusive. Each Party hereto further acknowledges and agrees that nothing in this Agreement shall be construed to abridge the rights of Editas under the Editas Cas9-I License Agreement and Editas Cas9-II License Agreement.

11.17 **Severability**. If any provision of this Agreement is or becomes invalid or is ruled invalid by any court of competent jurisdiction or is deemed unenforceable, it is the intention of the Parties that the remainder of this Agreement shall not be affected.

11.18 **HHMI Third Party Beneficiary**. HHMI is not a party to this Agreement and has no liability to Company or any licensee, sublicensee, or user of anything covered by this Agreement, but HHMI is an intended third-party beneficiary of this Agreement and certain of its provisions are for the benefit of HHMI and are enforceable by HHMI in its own name.

[The remainder of this page intentionally left blank; signature page follows]

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by their duly authorized representatives as of the Effective Date.

PRESIDENT AND FELLOWS OF HARVARD COLLEGE:

By: /s/ Isaac T. Kohlberg
Name: Isaac T. Kohlberg
Title: Sr. Associate Provost, Chief Technology Development Officer

Office of Technology Development

Harvard University

[Signature Page to Cas9 License Agreement]

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by their duly authorized representatives as of the Effective Date.

THE BROAD INSTITUTE, INC.:

By: /s/ Jesse Souweine
Name: Jesse Souweine
Title: Chief Operating Officer

[Signature Page to Cas9 License Agreement]

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by their duly authorized representatives as of the Effective Date.

VERVE THERAPEUTICS, INC.:

By: /s/ Andrew D. Ashe
Name: Andrew D. Ashe
Title: President & COO

[Signature Page to Cas9 License Agreement]

Exhibit 1.166
Targets

The Targets are:

- Proprotein convertase subtilisin/kexin type 9 (PCSK9)
- [**]
- **[**]**

Exhibit 3.1
Development Milestones

[**]

78

FIRST AMENDMENT TO
CAS9 LICENSE AGREEMENT

This FIRST AMENDMENT (the "**Amendment**") is entered into as of this 18th day of December, 2019 (the "**Amendment Effective Date**"), by and between, on the one hand, the President and Fellows of Harvard College, an educational and charitable corporation existing under the laws and the constitution of the Commonwealth of Massachusetts, having a place of business at Smith Campus Center, Suite 727, 1350 Massachusetts Avenue, Cambridge, MA 02138 ("**Harvard**") and The Broad Institute, Inc., a non-profit Massachusetts corporation, with a principal office at 415 Main Street, Cambridge, MA 02142 ("**Broad**," together with Harvard, the "**Licensor Institutions**" and each individually, a "**Licensor Institution**") and, on the other hand, Verve Therapeutics, Inc., a Delaware corporation, with a principal office at 26 Landsdowne Street, Cambridge, MA 02139 ("**Company**"). Company and the Licensor Institutions are each referred to herein as a "**Party**" and together, the "**Parties**."

WHEREAS, the Parties entered into that certain Cas9 License Agreement dated March 15, 2019 (the "**Cas9 License**") pursuant to which, among other things, the Licensor Institutions granted to Company certain rights with respect to certain identified Targets; and

WHEREAS, the Parties now wish to amend the Cas9 License to identify ANGPTL3 as an additional Target, as set forth in this Amendment.

NOW, THEREFORE, the Parties hereto, intending to be legally bound, hereby agree as follows:

1. **Defined Terms**. Capitalized terms used in this Amendment and not defined herein shall have the meaning given to such terms in the Cas9 License, unless otherwise specified herein.

2. **Exhibit 1.166**. Exhibit 1.166 of the Cas9 License is hereby deleted in its entirety and replaced with Exhibit 1.166 attached hereto.

3. **No Other Modification**. Except as specifically set forth in this Amendment, the terms and conditions of the Cas9 License shall continue in full force and effect and shall apply to this Amendment. This Amendment is the sole agreement with respect to the subject matter of this Amendment and, except as expressly set forth herein, supersedes all other agreements and understandings between the Parties with respect to the same. For the avoidance of doubt, this Amendment shall not supersede the Cpf1 Agreement. This Amendment may be amended, modified, superseded or canceled, and any of the terms may be waived, only by a written instrument executed by each Party or, in the case of waiver, by the Party waiving compliance.

4. **Miscellaneous**. The Parties may execute this Amendment in three (3) or more counterparts, each of which shall be deemed an original. This Amendment will be governed by, and construed in accordance with, the substantive laws of the Commonwealth of Massachusetts, without giving effect to any choice or conflict of law provision.

[The remainder of this page intentionally left blank; signature page follows]

IN WITNESS WHEREOF, the Parties have caused this Amendment to be executed by their duly authorized representatives as of the Amendment Effective Date.

PRESIDENT AND FELLOWS OF HARVARD COLLEGE:

By: /s/ Isaac T. Kohlberg
Name: Isaac T. Kohlberg
Title: Senior Associate Provost

Chief Technology Development Officer

Office of Technology Development

IN WITNESS WHEREOF, the Parties have caused this Amendment to be executed by their duly authorized representatives as of the Amendment Effective Date.

THE BROAD INSTITUTE, INC.:

By: /s/ Jesse Souweine
Name: Jesse Souweine
Title: Chief Operating Officer

[Signature Page to Cas9 License Amendment]

IN WITNESS WHEREOF, the Parties have caused this Amendment to be executed by their duly authorized representatives as of the Amendment Effective Date.

VERVE THERAPEUTICS, INC.:

By: /s/ Andrew D. Ashe
Name: Andrew D. Ashe
Title: President & COO

Exhibit 1.166
Targets

The Targets are:

- Proprotein convertase subtilisin/kexin type 9 (PCSK9)
- [**]
- [**]
- Angiopoietin-like 3 (ANGPTL3)

Exhibit 10.14

SUBLEASE

This SUBLEASE is made as of April 13, 2020, by and between FOGHORN THERAPEUTICS INC., a Delaware corporation having an address at 100 Binney Street, Suite 610, Cambridge, Massachusetts 02142 ("Sublandlord") and VERVE THERAPEUTICS INC., a Delaware corporation having an address at 215 First Street, Suite 440, Cambridge, MA 02142 ("Subtenant").

RECITALS:

A. Pursuant to that Lease dated as of October 23, 2019 by and between ARE-TECH SQUARE, LLC, as "Landlord" ("Prime Lessor") and Sublandlord, as "Tenant" (such lease, as so amended, and all renewals, modifications and extensions thereof are hereinafter collectively referred to as the "Prime Lease"), a true and complete copy of which (with certain economic terms redacted) has been provided to Subtenant, whereby Sublandlord leases approximately 81,441 rentable square feet of space in the building known as and numbered 500 Technology Square, Cambridge, Massachusetts (the "Building") (all as more particularly described in the Prime Lease the "Premises");

B. A portion of the Premises consists of the entire 9th floor of the Building designated as Suite 901, containing approximately 18,980 rentable square feet (the "Ninth Floor Premises");

C. A portion of the Premises consists of a portion of the 1st floor of the Building designated as Suite 101(a) containing approximately 371 rentable square feet (the "Initial First Floor Premises");

D. A portion of the Premises consists of a portion of the basement level of the Building designated as Suite 001a, containing approximately 472 rentable square feet (the "Initial Lower Level Premises");

E. Subtenant desires to sublease certain portions of the Premises from Sublandlord and Sublandlord is willing to sublease the same, all on the terms and conditions hereinafter set forth;

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties covenant and agree as follows, and capitalized terms used herein without definition shall have the meaning ascribed thereto in the Prime Lease:

1. Sublease of Subleased Premises. For the rent and upon the terms and conditions herein, Sublandlord hereby subleases to Subtenant, and Subtenant hereby subleases from Sublandlord:

(i) Effective on the Commencement Date, defined below, a portion of the Ninth Floor Premises containing approximately 16,000 rentable square feet as shown on **Exhibit A-1** attached hereto (the "Ninth Floor Subleased Premises");

(ii) Effective on the Commencement Date, the Initial First Floor Premises containing approximately 371 rentable square feet as shown on **Exhibit A-2** attached hereto (the "First Floor Subleased Premises"); and

(iii) Effective on the Commencement Date, the Initial Lower Level Premises containing approximately 472 rentable square feet as shown on **Exhibit A-3** attached hereto (the "Lower Level Subleased Premises" and together with the Ninth Floor Subleased Premises and the First Floor Subleased Premises, collectively, the "Subleased Premises").

This Sublease shall include Subtenant's right to use on a non-exclusive basis with Sublandlord from the Commencement Date through and including the Expiration Date (in accordance with reasonable procedures for such shared use to be established by Sublandlord), the shared glass wash facility located in the common area of the ninth floor of the Building as shown on **Exhibit A-4** attached hereto (the "Ninth Floor Common Area").

2. Term. The term (the "Term") of this Sublease with respect to the Subleased Premises shall commence upon the date (the "Commencement Date") that is the later of (i) the date on which the Consent Contingency (as hereinafter defined) has been satisfied and the Sublease has been fully executed by Sublandlord and Subtenant and (ii) March 15, 2020, and shall expire at 11:59 p.m. on the day immediately prior to the second (2nd) anniversary of the Rent Commencement Date, as defined below (the "Expiration Date"), unless the Term is earlier terminated pursuant to any of the terms or provisions of the Prime Lease, this Sublease or applicable law. When the Commencement Date is determined, Sublandlord and Subtenant shall, upon the request of either of them, execute a statement to be prepared by Sublandlord setting forth such date.

3. Base Rent. (A) Subtenant shall pay to Sublandlord the following amounts as base rent (the "Base Rent") in equal monthly installments commencing on the Commencement Date (subject to the provisions of Paragraph 3(E) below) and thereafter on the first day of each calendar month during the Term:

For the Subleased Premises (i.e., approximately 16,843 rentable square feet):

Term	Total Rent	Monthly Rent	Rent Per Square Foot
Commencement Date- day prior to first anniversary of Commencement Date	$1,650,614.00	$137,551.17	$ 98.00
First anniversary of Commencement Date – Expiration Date	$1,700,132.42	$141,677.70	$ 100.94

Notwithstanding anything in this Sublease to the contrary, on the date of execution of this Sublease by Subtenant, Subtenant shall pay to Sublandlord the amount of $137,551.17, which amount shall be credited against Base Rent for the Subleased Premises due for the first month of the Term of this Sublease.

(B) In addition to Base Rent, commencing on the Rent Commencement Date, Subtenant shall pay as additional rent the Subtenant's Percentage (as hereinafter defined) of amounts from time to time payable by Sublandlord as "Tenant" to Prime Lessor as "Landlord" under Article 5 of the Prime Lease in respect of Operating Expenses (which includes Taxes), including any property management fee (whether or not a third party property manager is engaged by Prime Lessor) included in Operating Expenses. Base Rent and additional rent shall sometimes be referred to as "Rent" herein. All Rent shall be due and payable in monthly installments in advance on the first day of each calendar month, without demand, deduction, counterclaim or setoff. All Rent payments should be sent to Sublandlord at the address first noted above to the attention of Fanny Cavalie or such other address as Sublandlord shall notify Subtenant in accordance with the terms of Paragraph 16 of this Sublease. Rent for any partial month shall be prorated and paid on the first day of such month. Notwithstanding the foregoing, Subtenant shall pay Subtenant's Percentage of any initial or revised Annual Estimate of Operating Expenses within fifteen (15) days after receipt of such Annual Estimate of Operating Expenses prepared by Prime Lessor, and Article 5 of the Prime Lease, as incorporated herein by reference pursuant to Paragraph 10, shall be deemed modified accordingly. Once the Annual Estimate of Operating Expenses is set by Prime

Lessor, Subtenant shall pay Subtenant's Percentage of such Annual Estimate of Operating Expenses at the same time Subtenant pays Rent under this Sublease. Sublandlord shall deliver to Subtenant reasonably promptly upon receiving the same true correct and complete copies of all Annual Estimates and Annual Statements of Operating Expenses, invoices or bills for Rent or other charges delivered to Sublandlord by Prime Lessor under the Prime Lease. Subtenant shall continue to pay Subtenant's Percentage of Operating Expenses so long as Sublandlord is required to continue paying Operating Expenses under the Prime Lease even if Sublandlord has not received the Annual Estimates or Annual Statements of Operating Expenses from Prime Lessor. Notwithstanding anything in this Sublease to the contrary, if pursuant to the terms of the Prime Lease the rent due under the Prime Lease with respect to the Subleased Premises is abated in whole or in part during the Term due to a casualty in the Subleased Premises, then the Rent due under this Sublease shall abate for the same period and to the same extent as the rent for the Premises is abated pursuant to the Prime Lease.

Subtenant shall also pay as additional rent for all other expenses for which Sublandlord is or would be responsible under the Prime Lease to the extent such expenses relate to the Subleased Premises (e.g., after hours HVAC ordered by Subtenant) or Subtenant's use of the Ninth Floor Common Area.

(C) As used herein, "Subtenant's Percentage" shall mean that percentage that from time to time constitutes the ratio that the rentable square feet in the Subleased Premises bears to the rentable square feet in the Premises. As of the Commencement Date, Subtenant's Percentage shall be 29.15%. As of June 1, 2020, Subtenant's Percentage shall be 20.68%.

(D) Subtenant shall pay for all other expenses, without mark-up by Sublandlord, specific to the Subleased Premises and the Ninth Floor Common Area to the extent incurred by Sublandlord or caused by Subtenant's actions.

(E) Notwithstanding the foregoing provisions of this Paragraph 3, if and for so long as no default has occurred, Sublandlord agrees to waive payment of the monthly installments of Base Rent for the Subleased Premises (together with any additional rent attributable to Subtenant's use and occupancy of the Subleased Premises and utility charges as described in Paragraph 4 of this Sublease) for the period commencing on the Commencement Date and ending on the date that is the sooner to occur of (i) the date upon which Subtenant occupies the Subleased Premises for the ordinary conduct of business with more than four (4) employees so conducting business in the Subleased Premises at any given time, and (ii) three (3) weeks from the date that the City of Cambridge Inspectional Services Department, Building Division, resumes conducting inspections and Massachusetts Executive Order COVID-19 Order No. 13 is withdrawn, rescinded or otherwise rendered inapplicable to construction activities by any governmental authority having jurisdiction, so that construction can occur (the "Rent Waiver Period"). As used herein, the "Rent Waiver Amount" shall mean the total

amount of Rent and utility charges that is subject to waiver during the Rent Waiver Period. The day immediately following the last day of the Rent Waiver Period is referred to herein as the "Rent Commencement Date". If the Rent Waiver Period ends on a day that is not the last day of a calendar month, then on the first day of such calendar month Subtenant shall make a pro-rated payment of Base Rent (calculated on a per diem basis) for the balance of the partial calendar month in which the Rent Waiver Period expires. Additional rent for the balance of such partial calendar month shall be payable by Subtenant to Sublandlord as and when invoiced, and utility charges for such partial calendar month shall be payable directly by Subtenant commencing on the Rent Commencement Date in accordance with Paragraph 4 below).

4. Electricity. Commencing on the Rent Commencement Date, Subtenant shall pay to Sublandlord within thirty (30) days of being invoiced therefor, Subtenant's Percentage of all electricity charges paid by Sublandlord for the Subleased Premises (whether paid by Sublandlord to the utility provider or to Prime Lessor) (including, but not limited to the consumption of lights, outlets and heating, ventilation and air conditioning serving the Subleased Premises).

Subtenant shall also (i) pay for all other utilities used in the Subleased Premises (including, without limitation, the right to use shared compressed air, central vacuum, RO water systems (if applicable) and, to the extent agreed by Sublandlord, the right to access back-up emergency power) by paying to Sublandlord Subtenant's Percentage for Building shared utilities at the cost charged to Sublandlord therefor without markup, but only to the extent such amounts are not included in Operating Expenses and are payable by Sublandlord under the Prime Lease and (ii) pay directly for any utilities separately metered solely to the Subleased Premises in accordance with the Prime Lease.

5. Permitted Use. Subtenant shall use the Subleased Premises only for the Permitted Use. Subtenant shall not do, suffer or permit anything to be done in or upon the Subleased Premises except in accordance with and as permitted by the Prime Lease, this Sublease and applicable law. Subtenant shall comply with the certificate of occupancy relating to the Subleased Premises and with all laws, statutes, ordinances, orders, rules, regulations and requirements of all federal, state and municipal governments and the appropriate agencies, officers, departments, boards and commissions thereof, and the board of fire underwriters and/or the fire insurance rating organization or similar organization performing the same or similar functions, whether now or hereafter in force, applicable to the Subleased Premises. During the Term hereof, subject to the terms, conditions and limitations of the Prime Lease and Prime Lessor's exercise of any rights it may have thereunder to restrict access to the Building, Subtenant shall have access to the Subleased Premises twenty-four (24) hours a day, 7 days a week, 52 weeks per year, subject to the terms of this Sublease.

6. Condition of Subleased Premises.

(a) Subtenant represents that it has made or caused to be made a thorough examination and inspection of the Subleased Premises and is familiar with the condition of every part thereof. Subtenant agrees that, except as expressly provided herein, (i) it enters into this Sublease without relying upon any representations, warranties or promises by Sublandlord, its agents, representatives, employees or any other person in respect of the Building or the Subleased Premises, (ii) no rights, easements or licenses are acquired by Subtenant by implication or otherwise except as expressly set forth herein, (iii) Sublandlord shall deliver the Subleased Premises broom-clean and otherwise in the condition which Sublandlord received the Subleased Premises from Prime Lessor and Sublandlord shall have no obligation to do any work in order to make the Subleased Premises suitable and ready for occupancy and use by Subtenant, and (iv) the Subleased Premises are in satisfactory condition. Notwithstanding the foregoing, Subtenant acknowledges receipt from Prime Lessor of a decommissioning report with respect to the Subleased Premises prepared by Ramboll US Corporation and dated March 17, 2020 (the "Decommissioning Report") and has accepted the results set forth in the Decommissioning Report. Sublandlord represents and warrants to Subtenant that Sublandlord has not physically occupied the Subleased Premises at any time, including from and after the date of the Decommissioning Report.

(b) Subtenant shall keep and maintain the Subleased Premises, the furniture, fixtures and equipment therein (including, without limitation, all laboratory-specific mechanical equipment) clean and in good order, repair and condition, except for reasonable wear and tear and damage by fire or other casualty or condemnation. To the extent agreed to by Prime Lessor, Subtenant shall be entitled to the benefit of those obligations of Prime Lessor set forth in the Prime Lease as to Prime Lessor's obligation to maintain Building Systems.

(c) Subtenant shall make no alteration, installation, removal, addition or improvement in or to the Subleased Premises or to any other portion of the Building without the prior written consent of each of Sublandlord and, if required pursuant to the terms of the Prime Lease, Prime Lessor, and then, only in compliance fully with the terms of this Sublease and the Prime Lease. Sublandlord may withhold consent in its sole discretion to any alteration, installation, addition or improvement proposed by Subtenant. Sublandlord may require Subtenant to remove any and all alterations, installations, additions or improvements that Subtenant makes to the Subleased Premises upon the expiration or termination of the Term, and to restore the Subleased Premises to its condition prior to such alterations, installations, additions or improvements.

(d) During the Term of the Sublease, and subject to Prime Lessor's consent, Subtenant may use 0.90 parking spaces in the Technology Square Garage per 1,000 rentable square feet of the Subleased Premises as allocated to Sublandlord pursuant to Section 10 of the Prime Lease. Such parking use by Subtenant shall, subject to Prime Lessor's consent, be at the same cost per space as charged to Sublandlord from time to time pursuant to the Prime Lease, and such use by Subtenant shall be in accordance with Section 10 of the Prime Lease as amended from time to time and all published rules and regulations of the Landlord and/or the operator of the Technology Square Garage as to such parking use.

7. Insurance. Subtenant shall maintain throughout the Term of this Sublease such insurance in respect of the Subleased Premises and the conduct and operation of business therein, with Sublandlord, Prime Lessor and Alexandria Real Estate Equities, Inc., and their respective officers, directors, employees, managers, agents, invitees and contractors listed as additional insureds as is required of "Tenant" pursuant to the terms of the Prime Lease (including, without limitation, Section 17 thereof as hereinafter incorporated by reference) with no penalty to Sublandlord or Prime Lessor resulting from deductibles or self-insured retentions effected in Subtenant's insurance coverage, and with such other endorsements and provisions as Sublandlord or Prime Lessor may reasonably request. If Subtenant fails to procure or maintain such insurance, pay all premiums and charges therefor and provide Sublandlord with certificate(s) thereof within ten (10) days after notice from Sublandlord, Sublandlord may (but shall not be obligated to) do so, whereupon Subtenant shall reimburse Sublandlord upon demand for Sublandlord's costs incurred in so doing. All such insurance policies shall, to the extent obtainable, contain endorsements providing that (i) such policies may not be canceled except upon thirty (30) days' prior notice to Sublandlord and Prime Lessor, (ii) no act or omission of Subtenant shall affect or limit the obligations of the insurer with respect to any other named or additional insured and (iii) Subtenant shall be solely responsible for the payment of all premiums under such policies and Sublandlord, notwithstanding that it is or may be a named insured, shall have no obligation for the payment thereof. Such insurance shall otherwise be reasonably acceptable to Sublandlord in both form and substance. On or before the Commencement Date, Subtenant shall deliver to Sublandlord and Prime Lessor a certificate evidencing the coverages required by this Paragraph 7. Any endorsements to such certificates shall also be delivered to Sublandlord and Prime Lessor upon issuance thereof. Subtenant shall procure and pay for renewals of such insurance from time to time before the expiration thereof, and Subtenant shall deliver to Sublandlord and Prime Lessor such renewal certificates at least ten (10) days before the expiration of any existing policy. In the event Subtenant fails so to deliver any such renewal certificate at least ten (10) days before the expiration of any existing policy, then, in addition to its other rights and remedies in respect of such breach of this Sublease by Subtenant, Sublandlord shall have the right, but not the obligation, to obtain such insurance on Subtenant's behalf, whereupon Subtenant shall reimburse Sublandlord upon demand for Sublandlord's costs incurred in so doing.

Sublandlord shall maintain in full force and effect during the Term of this Sublease, all insurance required to be maintained by Sublandlord as the Tenant under the Prime Lease.

Subtenant shall include in all such insurance policies any clauses or endorsements in favor of Prime Lessor including, but not limited to, waivers of the right of subrogation, which Sublandlord is required to provide as "Tenant" pursuant to the provisions of the Prime Lease. Subtenant and Sublandlord each shall include in all insurance policies it is required to carry in accordance with this Sublease, all clauses or endorsements in favor of the other which Sublandlord is required to carry in favor of Prime Lessor under the Prime Lease, including, but not limited to, waivers of the right of subrogation, which Sublandlord is required to provide as "Tenant" pursuant to the provisions of the Prime Lease. Subtenant releases and waives all claims against Sublandlord for loss or damage to Subtenant's personal property and its alterations in the Subleased Premises to the extent that such loss or damage is insurable under policies of casualty insurance Subtenant carries or is required to carry under this Sublease. Sublandlord releases and waives all claims against Subtenant for loss or damage to Sublandlord's personal property and its alterations in the Subleased Premises to the extent that such loss or damage is insurable under policies of casualty insurance Sublandlord carries or is required to carry under the Prime Lease.

8. Indemnification. Subtenant agrees to protect, defend (with counsel reasonably approved by Sublandlord), indemnify and hold Sublandlord and Prime Lessor and their respective officers, agents and employees harmless from and against any and all liabilities, claims, suits, demands, judgments, costs, losses, interest and expenses (except to the extent arising from Sublandlord's Work or any negligence or willful misconduct of Prime Lessor or Sublandlord or their contractors, invitees, agents or employees), arising from any bodily injury to or death of persons, or damage to property occurring or resulting from an occurrence in the Subleased Premises during the Term hereof, or from any breach or default on the part of Subtenant in the performance of any covenant or agreement on the part of Subtenant to be performed pursuant to the terms of this Sublease or from any willful misconduct or negligence on the part of Subtenant or any of its agents, employees, licensees, invitees or assignees or any person claiming through or under Subtenant. Subtenant further agrees to indemnify Sublandlord and Prime Lessor and their respective officers, agents and employees from and against any and all liabilities, claims, suits, demands, judgments, costs, losses, interest and expenses (including, without being limited to, reasonable attorneys' fees and expenses), incurred in connection with any such indemnified claim or any action or proceeding brought in connection therewith. The provisions of this Paragraph are intended to supplement any other indemnification provisions contained in this Sublease and in the Prime Lease to the extent incorporated by reference herein. Any non-liability, indemnity or hold harmless provisions in the Prime Lease for the benefit of Prime Lessor that are incorporated herein by reference shall be deemed to inure to the benefit of Sublandlord and Prime Lessor.

9. No Assignment or Subletting. Subtenant shall not assign, sell, mortgage, pledge or in any manner transfer this Sublease or any interest herein, or the Term or estate granted hereby or the rentals hereunder, or sublet the Subleased Premises or any part thereof, or grant any concession or license or otherwise permit occupancy of all or any part of the Subleased Premises by any person without the prior written consent of Sublandlord, and if such transaction would require the consent of Prime Lessor under Section 22 of the Prime Lease, without the prior written consent of Prime Lessor in accordance with Section 22 of the Prime Lease. Sublandlord's consent under this Paragraph 9 shall not be unreasonably withheld, conditioned or delayed. Any direct or indirect change in ownership of, or power to vote, a majority of the ownership interests of Subtenant shall constitute a transfer requiring Sublandlord's and Prime Lessor's prior written consent hereunder, other than a Corporate Permitted Assignment, which shall not require the consent of Sublandlord (but reasonable prior written notice thereof shall be provided to Sublandlord) and shall only require the consent of Prime Lessor to the extent required under Section 22 of the Prime Lease. Neither the consent of Sublandlord or Prime Lessor to an assignment, subletting, concession, or license, nor the references in this Sublease to assignees, subtenants, concessionaires or licensees, shall in any way be construed to relieve Subtenant or any assignee, subtenant or sub-subtenant of the requirement of obtaining the consent of Sublandlord and Prime Lessor to any further assignment or subletting or to the making of any assignment, subletting, concession or license for all or any part of the Subleased Premises, Subtenant and any such assignee, subtenant or sub-subtenant under this Sublease hereby agreeing to be bound by the provisions of this Sublease and the Prime Lease as to any further assignment, subleasing or other arrangement for which consent is required under this Sublease or the Prime Lease. Notwithstanding any assignment or subletting, including, without limitation, any assignment or subletting permitted or consented to, the original Subtenant named herein and any other person(s) who at any time was or were Subtenant shall remain fully liable under this Sublease, and all acts and omissions of any assignee or subtenant or anyone claiming under or through any assignee or subtenant that shall be in conflict with the terms of this Sublease shall constitute a breach by Subtenant under this Sublease. If this Sublease is assigned, or if the Subleased Premises or any part thereof is underlet or occupied by any person or entity other than Subtenant, Sublandlord may, after default by Subtenant, following notice and the expiration of any applicable cure period, collect rent from the assignee, undertenant or occupant, and apply the net amount collected to the Rent payable by Subtenant hereunder, but no assignment, underletting, occupancy or collection shall be deemed a waiver of the provisions hereof, the acceptance of the assignee, undertenant or occupant as tenant, or a release of Subtenant from the further performance by Subtenant of the covenants hereunder to be performed on the part of Subtenant. Any attempted assignment or subletting or other arrangement, whether by Subtenant or any assignee or subtenant of Subtenant, without the prior written consent of the Sublandlord and Prime Lessor shall be void.

10. Primacy and Incorporation of Prime Lease.

(a) This Sublease is and shall be subject and subordinate to the Prime Lease and to all matters to which the Prime Lease is or shall be subject and subordinate, and to all amendments, modifications, renewals and extensions of or to the Prime Lease and Sublandlord purports hereby to convey, and Subtenant takes hereby, no greater rights than those accorded to or taken by Sublandlord as "Tenant" under the terms of the Prime Lease. Subtenant covenants and agrees that it will perform and observe all of the provisions contained in the Prime Lease to be performed and observed by the "Tenant" thereunder to the extent incorporated herein, but only as and to the extent applicable to the Subleased Premises, other than the payment of rent. Notwithstanding anything in this Sublease to the contrary, Subtenant shall have no obligation to (i) cure any default of Sublandlord under the Prime Lease unless caused by Subtenant's default under this Sublease, (ii) perform any obligation of Sublandlord under the Prime Lease relating to Sublandlord's Work or any other alterations or improvements made by or at the direction of Sublandlord or which arose prior to the Commencement Date, (iii) repair any damage to the Premises, including the Subleased Premises, caused by Sublandlord or Prime Lessor, (iv) remove any alterations or additions installed within the Subleased Premises by or at the direction of Sublandlord or Prime Lessor or prior to the Commencement Date, (v) indemnify Sublandlord or Prime Lessor with respect to any negligence or willful misconduct of Sublandlord or Prime Lessor or their respective agents, employees or contractors or (vi) discharge any liens on the Subleased Premises or the Building that arise out of any work performed, or claimed to be performed, by or at the direction of Sublandlord or Prime Lessor, except work to be undertaken at Subtenant's expense. Except to the extent inconsistent with the context hereof, capitalized terms used and not otherwise defined herein shall have the meanings ascribed to them in the Prime Lease. Further, except as set forth below, the terms, covenants and conditions of the following specified provisions of the Prime Lease are incorporated herein by reference as if such terms, covenants and conditions were stated herein to be the terms, covenants and conditions of this Sublease, so that except to the extent that they are inconsistent with or modified by the provisions of this Sublease, for the purpose of incorporation by reference each and every referenced term, covenant and condition of the Prime Lease binding upon or inuring to the benefit of the "Landlord" thereunder shall, in respect of this Sublease and the Subleased Premises, be binding upon or inure to the benefit of Sublandlord, and each and every referenced term, covenant and condition of the Prime Lease binding upon or inuring to the benefit of the "Tenant" thereunder shall, in respect of this Sublease, be binding upon or inure to the benefit of Subtenant, with the same force and effect as if such terms, covenants and conditions were completely set forth in this Sublease: Sections: 5 (except for the last three paragraphs thereof), 7, 8, 10, 14, 15, 16, 17 (excluding the first paragraph), 20, 21, 23, 25, 26, 27 (except for the proviso starting on the 5th line thereof) 28, 29, 30, 31, 32, 33, 34, 36, 37, 38 and 41(excluding 41(k)). Notwithstanding anything in this Sublease to the contrary, for purposes of this Sublease, as to such incorporated terms, covenants and conditions:

(i) references in the Prime Lease to the "Premises" shall be deemed to refer to the "Subleased Premises" hereunder;

(ii) references in the Prime Lease to "Landlord" and to "Tenant" shall be deemed to refer to "Sublandlord" and "Subtenant" hereunder, respectively, except that where the terms "Landlord" is used in the context of ownership or management of the entire Building, such term shall be deemed to mean only "Prime Lessor";

(iii) references in the Prime Lease to "this Lease" shall be deemed to refer to "this Sublease" (except when such reference in the Prime Lease is, by its terms (unless modified by this Sublease), a reference to any other section of the Prime Lease, in which event such reference shall be deemed to refer to the particular section of the Prime Lease);

(iv) references in the Prime Lease to the "Commencement Date" shall be deemed to refer to the "Commencement Date" hereunder;

(v) references in the Prime Lease to the "Fixed Rent," "additional rent" and "rent" shall be deemed to refer to the "Base Rent," "additional rent" and "Rent", respectively, as defined hereunder; and

(vi) references in the Prime Lease to the "Lease Term" shall be deemed to refer to the "Term" of this Sublease.

The following provisions of the Prime Lease, Exhibits and Schedules annexed thereto are not incorporated herein by reference and shall not, except as to definitions set forth therein, have any applicability to this Sublease: Sections: 1, 2, 3, 4, the last three paragraphs of Section 5, Sections 6, 9, 12, the first paragraph of 17, 18, 19, 22, the proviso starting on the fifth line of Section 27, 32, 35, 39, 40 and 41(k); Exhibits A, B, C, D and F.

Where reference is made in the following Sections to "Landlord", the same shall be deemed to refer only to Prime Lessor and not Sublandlord: Sections: 7(c), 10, 11, 13 and the third and fifth paragraphs of Section 17.

Where reference is made in the following Sections to "Landlord", the same shall be deemed to refer to both Prime Lessor and Sublandlord: Sections: the second paragraph of Section 17, Sections 24, 26, 32, and 33.

(b) Notwithstanding such incorporation by reference, Subtenant acknowledges that pursuant to the Prime Lease, certain services, repairs, restorations, equipment and access to and for the Premises and insurance coverage of the Building are in fact to be provided by Prime Lessor and Sublandlord shall have no obligation to provide any such services, repairs, restorations, equipment, access or insurance coverage. Subtenant agrees to look solely to Prime Lessor for the furnishing of such services, repairs, restorations, equipment, access and insurance coverage. Sublandlord shall cooperate reasonably with Subtenant in attempting to obtain for Subtenant's benefit the performance by Prime Lessor of its obligations under the Prime Lease, but Sublandlord shall in no event be obligated to commence litigation or other formal proceedings, nor shall Sublandlord be liable to Subtenant, nor shall the obligations of Subtenant hereunder be impaired or the performance thereof excused, because of any failure or delay on Prime Lessor's part in furnishing such services, repairs, restorations, equipment, access or insurance coverage.

(c) Notwithstanding anything to the contrary contained in the Prime Lease, the time limits (the "Notice Periods") contained in the Prime Lease for the giving of notices, making of demands or performing of any act, condition or covenant on the part of the "Tenant" (including any grace periods set forth in Section 19 of the Prime Lease), thereunder, or for the exercise by "Tenant" thereunder of any right, remedy or option, are changed for the purposes of incorporation herein by reference by shortening the same in each instance by five (5) days (or by three (3) days if the notice period is ten (10) days or less), so that in each instance Subtenant shall have five (5) (or three (3), as applicable) fewer days to observe or perform hereunder than Sublandlord has as "Tenant" under the Prime Lease; provided, however, that if the Prime Lease allows a Notice Period of five (5) days or less, then Subtenant shall nevertheless be allowed the number of days equal to one-half of the number of days in each Notice Period to give any such notices, make any such demands, perform any such acts, conditions or covenants or exercise any such rights, remedies or options; provided, further, that if one-half of the number of days in the Notice Period is not a whole number, Subtenant shall be allowed the number of days equal to one-half of the number of days in the Notice Period rounded up to the next whole number.

(d) Notwithstanding anything to the contrary contained in this Sublease (including, without limitation, the provisions of the Prime Lease incorporated herein by reference), Sublandlord makes no representations or warranties whatsoever with respect to the Subleased Premises, this Sublease, the Prime Lease or any other matter, either express or implied, except as expressly set forth herein, except further that Sublandlord represents and warrants, as of the date of execution hereof, (i) that it is the holder of the interest of the "Tenant" under the Prime Lease and said interest is not the subject of any lien, assignment, conflicting sublease, or other hypothecation or pledge, (ii) that the Prime Lease is in full force and effect, unmodified and constitutes the entire agreement between Prime Lessor and Sublandlord in respect of the Subleased Premises, (iii) that no notices of default have been served on Sublandlord under the Prime Lease which have not been cured and (iv) to the best of Sublandlord's knowledge, neither Sublandlord nor Prime Lessor is in default under the Prime Lease.

11. Certain Services and Rights. Except to the extent otherwise expressly provided in Paragraph 10(b) of this Sublease, the only services or rights to which the Subtenant is entitled hereunder, including without limitation rights relating to the repair, maintenance and restoration of the Subleased Premises, are those services and rights to which Sublandlord is entitled under the Prime Lease. Subtenant acknowledges and agrees that Sublandlord shall have no obligation to furnish any services whatsoever to Subtenant, any such obligation being that of Prime Lessor under the Prime Lease, and that, as set forth in Paragraph 10(b) of this Sublease, the sole obligation of Sublandlord hereunder with respect to such services is to cooperate reasonably with Subtenant to obtain Prime Lessor's performance. Notwithstanding anything in this Sublease to the contrary, all cleaning and janitorial services to the Subleased Premises shall be provided by Subtenant at its sole cost and expense.

12. Compliance with Prime Lease.

(i) Subtenant shall neither do nor permit anything to be done that could, after notice and failure to timely cure, if applicable, cause the Prime Lease to be terminated or forfeited by reason of any right of termination or forfeiture reserved or vested in Prime Lessor under the Prime Lease as a result of a "Tenant" default under the Prime Lease, and Subtenant shall defend, indemnify and hold Sublandlord harmless from and against any and all liabilities, claims, suits, demands, judgments, costs, losses, interest and expenses (including, without being limited to, reasonable attorneys' fees and expenses) of any kind whatsoever by reason of any breach or default on the part of Subtenant by reason of which the Prime Lease is or could be so terminated or forfeited. Subtenant covenants and agrees that Subtenant will not do anything that would constitute a default under the provisions of the Prime Lease or omit to do anything that Subtenant is obligated to do under the terms of this Sublease that would constitute a default under the Prime Lease.

(ii) Sublandlord covenants and agrees that Sublandlord: (i) shall cause all rent to be paid under the Prime Lease as and when due and payable under the Prime Lease; (ii) shall observe and perform the other terms, provisions, covenants and conditions of the Prime Lease to be observed and performed by Sublandlord, except and to the extent that such terms, provisions, covenants and conditions are assumed by Subtenant hereunder; (iii) shall not

amend the Prime Lease in a manner adverse to Subtenant in any material respect; (iv) shall not knowingly take any action or knowingly fail to perform any act that results in a breach or default under the Prime Lease to the extent any such failure to perform such act adversely affects the rights of Subtenant under this Sublease, including, without limitation, the right of Subtenant to receive all services, utilities, repairs and restorations to be provided by Landlord to Sublandlord under the Prime Lease with respect to the Subleased Premises or the ability of Subtenant to seek or obtain the approval or consent of Landlord or the right of Subtenant to use and occupy the Subleased Premises for the purposes set forth in this Sublease. Sublandlord shall not be deemed to have made any representation made by Landlord in any of the incorporated provisions. Should the Prime Lease expire or terminate during the Term for any reason, this Sublease shall terminate on the date of such expiration or termination of the Prime Lease, with the same force and effect as if such expiration or termination date had been specified in this Sublease as the Termination Date and Sublandlord shall have no liability to Subtenant in the event of any such expiration or termination except to the extent such termination is solely and directly caused by an Event of Default by Sublandlord under the Prime Lease not caused by a default by Subtenant hereunder.

13. Default. If Subtenant shall default in any of its obligations hereunder beyond applicable cure periods, Sublandlord shall have available to it all of the rights and remedies available to Prime Lessor under the Prime Lease, including without limitation Sections 20 and 21 thereof as incorporated herein by reference, as though Sublandlord were the "Landlord" thereunder and Subtenant the "Tenant" thereunder. If Subtenant shall default in any of its obligations hereunder beyond applicable cure periods, Subtenant further agrees to reimburse the Rent Waiver Amount to Sublandlord, and to reimburse Sublandlord for all costs and expenses, including reasonable attorneys' fees, incurred by Sublandlord in asserting or enforcing its rights hereunder against Subtenant or any assignee, sub-subtenant or other person claiming under Subtenant.

14. Brokerage. Subtenant and Sublandlord represent that they have not dealt with any broker in connection with this Sublease other than CB Richard Ellis (the "Broker"). Each party agrees to indemnify and hold harmless the other from and against any and all liabilities, claims, suits, demands, judgments, costs, losses, interest and expenses (including, without being limited to, reasonable attorneys' fees and expenses) which the indemnified party may be subject to or suffer by reason of any claim made by any person, firm or corporation other than the Broker for any commission, expense or other compensation as a result of the execution and delivery of

this Sublease, which is based on alleged conversations or negotiations by said person, firm or corporation with the indemnifying party. Sublandlord shall pay the Broker(s) the brokerage commission due the Broker in connection with this Sublease under separate agreement between Sublandlord and Broker.

15. Security Deposit. (a) To secure the full and prompt payment by Subtenant of all amounts due under this Sublease and the performance of all obligations of Subtenant hereunder, Subtenant shall, simultaneously with the execution and delivery of this Sublease, provide Sublandlord with an irrevocable standby letter of credit (the "Letter of Credit") in the amount of Four Hundred Twelve Thousand Six Hundred Fifty-Four Dollars ($412,654.00) (the "Stated Amount) substantially in the form attached hereto as Exhibit B issued by a bank or other financial institution selected by Subtenant (and reasonably approved by Sublandlord) with a window for the presentation of letters of credit in Boston, Massachusetts, and otherwise reasonably acceptable to Sublandlord, in which the issuer unconditionally agrees to pay upon sight draft within three (3) business days the amount(s) from time to time drawn by Sublandlord. Any issuer of a Letter of Credit hereunder shall, at a minimum, have long-term debt rated at least "A," or the equivalent, by Standard & Poor's Rating Group or "A," or the equivalent, by Moody's Investors Services Inc. and have capital and surplus in excess of Five Hundred Million Dollars ($500,000,000). The following provisions and requirements shall apply to the Letter of Credit:

(i) The initial expiration date of the Letter of Credit shall be the first anniversary of the Commencement Date and such expiration date shall be automatically extended for additional periods of one (1) year each from such initial or each subsequent expiration date (except that the final expiration date shall be a date not less than sixty (60) days after the expiration of the Term), unless, at least sixty (60) days prior to any such expiration date of the Letter of Credit, the issuer notifies Sublandlord in writing, by registered mail, courier service or hand delivery, that it elects not to extend the expiration date. In such event, Subtenant shall, no later than thirty (30) days prior to the expiration date of the then current Letter of Credit, provide to Sublandlord a replacement Letter of Credit from another bank or financial institution reasonably acceptable to Sublandlord meeting or exceeding the same minimum credit requirements as set forth in Paragraph 15(a), substantially in the form of the Letter of Credit initially issued. In addition, if the credit rating of an issuer of a Letter of Credit furnished hereunder, as determined by any commercially recognized rating agency, falls below the level of credit rating required under Paragraph 15(a), then, upon notice to Subtenant, Sublandlord may require Subtenant to provide a substitute Letter of Credit from a new issuer having a credit rating equivalent to that of the issuer at the time the then current Letter of Credit was furnished. If Sublandlord shall present, draw upon and apply or retain all or any portion of the proceeds of the Letter of Credit, Subtenant shall upon notice from Sublandlord cause a substitute Letter of Credit in the form and Stated Amount and with an issuer all as required

above to be furnished to Sublandlord so that at all times during the Term of this Sublease, Sublandlord shall be entitled to draw upon the full Stated Amount of the Letter of Credit notwithstanding any prior presentation and draw thereon. Upon issuance of a substitute Letter of Credit, the current Letter of Credit shall be cancelled and surrendered. Failure to provide Sublandlord with a replacement Letter of Credit by the expiration of the then expiring Letter of Credit or a substitute Letter of Credit within thirty (30) days of Sublandlord's notice, as the case may be, shall be deemed a default by Subtenant without any further grace period applicable thereto, on account of which Sublandlord shall have the immediate right to draw the entire Stated Amount due.

(ii) From and after the occurrence of any default of Subtenant hereunder (beyond the expiration of any applicable notice or cure period), or upon the events described in Paragraphs 15(a)(i) or (iii) , Sublandlord may draw in full, or in part, upon the Letter of Credit and apply all or any portion of the proceeds of the draw to remedy said default and to reimburse itself for any loss, cost, damage or expense incurred thereby, including, without limitation, thereafter accruing on account of a termination. Subtenant shall thereafter immediately provide a supplementary letter of credit to Sublandlord in the amount of such draw, so that at all times Sublandlord shall hold a rent security deposit in the Stated Amount.

(iii) In the event a petition is filed by the Subtenant seeking an adjudication of itself as bankrupt or insolvent under any bankruptcy law or similar law or if any petition shall be filed or action taken to declare Subtenant a bankrupt or to delay, reduce or modify Subtenant's debts or obligations or to reorganize or modify Subtenant's capital structure or indebtedness or to appoint a trustee, receiver or liquidator of Subtenant or if an involuntary petition in bankruptcy is filed against Subtenant, Sublandlord may draw against the Letter of Credit for any amount up to the Stated Amount paid by Subtenant to Sublandlord within the applicable preference period on account of its obligations under this Sublease. The amount so drawn shall be held by Sublandlord in a segregated account until expiration of the preference period. If a preference claim is brought against Sublandlord requiring Sublandlord to repay to the debtor's estate the amount of any payments made by Subtenant to Sublandlord as a preference, Sublandlord may reimburse itself out of the funds drawn under the Letter of Credit and so held the amount of the preference payments that Sublandlord is required to pay back to the debtor's estate, together with reasonable attorneys' fees and disbursements incurred by Sublandlord in connection with any claim by the debtor's estate for such payment. Any amounts drawn down in accordance with this subparagraph that are unexpended after expiration of the preference period shall be paid over to Subtenant, or its estate, as applicable.

(iv) The Letter of Credit shall be fully transferable to any successor or assign of Sublandlord.

(v) If a draw is made against the Letter of Credit of the entire Stated Amount due to the failure of the issuer to renew or the failure or inability of Subtenant to obtain a replacement or substitute Letter of Credit within the applicable period provided in Paragraph 15(a)(i), or either such condition, and unless this Sublease is terminated by Sublandlord, the funds shall be held by Sublandlord as a security deposit for the performance of Subtenant's obligations under the Sublease in accordance with the provisions of Paragraph 15(a)(vi) and shall be promptly paid to Subtenant by Sublandlord upon Sublandlord's receipt of a replacement or substitute Letter of Credit.

(b) In the event the proceeds of the Letter of Credit are drawn under circumstances described in Paragraph 15(a)(v) and if the Sublease is not terminated, the proceeds so drawn shall be held as a security deposit ("Proceeds Security Deposit") to secure the faithful performance by Subtenant of all the covenants, conditions and agreements in this Sublease set forth and contained on the part of Subtenant to be fulfilled, kept, observed and performed including, but not by way of limitation, such covenants and agreements in this Sublease which become applicable upon the termination of the same by re-entry or otherwise, in accordance with the following: (a) the Proceeds Security Deposit or any portion thereof not previously applied, or from time to time, such one or more portions thereof, may be applied to the curing of any default that may then exist, without prejudice to any other remedy or remedies which Sublandlord may have on account thereof; (b) should the Prime Lease be assigned by Sublandlord, the Proceeds Security Deposit or any portion thereof not previously applied shall be turned over to Sublandlord's assignee or refunded to Subtenant within sixty (60) days thereafter, and if the same be turned over as aforesaid, Subtenant hereby releases Sublandlord from any and all liability with respect to the Proceeds Security Deposit, its application or return; (c) if permitted by law, Sublandlord or its successor shall not be obligated to hold the Proceeds Security Deposit as a separate fund, but on the contrary may commingle the same with its other funds; (e) if Subtenant shall not then be in default under this Sublease, the sum deposited or the portion thereof not previously applied, shall be returned to Subtenant, without interest, no later than sixty (60) days after the expiration of the Term of this Sublease (or, if later, the date upon which any such default shall have been cured), provided Subtenant has vacated the Premises and surrendered possession thereof to Sublandlord at the expiration of the Term or any extension or renewal thereof as provided herein; (f) in the event that Sublandlord terminates this Sublease or Subtenant's right to possession by reason of a default by Subtenant, Sublandlord may apply the Proceeds Security Deposit against damages suffered to the date of such termination or may retain the Proceeds Security Deposit to apply against such damages as may be suffered or shall accrue thereafter by reason of Subtenant's default, or both of them; (g) in the event any bankruptcy, insolvency, reorganization or other creditor-debtor proceedings shall be instituted by or against Subtenant, or its successors or assigns, the Proceeds Security Deposit shall be deemed to be applied first to the payment of any Annual Fixed Rent or Additional Rent, or both, due Sublandlord

for all periods prior to the institution of such proceedings, and the balance, if any, of the Proceeds Security Deposit may be applied by Sublandlord on account of Sublandlord's damages. No portion of the Proceeds Security Deposit, while held by Sublandlord, shall be deemed a "last month's rent" or other payment on account of Subtenant's monetary obligations, unless Sublandlord so specifies. The use and application of the Proceeds Security Deposit shall be solely at the discretion of Sublandlord. The provisions of this Paragraph shall inure to the benefit of and be binding upon any subsequent transferee of Sublandlord.

16. Notices. All notices, consents, approvals, demands, bills, statements and requests which are required or permitted to be given by either party to the other hereunder shall be in writing and shall be governed by Section 41(a) of the Prime Lease as incorporated herein by reference, except that the mailing addresses for Sublandlord and Subtenant shall initially be those first set forth above, and after the Commencement Date, to Subtenant at the Premises. Communications and payments to the Prime Lessor shall be given in accordance with, and subject to, Section 41(a) of the Prime Lease.

17. Interpretation. Each covenant, agreement, obligation or other provision of this Sublease shall be deemed and construed as a separate and independent covenant of the party bound by, undertaking or making the same, which covenant, agreement, obligation or other provision shall be construed and interpreted in the context of the Sublease as a whole. The word "person" as used in this Sublease shall mean a natural person or persons, a partnership, a corporation or any other form of business or legal association or entity.

18. Fire or Casualty; Eminent Domain. In the event the Subleased Premises (or access thereto or systems serving the same) are subjected to a fire or other casualty or to a taking by eminent domain that interferes with the use and enjoyment by Subtenant of a material portion of the Subleased Premises, Subtenant shall, to the extent Sublandlord is entitled to an abatement of rent pursuant to the Prime Lease, be entitled to an equitable adjustment of Rent until tenantable occupancy is restored. If the estimated time for repairs will exceed, or such interference has not been remedied and tenantable occupancy restored after, one hundred eighty (180) days from the date such interference was first experienced, Sublandlord or Subtenant may, by notice to the other, terminate this Sublease. In the event of any taking of the Subleased Premises, Subtenant assigns to Prime Lessor any right Subtenant may have to any damages or award. Subtenant shall not make claims against Sublandlord, Prime Lessor or the condemning authority for damages.

19. Right to Cure Subtenant's Defaults. If Subtenant shall at any time fail to make any payment or perform any other obligation of Subtenant hereunder and fails to cure such default following notice and prior to expiration of the applicable cure period hereunder, then Sublandlord shall have the right, but not the obligation, after notice to Subtenant, or without notice to Subtenant in the case of any emergency, and without

waiving or releasing Subtenant from any obligations of Subtenant hereunder, to make such payment or perform such other obligation of Subtenant in such manner and to such extent as Sublandlord shall deem necessary, and in exercising any such right, to pay any incidental costs and expenses, employ attorneys, and incur and pay reasonable attorneys' fees. Subtenant shall pay to Sublandlord upon demand as additional rent all sums so paid by Sublandlord and all incidental costs and expenses of Sublandlord in connection therewith, together with interest thereon at an annual rate equal to the rate two percent (2%) above the base rate or prime rate then published as such in the *Wall Street Journal*, or, if less, the maximum rate permitted by law. Such interest shall be payable with respect to the period commencing on the date such expenditures are made by Sublandlord and ending on the date such amounts are repaid by Subtenant. The provisions of this Paragraph shall survive the Expiration Date or the sooner termination of this Sublease.

20. Termination of Prime Lease. If for any reason the term of the Prime Lease shall terminate prior to the Expiration Date, this Sublease shall thereupon automatically terminate and Sublandlord shall not be liable to Subtenant by reason thereof; provided, however, that Sublandlord agrees that so long as Subtenant is not in default hereunder beyond delivery of written notice and expiration of the applicable cure period hereunder, Sublandlord shall not voluntarily surrender the Prime Lease, except in accordance with rights expressly reserved to Sublandlord as "Tenant" under the Prime Lease, including, without limitation, such rights as are available under Sections 18 and 19 of the Prime Lease in the event of a taking or casualty. Notwithstanding anything in this Sublease to the contrary, if the Prime Lease gives Sublandlord any right to terminate the Prime Lease in the event of the partial or total damage, destruction, or condemnation of the Subleased Premises or the Building, the exercise of such right by Sublandlord shall not constitute a default or breach hereunder. Nothing herein shall prevent an assignment of the Prime Lease or the subleasing by Sublandlord of additional space covered by the Prime Lease (excluding the Subleased Premises) to any third parties and in no event shall Sublandlord have any liability to Subtenant for any defaults or termination of the Prime Lease by such other subtenants or defaults under such other subleases.

Upon the expiration or termination of this Sublease, whether by forfeiture, lapse of time or otherwise, or upon the termination of Subtenant's right of possession, Subtenant shall (i) remove (and restore any damage resulting from such removal) (a) any and all of Subtenant's movable personal property and signage and (b) such alterations, installations, additions and improvements, if any (expressly excluding Sublandlord's Work) made by or on behalf of Subtenant that Sublandlord requires to be removed and restore the Subleased Premises to its condition prior to such alterations, installations, additions and improvements, and (ii) at once surrender and deliver the Subleased Premises in the condition and repair required by, and in accordance with the provisions of, this Sublease. If Subtenant shall fail to remove any of Subtenant's personal property from the Subleased Premises, such property shall be deemed abandoned (and

Subtenant will be deemed to have relinquished all right, title and interest in such property), and Sublandlord is authorized, without liability to Subtenant for loss or damage thereto, at the sole risk of Subtenant, to (a) remove and store such property at Subtenant's risk and expense; (b) retain such property, in which case all right, title and interest therein shall accrue to Sublandlord; (c) sell such property and retain the proceeds from such sale; or (d) otherwise dispose or destroy such property.

21. No Privity of Estate. Nothing contained in this Sublease shall be construed to create privity of estate or of contract between Subtenant and Prime Lessor and Prime Lessor is not obligated to recognize or to provide for the non-disturbance of the rights of Subtenant hereunder.

22. No Waiver. The failure of Sublandlord to insist in any one or more cases upon the strict performance or observance of any obligation of Subtenant hereunder or to exercise any right or option contained herein shall not be construed as a waiver or relinquishment for the future of any such obligation of Subtenant or any right or option of Sublandlord. Sublandlord's receipt and acceptance of Rent or electricity charge, or Sublandlord's acceptance of performance of any other obligation by Subtenant, with knowledge of Subtenant's breach of any provision of this Sublease, shall not be deemed a waiver of such breach. No waiver by Sublandlord of any term, covenant or condition of this Sublease shall be deemed to have been made unless expressed in writing and signed by Sublandlord.

23. Complete Agreement. This Sublease constitutes the entire agreement between the parties and there are no representations, agreements, arrangements or understandings, oral or written, between the parties relating to the subject matter of this Sublease which are not fully expressed in this Sublease. This Sublease cannot be changed or terminated orally or in any manner other than by a written agreement executed by both parties. This Sublease may be executed in several counterparts, each of which shall be deemed an original, and all of such counterparts together shall constitute one and the same instrument. Signatures transmitted electronically (by pdf) shall be binding as originals.

24. Successors and Assigns. The provisions of this Sublease, except as herein otherwise specifically provided, shall extend to bind and inure to the benefit of the parties hereto and their respective personal representatives, heirs, successors and permitted assigns.

25. Waiver of Jury Trial and Right to Counterclaim. The parties hereto hereby waive any rights which they may have to trial by jury in any summary action or other action, proceeding or counterclaim arising out of or in any way connected with this Sublease, the relationship of Sublandlord and Subtenant, the Subleased Premises and the use and occupancy thereof, and any claim for injury or damages. Subtenant also hereby waives all right to assert or interpose a counterclaim (other than mandatory or compulsory counterclaims) in any summary proceeding or other action or proceeding to recover or obtain possession of the Subleased Premises.

26. Consent of Prime Lessor. Notwithstanding anything contained herein, the effectiveness of this Sublease is subject to and conditioned upon the written approval hereof and consent hereto by Prime Lessor in form reasonably acceptable to Sublandlord and Subtenant (the "Consent"). This Sublease shall not become effective unless and until the Consent is fully executed and delivered by Prime Lessor, Sublandlord and Subtenant (the "Consent Contingency"). Each of Sublandlord and Subtenant agrees to execute and deliver the Consent in the form provided by Prime Lessor and reasonably approved by Sublandlord and Subtenant.

27. Limitation of Liability. No director, officer, shareholder, employee, adviser or agent of either Sublandlord or Subtenant shall be personally liable in any manner or to any extent under or in connection with this Sublease. In no event shall either Sublandlord, Subtenant or any of their respective directors, officers, shareholders, employees, advisers or agents be responsible for (i) any incidental, indirect or consequential/special or punitive damages (except that Subtenant shall be liable for such damages under Paragraph 28 of this Sublease), (ii) any damages in the nature of interruption or loss of business (except that Subtenant shall be liable for such damages under Paragraph 28 of this Sublease) or (iii) claims for constructive eviction, nor shall Sublandlord be liable for loss of or damage to personal property of Subtenant, its agents, contractors, employees or invitees.

28. Holdover. If Subtenant shall fail to surrender and deliver the Subleased Premises as and when required hereunder, Subtenant shall become a tenant at sufferance only, subject to all of the terms, covenants and conditions herein specified, except the rate of Base Rent shall increase to (i) 150% of the rate of Base Rent then in effect for the first thirty (30) days of such holdover and (ii) thereafter Sublessee shall pay 200% of the rate of Base Rent then in effect for the remainder of such holdover. In addition, Subtenant agrees to protect, defend (with counsel reasonably approved by Sublandlord), indemnify and hold harmless Sublandlord and its officers, directors, agents and employees from and against any and all liability, claims, suits, demands, judgments, costs, losses, interest and expenses (including, without being limited to, reasonable attorneys' fees and expenses) that Sublandlord may suffer, under Section 8 of the Prime Lease or otherwise, by reason of any holdover by Subtenant hereunder. If a holdover by Subtenant exceeds sixty (60) days, damages payable by Subtenant under this Section 28 shall not be limited to direct damages, but shall include incidental, indirect, consequential/special or punitive damages and damages in the nature of interruption or loss of business. The terms and provisions of this Paragraph 28 shall survive the expiration or earlier termination of this Sublease.

29. Attorney's Fees. If either Sublandlord or Subtenant shall bring any action or legal proceeding for an alleged breach of any provision of this Sublease, to recover Rent, to terminate this Sublease or otherwise to enforce, protect or establish any term or covenant of this Sublease, the prevailing party shall be entitled to recover as a part of such action or proceeding, or in a separate action brought for that purpose, reasonable attorneys' fees, court costs, and expert fees as may be fixed by the court.

30. Appurtenant Rights. Subtenant shall have (as appurtenant to the Subleased Premises) rights to use in common with Sublandlord and others entitled thereto Sublandlord's rights in driveways, walkways, hallways, stairways and passenger elevators convenient for access to the Subleased Premises.

31. Surrender. Subtenant expressly acknowledges and agrees that it is required to comply with all of the provisions of Section 28 of the Prime Lease (as incorporated herein by reference) regarding surrender of the Subleased Premises, including, without limitation, hiring of a certified industrial hygienist to timely submit and perform a Decommissioning and HazMat Closure Plan with respect to the Subleased Premises as described in said Section 28 of the Prime Lease.

32. Extension Option. Subtenant shall have the right (the "Extension Right") to extend the Term of this Sublease for a single additional period of three (3) months (the "Sublease Extension Term") on the same terms and conditions as this Sublease (other than Base Rent) by giving Sublandlord written notice of its election to exercise the Extension Right at least eight (8) months prior to the Expiration Date of the initial Term, which notice, once given, shall be irrevocable. If Subtenant timely elects to exercise such right to the Sublease Extension Term, the Sublease Extension Term shall commence on the day immediately following the initial Expiration Date. During the Sublease Extension Term, Base Rent for each portion of the Subleased Premises shall be payable at a rate equal to 103% of the rate in effect with respect to such portion of the Subleased Premised on the initial Expiration Date. The Extension Right is personal to Subtenant and shall not be assignable without Sublandlord's and Prime Lessor's consent in their respective sole discretion, except that it may (subject to obtaining the consent of Prime Lessor to the extent required under Section 22 of the Prime Lease) be assigned in connection with a Corporate Permitted Assignment of this Sublease. Notwithstanding the foregoing, Subtenant may not exercise the Extension Right (i) during any period of time that Subtenant is in default under any provision of this Sublease, (ii) if Subtenant has been in default under any provision of this Sublease two (2) or more times, whether or not the defaults are cured, during the last year of the initial Term of this Sublease, or (iii) if Subtenant is not in occupancy of at least eighty percent (80%) of the entire Subleased Premises both at the time of the exercise of the Extension Right and at the time of the commencement date of the Sublease Extension Term. The Extension Right shall terminate and be of no further force or effect even after Subtenant's due and timely exercise of the Extension Right, if after such exercise, but prior to the commencement date of the Sublease Extension Term, (i) Subtenant fails to timely cure any default by Subtenant under this Sublease, or (ii) Subtenant has defaulted two (2) or more times during the period from the date of the exercise of the Extension Right to the date of the commencement of the Sublease Extension Term, whether or not such defaults are cured.

33. Signage. Supplementing the provisions of Section 38 of the Prime Lease as incorporated herein by reference, Subtenant shall, subject to the provisions of the Prime Lease and to Sublandlord's prior written consent (which shall be granted provided that Prime Lessor similarly consents) and at Subtenant's sole cost and expense, have the right to Building standard signage at the entrance to the Subleased Premises and Subtenant's pro-rata share of listings on any tenant directories maintained by Landlord at the Building.

34. Survival. Paragraphs 3 (Base Rent), 4 (Electricity), 8 (Indemnification), 14 (Brokerage), 25 (Waiver of Jury Trial and Right to Counterclaim), 27 (Limitation on Liability) and 31 (Surrender) of this Sublease shall survive the expiration or earlier termination of this Sublease.

[remainder of page intentionally left blank]

IN WITNESS WHEREOF, Sublandlord and Subtenant have executed this Sublease as a sealed instrument as of the date first written above.

SUBLANDLORD

FOGHORN THERAPEUTICS INC.

By: /s/ Adrian Gottschalk
Name: Adrian Gottschalk
Title: President & CEO

SUBTENANT

VERVE THERAPEUTICS, INC.

By: /s/ Andrew D. Ashe
Name: Andrew D. Ashe
Title: President & COO

EXHIBITS A-1 THOUGH A-4

SUBLEASED PREMISES

EXHIBIT B

FORM OF LETTER OF CREDIT

[NAME AND OFFICE OF ISSUING BANK]

IRREVOCABLE AND TRANSFERABLE
LETTER OF CREDIT

LETTER OF CREDIT NO. _____
Date: _____, 2020
AMOUNT: $412,654.00

[BENEFICIARY]

Re: Sublease dated , 2020, between FOGHORN THERAPEUTICS INC. and VERVE THERAPEUTICS, INC/ ("Subtenant").

Gentlemen:

We hereby open our Irrevocable and Transferable Letter of Credit No. _____ in your favor for the account of _____ in an aggregate amount of up to $412,654.00. We hereby irrevocably authorize you to draw on us in accordance with the terms and conditions hereinafter set forth by one (1) or more demands for payment in an aggregate amount not exceeding the foregoing amount. Partial drawings under this Letter of Credit are permitted.

Any demand for payment and all other communications relating to this Letter of Credit shall be in writing and addressed and presented by hand or by reputable overnight courier or by certified mail or registered mail, return receipt requested to our Letter of Credit Section at our office at _____, Boston, Massachusetts, and shall make specific reference to this Letter of Credit by number. Demand for payment under this Letter of Credit may be made prior to its expiration at any time during business hours at the foregoing office on a day (a "Business Day") on which we are open for the purpose of conducting commercial banking business. Payments under this Letter of Credit shall be made within three (3) business days after the date of presentment to us.

This Letter of Credit shall expire at 5:00 P.M., Eastern Standard Time, on _____ or, if such day is not a Business Day, then on the next day following which is a Business Day. This Letter of Credit shall be considered automatically extended without amendment for periods of one year from the present or any future expiration date unless we notify you in writing at your address set forth above (or in any transfer instruction, if applicable) presented by hand or by reputable overnight courier or by certified mail or registered mail, return receipt requested, not less than sixty (60) days prior to any such expiration date that we elect not to consider this Letter of Credit renewed for any such additional period. The final expiry date of this Letter of Credit shall be [60 days after sublease expiration date including any renewal term].

This Letter of Credit may be transferred one or more times in its entirety without our consent and without cost to you upon presentation to us of (i) a written transfer instruction signed by you and naming the transferee and (ii) the original of this letter of credit. Upon such presentation, we shall issue a replacement letter of credit in favor of the transferee in the form of this letter of credit. No other documents or presentations will be required by us in connection with any such transfer. Any and all transfer fees shall be charged to the account of Subtenant.

This Letter of Credit sets forth in full our undertaking and such undertaking shall not in any way be modified, amended, amplified or limited by reference to any document, instrument or agreement referred to herein; and any such reference shall be limited to the matter referred to and shall not be deemed to incorporate herein by reference any such document, instrument or agreement. This Letter of Credit may not be amended without your written consent.

This letter of credit is issued subject to, and shall be governed by, the International Standby Practices 1998, International Chamber of Commerce Publication No. 590.

Very truly yours,

[Name of Issuing Bank**]**

By: _____
NAME:
TITLE:

FIRST AMENDMENT TO LEASE

THIS FIRST AMENDMENT TO LEASE (this "Amendment") is entered into as of July 17, 2020 (the "Effective Date"), by and between FOGHORN THERAPEUTICS INC., a Delaware corporation having an address at 100 Binney Street, Suite 610, Cambridge, Massachusetts 02142 ("Sublandlord") and VERVE THERAPEUTICS INC., a Delaware corporation having an address at 215 First Street, Suite 440, Cambridge, MA 02142 ("Subtenant").

RECITALS

A. WHEREAS, Sublandlord and Subtenant entered into that certain Sublease dated as of April 13, 2020 (the "Existing Sublease"), whereby Subtenant leases certain premises from Sublandlord (the "Existing Premises") in the building at 500 Technology Square, Cambridge, Massachusetts (the "Building");

B. WHEREAS, the Existing Sublease was consented to by ARE-TECH SQUARE LLC ("Prime Lessor") pursuant to Consent to Sublease dated as of April 20, 2020 and executed among Sublandlord, Subtenant and Prime Lessor (the "Original Consent");

C. WHEREAS, Sublandlord desires to sublease to Subtenant and Subtenant desires to sublease from Sublandlord, additional premises comprising approximately 2,980 square feet of Rentable Area (the "Additional Premises") on the ninth (9th) floor of the Building, as depicted on Exhibit A attached hereto;

D. WHEREAS, Sublandlord and Subtenant desire to modify and amend the Existing Sublease only in the respects and on the conditions hereinafter stated.

AGREEMENT

NOW, THEREFORE, Sublandlord and Subtenant, in consideration of the mutual promises contained herein and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, and intending to be legally bound, agree as follows:

1. Definitions. For purposes of this Amendment, capitalized terms shall have the meanings ascribed to them in the Existing Sublease unless otherwise defined herein. The Existing Sublease, as amended by this Amendment, is referred to collectively herein as the "Sublease." From and after the date hereof, the term "Sublease," as used in the Existing Sublease, shall mean the Existing Sublease, as amended by this Amendment.

2. Sublease of Additional Premises. Subject to satisfaction of the Amendment Consent Contingency, defined below, effective on the Additional Premises Commencement Date (as hereinafter defined), Sublandlord hereby leases to Subtenant, and Subtenant hereby leases from Sublandlord, the Additional Premises. Subtenant's leasing of the Additional Premises shall be upon all of the same terms and conditions of Sublease applicable to the Existing Premises, except to the extent inconsistent with the provisions of this Amendment. From and after the Additional Premises Commencement Date, the term "Premises," as used in the Sublease, shall be deemed to include the Additional Premises.

3. Additional Premises Term. The Term of the Sublease for the Additional Premises (the "Additional Premises Term") shall commence on July 29, 2020 (the "Additional Premises Commencement Date") and end on the date that is one month from the Additional Premises Rent Commencement Date, subject to a week-to-week extension as mutually agreed upon by the parties. The Additional Premises Term, together with the Term with respect to the Existing Premises, shall be referred to collectively as the "Term." Prior to entering upon the Additional Premises, Subtenant shall furnish to Sublandlord evidence satisfactory to Sublandlord that insurance coverages required of Subtenant under the provisions of the Existing Sublease.

4. Additional Premises Rent.

(a) Subtenant shall pay to Sublandlord as Base Rent for the Additional Premises, commencing on the Additional Premises Rent Commencement Date, the sums set forth in Section 4(b) of this Amendment with respect to the Additional Premises. Notwithstanding anything herein to the contrary, the waiver contained in Section 3(E) of the Sublease shall not apply to Subtenant's obligation to pay Base Rent for the Additional Premises.

(b) Initial monthly and weekly installments of Base Rent for the Additional Premises shall be as follows

Dates	Square Feet of Rentable Area	Rent per Square Foot of Rentable Area	Monthly Rent	Weekly Rent	Annualized Rent
Additional Premises Rent Commencement Date –Rent Commencement Date	2,980	$ 98.00	$24,336.67	$5,616.15	$292,040.00

Payment for rent after the first month shall be made weekly and extend thereafter upon mutual agreement of the parties on a week-to-week basis. To the extent Subtenant's occupancy is for less than a week after a weekly payment has been made, Subtenant shall not be entitled to any refund of the Base Rent paid for such week.

5. Condition of Additional Premises. Subtenant acknowledges that (a) it is fully familiar with the condition of the Additional Premises and, notwithstanding anything contained in the Lease to the contrary, agrees to take the same in its condition "as is" as of the first day of the Additional Premises Term, and (b) Sublandlord shall have no obligation to alter, repair or otherwise prepare the Additional Premises for Subtenant's occupancy for the Additional Premises Term or to pay for any improvements to the Additional Premises.

6. Consent of Prime Lessor. Notwithstanding anything contained herein, the effectiveness of this Amendment is subject to and conditioned upon the written approval hereof and consent hereto by Prime Lessor in form reasonably acceptable to Sublandlord and Subtenant. This Amendment shall not become effective unless and until the Original Consent is amended in writing as among Prime Lessor, Sublandlord and Subtenant to evidence Prime Lessor's consent to this Amendment (the "Amendment Consent Contingency"). Each of Sublandlord and Subtenant agrees to execute and deliver an amendment to the Original Consent in the form provided by Prime Lessor and reasonably approved by Sublandlord and Subtenant.

7. Effect of Amendment. Except as modified by this Amendment, the Existing Sublease and all the covenants, agreements, terms, provisions and conditions thereof shall remain in full force and effect and are hereby ratified and affirmed as to both the Premises and the Additional Premises. In the event of any conflict between the terms contained in this Amendment and the Existing Sublease, the terms herein contained shall supersede and control the obligations and liabilities of the parties.

8. Successors and Assigns. Each of the covenants, conditions and agreements contained in this Amendment shall inure to the benefit of and shall apply to and be binding upon the parties hereto and their respective heirs, legatees, devisees, executors, administrators and permitted successors and assigns and sublessees. Nothing in this section shall in any way alter the provisions of the Lease restricting assignment or subletting.

9. Miscellaneous. This Amendment becomes effective only upon execution and delivery hereof by Sublandlord and Subtenant. The captions of the paragraphs and subparagraphs in this Amendment are inserted and included solely for convenience and shall not be considered or given any effect in construing the provisions hereof. All exhibits hereto are incorporated herein by reference. Submission of this instrument for examination or signature by Subtenant does not constitute a reservation of or option for a lease, and shall not be effective as a lease, lease amendment or otherwise until execution by and delivery to both Sublandlord and Subtenant.

10. Authority. Subtenant guarantees, warrants and represents that the individual or individuals signing this Amendment have the power, authority and legal capacity to sign this Amendment on behalf of and to bind all entities, corporations, partnerships, limited liability companies, joint venturers or other organizations and entities on whose behalf such individual or individuals have signed.

11. Brokerage. Subtenant and Sublandlord represent that they have not dealt with any broker in connection with this Amendment. Each party agrees to indemnify and hold harmless the other from and against any and all liabilities, claims, suits, demands, judgments, costs, losses, interest and expenses (including, without being limited to, reasonable attorneys' fees and expenses) which the indemnified party may be subject to or suffer by reason of any claim made by any person, firm or corporation for any commission, expense or other compensation as a result of the execution and delivery of this Sublease, which is based on alleged conversations or negotiations by said person, firm or corporation with the indemnifying party.

12. Surrender. Subtenant expressly acknowledges and agrees that it is required to comply with all of the provisions of Section 28 of the Prime Lease (as incorporated in the Existing Sublease and this Amendment by reference) regarding surrender of the Additional Premises, including, without limitation, hiring of a certified industrial hygienist to timely submit and perform a Decommissioning and HazMat Closure Plan with respect to the Additional Premises as described in said Section 28 of the Prime Lease.

13. Counterparts; Facsimile and PDF Signatures. This Amendment may be executed in one or more counterparts, each of which, when taken together, shall constitute one and the same document. A facsimile or portable document format (PDF) signature on this Amendment shall be equivalent to, and have the same force and effect as, an original signature.

[REMAINDER OF THIS PAGE INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, Sublandlord and Subtenant have executed this Amendment as a sealed Massachusetts instrument as of the date and year first above written.

SUBLANDLORD:

FOGHORN THERAPEUTICS, INC.,
a Delaware limited liability company

By: /s/ Fanny Cavalié
Name: Fanny Cavalié
Title: VP, Head of Business and Operations

SUBTENANT:

VERVE THERAPEUTICS, INC.,
a Delaware corporation

By: /s/ Andrew D. Ashe
Name: Andrew D. Ashe
Title: President & COO

EXHIBIT A

Additional Premises Plan

SECOND AMENDMENT TO SUBLEASE

THIS SECOND AMENDMENT TO SUBLEASE (this "Second Amendment") is entered into as of January 20, 2021 (the "Effective Date"), by and between FOGHORN THERAPEUTICS INC., a Delaware corporation having an address at 500 Technology Square, Suite 700, Cambridge, Massachusetts 02139 ("Sublandlord") and VERVE THERAPEUTICS, INC., a Delaware corporation having an address at 500 Technology Square, Cambridge, MA 02139 ("Subtenant").

RECITALS

E. WHEREAS, Sublandlord and Subtenant entered into that certain Sublease dated as of April 13, 2020 (the "Original Sublease"), as amended by that First Amendment (the "First Amendment") dated as of July 17, 2020 (together with the Original Sublease, the "Existing Sublease"), whereby Subtenant leases certain premises from Sublandlord (the "Existing Premises") in the building at 500 Technology Square, Cambridge, Massachusetts (the "Building");

F. WHEREAS, the Original Sublease was consented to by ARE-TECH SQUARE LLC ("Prime Lessor") pursuant to that certain Consent to Sublease dated as of April 20, 2020 and executed among Sublandlord, Subtenant and Prime Lessor (the "Original Consent"), and the First Amendment was consented to by Prime Lessor pursuant to that certain Consent to Sublease Amendment dated as of July 24, 2020 and executed among Sublandlord, Subtenant and Prime Lessor (the "Consent to Amendment");

G. WHEREAS, Sublandlord desires to sublease to Subtenant and Subtenant desires to sublease from Sublandlord, additional premises comprising approximately 2,980 square feet of Rentable Area (the "Additional Premises") on the ninth (9th) floor of the Building, as depicted on Exhibit A attached hereto;

H. WHEREAS, Sublandlord and Subtenant desire to modify and amend the Existing Sublease only in the respects and on the conditions hereinafter stated.

AGREEMENT

NOW, THEREFORE, Sublandlord and Subtenant, in consideration of the mutual promises contained herein and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, and intending to be legally bound, agree as follows:

14. Definitions. For purposes of this Second Amendment, capitalized terms shall have the meanings ascribed to them in the Existing Sublease unless otherwise defined herein. The Existing Sublease, as amended by this Amendment, is referred to collectively herein as the "Sublease." From and after the date hereof, the term "Sublease," as used in the Existing Sublease, shall mean the Existing Sublease, as amended by this Amendment.

15. Sublease of Additional Premises. Subject to satisfaction of the Second Amendment Consent Contingency, defined below, effective on the Second Amendment Additional Premises Commencement Date (as hereinafter defined), Sublandlord hereby leases to Subtenant, and Subtenant hereby leases from Sublandlord, the Additional Premises. Subtenant's leasing of the Additional Premises shall be upon all of the same terms and conditions of Sublease applicable to the Existing Premises, except to the extent inconsistent with the provisions of this Amendment. From and after the Second Amendment Additional Premises Commencement Date, the term "Premises," as used in the Sublease, shall be deemed to include the Additional Premises.

16. Second Amendment Additional Premises Term. The Term of the Sublease for the Additional Premises (the "Second Amendment Additional Premises Term") shall commence on the Second Amendment Additional Premises Commencement Date and end on the same date as the Term for the Existing Premises in the Existing Sublease. The Second Amendment Additional Premises Term, together with the Term with respect to the Existing Premises, shall be referred to collectively as the "Term." Prior to entering upon the Additional Premises, Subtenant shall furnish to Sublandlord evidence satisfactory to Sublandlord that insurance coverages required of Subtenant under the provisions of the Existing Sublease.

17. Additional Premises Rent.

(a) Subtenant shall pay to Sublandlord as Base Rent for the Additional Premises, commencing on February 1, 2021 ("Second Amendment Additional Premises Commencement Date"), the sums set forth in Section 4(b) of this Amendment with respect to the Additional Premises. Such payment shall be made at the same time and on the same terms as the Rent payments set forth in the Existing Sublease.

(b) Base Rent for the Additional Premises shall be as follows

Dates	Square Feet of Rentable Area	Rent per Square Foot of Rentable Area	Monthly Rent	Annualized Rent
Second Amendment Additional Premises Rent Commencement Date – Day prior to first anniversary of Commencement Date (as defined in Existing Sublease)	2,980	$ 98.00	$24,336.67	$292,040.00
First Anniversary of Commencement Date- Expiration Date	2,980	100.94	$25,066.77	$300,801.20

18. Condition of Additional Premises. Subtenant acknowledges that (a) it is fully familiar with the condition of the Additional Premises and, notwithstanding anything contained in the Lease to the contrary, agrees to take the same in its condition "as is" as of the first day of the Second Amendment Additional Premises Term, and (b) Sublandlord shall have no obligation to alter, repair or otherwise prepare the Additional Premises for Subtenant's occupancy for the Additional Premises Term or to pay for any improvements to the Additional Premises.

19. Consent of Prime Lessor. Notwithstanding anything contained herein, the effectiveness of this Second Amendment is subject to and conditioned upon the written approval hereof and consent hereto by Prime Lessor in substantially the same form as the Original Consent and the Consent to Amendment (the "Consent to Second Amendment"). This Second Amendment shall not become effective unless and until the Consent to Second Amendment has been duly executed by each of Prime Lessor, Sublandlord and Subtenant (the "Second Amendment Consent Contingency"). Each of Sublandlord and Subtenant agrees to execute and deliver the Consent to Second Amendment in the form provided by Prime Lessor and reasonably approved by Sublandlord and Subtenant.

20. Effect of Amendment. Except as modified by this Second Amendment, the Existing Sublease and all the covenants, agreements, terms, provisions and conditions thereof shall remain in full force and effect and are hereby ratified and affirmed as to both the Premises and the Additional Premises. In the event of any conflict between the terms contained in this Amendment and the Existing Sublease, the terms herein contained shall supersede and control the obligations and liabilities of the parties.

21. Successors and Assigns. Each of the covenants, conditions and agreements contained in this Amendment shall inure to the benefit of and shall apply to and be binding upon the parties hereto and their respective heirs, legatees, devisees, executors, administrators and permitted successors and assigns and sublessees. Nothing in this section shall in any way alter the provisions of the Lease restricting assignment or subletting.

22. Miscellaneous. This Amendment becomes effective only upon execution and delivery hereof by Sublandlord and Subtenant. The captions of the paragraphs and subparagraphs in this Amendment are inserted and included solely for convenience and shall not be considered or given any effect in construing the provisions hereof. All exhibits hereto are incorporated herein by reference. Submission of this instrument for examination or signature by Subtenant does not constitute a reservation of or option for a lease, and shall not be effective as a lease, lease amendment or otherwise until execution by and delivery to both Sublandlord and Subtenant.

23. Authority. Subtenant guarantees, warrants and represents that the individual or individuals signing this Amendment have the power, authority and legal capacity to sign this Amendment on behalf of and to bind all entities, corporations, partnerships, limited liability companies, joint venturers or other organizations and entities on whose behalf such individual or individuals have signed.

24. Brokerage. Subtenant and Sublandlord represent that they have not dealt with any broker in connection with this Second Amendment. Each party agrees to indemnify and hold harmless the other from and against any and all liabilities, claims, suits, demands, judgments, costs, losses, interest and expenses (including, without being limited to, reasonable attorneys' fees and expenses) which the indemnified party may be subject to or suffer by reason of any claim made by any person, firm or corporation for any commission, expense or other compensation as a result of the execution and delivery of this Sublease, which is based on alleged conversations or negotiations by said person, firm or corporation with the indemnifying party.

25. Surrender. Subtenant expressly acknowledges and agrees that it is required to comply with all of the provisions of Section 28 of the Prime Lease (as incorporated in the Existing Sublease and this Amendment by reference) regarding surrender of the Additional Premises, including, without limitation, hiring of a certified industrial hygienist to timely submit and perform a Decommissioning and HazMat Closure Plan with respect to the Additional Premises as described in said Section 28 of the Prime Lease.

26. Counterparts; Facsimile and PDF Signatures. This Amendment may be executed in one or more counterparts, each of which, when taken together, shall constitute one and the same document. A facsimile or portable document format (PDF) signature on this Amendment shall be equivalent to, and have the same force and effect as, an original signature.

[REMAINDER OF THIS PAGE INTENTIONALLY LEFT BLANK]

IN WITNESS WHEREOF, Sublandlord and Subtenant have executed this Amendment as a sealed Massachusetts instrument as of the date and year first above written.

SUBLANDLORD:

FOGHORN THERAPEUTICS INC.,
a Delaware Corporation

By: /s/ Fanny Cavalié
Name: Fanny Cavalié
Title: SVP, Head of Business & Operations

SUBTENANT:

VERVE THERAPEUTICS, INC.,
a Delaware corporation

By: /s/ Andrew D. Ashe
Name: Andrew D. Ashe
Title: President & COO

EXHIBIT A

Additional Premises Plan

See section in green

April 16, 2019

Sekar Kathiresan, M.D.
[**]

Dear Sek:

We are very excited about the possibility of your joining us as the Chief Executive Officer of Verve Therapeutics, Inc. (f/k/a Endcadia, Inc., "Verve" or the "Company"), the company you helped to found! The Board of Directors of the Company (the "Board") believes that your clinical and scientific expertise will enable you to be a great leader and contributor at Verve. Importantly, we know that you are committed to our mission to offer patients throughout the world life-long protection against coronary artery disease.

The terms of our offer are as follows:

Start Date and Responsibilities:

Your employment will commence on July 24, 2019 (the "Start Date").

As Chief Executive Officer, you will be responsible for providing strategic leadership for the Company by working with the Board and the executive management team to establish long-range goals, plans and policies. In this role, you will report directly to the Board. All your duties are to be performed and discharged faithfully, diligently and to the best of your ability and in compliance with internal procedures and all applicable laws and regulations. For as long as you serve as the Company's CEO you will serve as a member of the Board.

Additional Financing:

On the Start Date, in accordance with the Series A Preferred Stock Purchase Agreement by and between the Company and the investors listed on Exhibit A attached thereto, dated as of August 7, 2018, as amended (the "Purchase Agreement"), the Company shall provide notice to each Purchaser that the Company has achieved each of the Second Tranche Milestones and instruct such Purchaser to pay the purchase price for the Shares to be purchased by such Purchaser at the Second Tranche Closing on such date as designated by the Company that is at least ten (10) but not more than fifteen (15) business days thereafter. For the purpose of this paragraph, the terms Purchaser, Second Tranche Milestones and Second Tranche Closing shall have the meanings given to them under the Purchase Agreement.

Compensation:

As a full-time, exempt employee, you will receive a monthly salary of $40,000.00 ($480,000 on an annualized basis), to be paid in accordance with Verve's standard payroll practice. In addition to your base salary, you will be eligible for an annual bonus target of forty percent (40%) of your base salary. Your bonus payments related to work performed in 2019 from your Start Date until December 31, 2019 and in 2020 from January 1, 2020 until the first anniversary of your Start Date (to be paid in 2020 and 2021, respectively) shall each be in an amount that is no less than the full bonus target; provided that such bonus amounts for 2019 and 2020 shall be prorated based on the applicable portion of each such calendar year. Any bonus payment for the remainder of 2020 after the first anniversary of your Start Date shall be based on the Board's assessment of your performance based on individual and corporate objectives that will be determined by the Board, after consultation with you, and provided to you in writing no later than January 31, 2020. For any bonuses related to work performed after 2020, bonus eligibility and amounts will be discretionary and determined based upon periodic assessments of performance and the achievement of specific individual and corporate objectives that will be determined by the Board, after consultation with you, and provided to you in writing no later than January 31 of the applicable bonus year. Furthermore, please note that (i) you must be an employee on the last date of the applicable bonus year to receive the applicable bonus, and (ii) the determination of whether a bonus is paid in any given year following 2020 is subject to the approval of the Board. Any bonus will be paid no later than March 15 of the calendar year following the calendar year to which the bonus relates.

Any compensation paid to you will be less applicable deductions, taxes, and other amounts required by federal and state laws.

Stock Options:

Upon or promptly after you sign and return this letter agreement, Verve will grant you (i) an option to purchase 4,500,000 shares of the Company's common stock (the "Initial Option Grant"), and (ii) an option to purchase an additional 1,750,000 shares of the Company's common stock (the "Third Tranche Option Grant") each grant at an exercise price of $0.15 per share which is equal to the fair market value per share of the common stock on the date of the grant (collectively, the Initial Option Grant and the Third Tranche Option Grant (as defined below) shall be the "Offer Letter Equity Grants")). The shares granted to you pursuant to the Restricted Stock Purchase Agreement between you and the Company dated May 8, 2018, as amended (the "Restricted Stock Purchase Agreement") shall be the "Founder's Shares".

The Offer Letter Equity Grants will be subject to the provisions of the Company's 2018 Equity Incentive Plan, as may be amended from time to time (the "Plan") or any successor plan and stock option agreements on the Company's standard form (as modified as appropriate to reflect the terms set forth herein) to be entered into by you and the Company following the grant (collectively, the "Equity Documents"), which in relevant part will provide that each such option (i) vests over a period of four years beginning on the applicable vesting commencement date, with an initial 25% one-year cliff and monthly vesting thereafter, subject to your continued service relationship as an employee or a Board member ("service relationship") through each applicable vesting date; (ii) expires ten (10) years from the grant date, subject to earlier

termination pursuant to the terms of the Plan relating to mergers, changes in control, dissolutions and liquidations and similar events; and (iii) may be exercised (as to the vested portion) for twenty four (24) months following the termination of your service relationship with the Company (including in the event the termination of your service relationship is due to your death or Disability (as defined in the Plan)). The vesting commencement date for the Initial Option Grant will be the Start Date, and the vesting commencement date for the Third Tranche Option Grant will be the date of the Third Tranche Closing (as defined in the Purchase Agreement).

Except as otherwise provided herein, in the event of any inconsistencies between this section of the offer letter and the applicable Equity Documents, the terms of this offer letter shall govern. No right to any stock is earned or accrued until such time that vesting occurs, nor do these option grants confer any right to continue vesting or employment. Additional options may be granted over time as determined by the Board.

Notwithstanding anything to the contrary in the Equity Documents, in the event of a Change in Control (as defined in the Plan), 100% of the unvested shares underlying the Offer Letter Equity Grants, and any other stock options or restricted stock granted or issued to you as of the date of such Change in Control, including without limitation the Founder's Shares, shall immediately vest and, if applicable, become fully exercisable (or if restricted stock nonforfeitable).

Benefits:

You will be eligible to participate in Verve's employee benefits in the same manner provided generally to Verve's exempt employees, including its 401(k) savings plan, health and dental insurance, and life and disability insurance, subject to the satisfaction of any eligibility requirements and subject to the terms of such benefit programs. A package describing these benefits will be provided to you prior to the first day of your employment. You should note that the Company may modify or terminate benefits from time to time as it deems necessary or appropriate.

Severance:

In the event that your employment is terminated by the Company without Cause (as defined below) other than as a result of your death or Disability (as defined in the Plan), or you resign for Good Reason (as defined below) (collectively, your "qualifying termination") and provided that you execute and do not revoke a Separation and Release Agreement in a form attached as Exhibit A , but with such changes as may be determined by the Company in good faith to be necessary or appropriate to reflect changes to applicable law and/or your then-current equity awards, that becomes effective and irrevocable within 60 days of your qualifying termination date, then you will be entitled to the following severance benefits effective as of your qualifying termination date:

- a lump-sum payment equal to your full annual base salary and target bonus (less all applicable tax-related deductions);
- the Company will pay, for a period of twelve months following your qualifying termination date, or until you have secured other employment, or the date on which you are no longer eligible for coverage under COBRA, whichever occurs first, the full employer and employee premium for benefits that you continue pursuant to the Consolidated Omnibus Benefits Reconciliation Act of 1984, as amended ("COBRA"), provided that you timely elect continuation coverage pursuant to COBRA, within the time period prescribed pursuant to COBRA; and

- immediate vesting and exercisability, or immediate release from the Company's repurchase option, as applicable of the number of shares subject to any unvested stock options or restricted stock previously granted or issued to you that would have vested or been released, as applicable, had you remained an employee for twelve months following your qualifying termination date (assuming no Change in Control (as defined under the Plan) and no Third Tranche Closing occurred within such twelve month period); provided, however, if the Third Tranche Closing occurs within 6 months following your qualifying termination date, 25% of the Third Tranche Option Grant shall immediately vest and become exercisable upon the Third Tranche Closing. For the avoidance of doubt, assuming the Separation and Release Agreement requirement above is timely met, a sufficient portion of the unvested shares of Third Tranche Option Grant shall remain outstanding during the 6 months following your qualifying termination date so as to remain available for acceleration under the prior sentence (but not later than the expiration of such option, and subject to earlier termination pursuant to the terms of the Plan relating to mergers, changes in control, dissolutions and liquidations and similar events).

Subject to the Section 409A-related section of this offer letter, the amounts payable to you upon termination, to the extent taxable, shall be paid or commence to be paid within 60 days of your qualifying termination date; provided, however, that if the 60-day period begins in one calendar year and ends in a second calendar year, such payments to the extent they qualify as "non-qualified deferred compensation" within the meaning of Section 409Aof the Internal Revenue Code of 1986, as amended (the "Code"), shall be paid or commence to be paid in the second calendar year by the last day of such 60-day period.

For the purposes of this offer letter and any stock option agreement:

"Cause" shall mean, as determined by the Board pursuant to the process below: (i) your continued willful failure, as determined in the reasonable good faith discretion of the Board, to perform your assigned duties or responsibilities as directed or assigned by the Board (other than due to death or Disability) after written notice thereof from the Board describing in reasonable detail the failure to perform providing you a reasonable opportunity to address such alleged failure; (ii) engaging in knowing and intentional illegal conduct that was or is materially injurious to the Company or its affiliates; (iii) any willful violation of a federal or state law or regulation directly or indirectly applicable to the business of the Company or its affiliates, which violation was or is reasonably likely to be injurious to the Company or its affiliates; (iv) any material breach of the terms of any confidentiality agreement or invention assignment agreement between you and the Company (or any affiliate of the Company); or (v) being convicted of, or entering a plea of nolo contendere to, a felony or committing any act of moral turpitude, dishonesty or fraud against the Company or its affiliates. No finding of Cause shall be effective unless and until the Board votes to terminate your employment for Cause at a Board meeting.

“Good Reason” shall mean that you have complied with the “Good Reason Process” (hereinafter defined) following the occurrence of any of the following events without your prior consent: (i) material reduction of your base salary; (ii) your removal from the Board or a change in your reporting structure such that you are required to report to anyone other than the Board; (iii) material diminution in your authority, duties, or responsibilities with the Company; (iv) relocation of the Company’s offices more than 30 miles away from the current location; or (v) any material breach by the Company or any successor thereto of this offer letter. “Good Reason Process” shall mean that (i) you have reasonably determined in good faith that a “Good Reason” condition has occurred; (ii) you have notified the Company in writing of the first occurrence of the Good Reason condition within 90 days of the first occurrence of such condition; (iii) you have cooperated in good faith with the Company’s efforts, for a period not less than 30 days following such notice (the “Cure Period”), to remedy the condition; (iv) notwithstanding such efforts, the Good Reason condition continues to exist; and (v) you terminate your employment within 30 days after the end of the Cure Period. If the Company cures the Good Reason condition during the Cure Period, Good Reason shall be deemed not to have occurred.

Vacation, Sick Leave and Holidays:

Over the first year of your employment, you will accrue twenty (20) days of vacation. Thereafter, you will continue to accrue one additional day per year of employment in accordance with the Company’s vacation policies, up to a maximum of thirty (30) days of vacation per year. All vacation is to be taken in accordance with the Company’s vacation policies. In addition, should you become ill, you will be allowed up to five (5) paid sick days, provided that any unused sick days will not to be carried over from year to year and will not to be cashed out upon termination, unless otherwise required by applicable law. Additionally, the Company will offer employees at least ten (10) paid holidays per year, as determined annually according to the Company calendar.

Employment-At-Will:

The Company is excited about your joining and looks forward to a beneficial and fruitful relationship. Nevertheless, you should be aware that your employment with the Company is for no specified period and constitutes at-will employment. As a result, the Company is free to terminate its employment relationship with you at any time, with or without cause, and with or without notice you. Similarly, you are free to resign at any time, for any reason or for no reason. Nevertheless, given the importance of your position at the Company, we request that in the event of resignation, you give the Company at least thirty (30) days’ prior notice.

Additional Documents and Company Policies:

As a condition of your employment, you will also be required to sign and comply with an At-Will Employment, Confidential Information, Invention Assignment, and Arbitration Agreement (the “Employee Agreement”), which requires, among other provisions, the assignment of patent rights to any invention made during your employment at the Company, and non-disclosure of proprietary information. In the event of any dispute or claim relating to or arising out of our employment relationship, you and the Company agree to resolve the matter through binding arbitration in which (i) you are waiving any and all rights to a jury trial, and (ii) a neutral arbitrator who shall issue a written opinion, as set forth more fully in the Employee Agreement.

You will also be expected to abide by Company policies and procedures. You will be specifically required to sign an acknowledgment that you have read and understand the Company's rules of conduct, which are included in the Company Handbook, which the Company will complete and distribute soon.

Verification of Eligibility for Employment:

For purposes of federal immigration law, you will be required to provide to the Company documentary evidence of your identity and eligibility for employment in the United States. Such documentation must be provided to us within three (3) business days of your date of hire, or our employment relationship with you may be terminated.

Prior Agreements, Relationships and Conflicts:

If you have not already done so, we ask that you disclose to the Company any and all agreements relating to your prior employment and consulting roles that may affect your eligibility to be employed by the Company or limit the manner in which you may be employed. It is the Company's understanding that any such agreements will not prevent you from performing the duties of your position and you represent that such is the case. Moreover, you agree that, during the term of your employment with the Company, you will not engage in any other employment, occupation, consulting, or other business activity directly related to the business in which the Company is now involved or becomes involved during the term of your employment without the prior written consent of the Chairman of the Board, nor will you engage in any other activities that conflict with your obligations to the Company. Notwithstanding the foregoing, the Company acknowledges and agrees that you may (i) continue to provide consulting services to Maze Therapeutics, Inc., Color Genomics, Inc., and MedGenome Inc., and (ii) continue working on a limited, part-time basis at Massachusetts General Hospital in your clinical practice (collectively, the "Outside Activities"); provided that such Outside Activities (a) do not take up more than 10% of your professional time and (b) will be subject to annual review by the Board. You agree not to bring any third-party confidential information to the Company, including that of your former employer, and that you will not in any way utilize any such information in performing your duties for the Company.

Section 409A:

Anything in this offer letter to the contrary notwithstanding, if at the time of your separation from service within the meaning of Section 409A of the Code, the Company determines that you are a "specified employee" within the meaning of Section 409A(a)(2)(B)(i) of the Code, then to the extent any payment or benefit that you become entitled to under this offer letter on account of your separation from service constitutes "non-qualified deferred compensation" under Section 409Aof the Code or the regulations and guidance thereunder (collectively, "Section 409A"), such payment shall not be payable and such benefit shall not be provided until the date that is the earlier of (A) six months and one day after your separation from service, or (B) your death. If any such delayed cash payment is otherwise payable on an installment basis, the first payment shall include a catchup payment covering amounts that would otherwise have been paid during the six-month period but for the application of this provision, and the balance of the installments shall be payable in accordance with their original schedule. Each payment, installment and

benefit payable under this offer letter is intended to constitute a separate payment for purposes of Section 1.409A-2(b)(2) of the Treasury Regulations. All in-kind benefits provided and expenses eligible for reimbursement under this offer letter shall be provided by the Company or incurred by you during the time periods set forth in this offer letter. All reimbursements shall be paid as soon as administratively practicable, but in no event shall any reimbursement be paid after the last day of the taxable year following the taxable year in which the expense was incurred. The amount of in-kind benefits provided or reimbursable expenses incurred in one taxable year shall not affect the in-kind benefits to be provided or the expenses eligible for reimbursement in any other taxable year. Such right to reimbursement or in-kind benefits is not subject to liquidation or exchange for another benefit. To the extent that any payment or benefit described in this offer letter constitutes “non-qualified deferred compensation” under Section 409A, and to the extent that such payment or benefit is payable upon your termination of employment, then such payments or benefits shall be payable only upon your “separation from service.” Similarly, no severance payable to you, if any, pursuant to this offer letter that otherwise would be exempt from Section 409A pursuant to Treasury Regulation Section 1.409A-l(b)(9) will be payable until you have a “separation from service” within the meaning of Section 409A The determination of whether and when a separation from service has occurred shall be made in accordance with the presumptions set forth in Treasury Regulation Section 1.409A 1(h). The Company and you intend that this offer letter will be exempt from or otherwise comply with Section 409Aso that none of the severance or other payments and benefits to be provided hereunder will be subject to the additional tax imposed under Section 409A, and this offer letter will be administered in accordance with such intent. To the extent that any terms or provision of this offer letter is ambiguous as to its exemption from or compliance with Section 409A of the Code, the term or provision, as applicable, shall be read in such a manner so that all payments hereunder are exempt from or comply with Section 409A In no event will the Company have any obligation to reimburse you for any taxes or costs that may be imposed on or incurred by you as a result of Section 409A You and the Company agree to work together in good faith to consider amendments to this offer and to take such reasonable actions which are necessary, appropriate or desirable to avoid imposition of any additional tax or income recognition prior to actual payment to you under Section 409A

Attorneys’ Fees:

The Company shall reimburse you up to $15,000 in attorneys’ fees related to negotiating and drafting this offer letter and related agreements upon your submission to the Company of proper documentation. Such reimbursement shall be made promptly upon your submission of proper documentation, and in any event no later than December 31, 2019.

Acknowledgements:

This offer is contingent upon satisfactory completion of reference and background checks. In accepting this offer, you give us your assurance that you have not relied on any agreements, promises or representations, express or implied, with respect to your employment that are not set forth expressly in this letter. This offer letter may not be modified or amended except in a writing signed by both you and the Chairman of the Board. This letter, along with the Employee Agreement and the Equity Documents, sets forth the entire agreement and understanding between you and Verve with respect to the subject matter hereof and will supersede all prior oral

or written agreements relating to such matters. Notwithstanding the foregoing, the Restricted Stock Purchase Agreement shall remain in full force and effect and you shall continue to vest in Founder's Shares granted to you pursuant to the Restricted Stock Purchase Agreement in accordance with its terms. You hereby agree and acknowledge that effective upon the Start Date, the Founders Agreement by and between you and the Company, dated as of August 7, 2018 shall be terminated and you shall cease to accrue additional compensation thereunder, subject to the survival of certain provisions as set forth in Section 4 thereof.

If this letter correctly sets forth our agreement on the subject matter hereof, kindly sign and return this letter.

Sek, it is with great pleasure that the Board and I offer you this position at Verve. We are all excited about the possibility that you will be joining and leading our team. Personally, I look forward to our working together to create one of the great biotech companies of the 21st century!

Sincerely,

/s/ Burt Adelman
Burt Adelman, M.D.
Chairman, Board of Directors

Acknowledged and accepted.

/s/ Sekar Kathiresan
Sekar Kathiresan, M.D.

EXHIBIT A

FORM OF SEPARATION AGREEMENT AND RELEASE

This Separation Agreement and Release ("Agreement") is made by and between Sekar Kathiresan, M.D. ("Employee") and Verve Therapeutics, Inc. (the "Company") (collectively referred to as the "Parties" or individually referred to as a "Party").

RECITALS

WHEREAS, Employee was employed by the Company;

WHEREAS, Employee signed an offer letter with the Company at the inception of employment (the "Offer Letter");

WHEREAS, Employee signed an At-Will Employment, Confidential Information, Invention Assignment, and Arbitration Agreement with the Company at the inception of employment (the "Confidentiality Agreement");

WHEREAS, the Company and Employee have entered into (x) those certain Stock Option Agreements granting Employee the option to purchase shares of the Company's common stock detailed in **Exhibit A**, subject to the terms and conditions of the Company's applicable 2018 Equity Incentive Plan and the Stock Option Agreements (which are consistent with the terms of the Offer Letter) pursuant to which they were granted (collectively, the "Option Documents"), and (y) a Restricted Stock Purchase Agreement (the "Founder's Grant Agreement") granting Employee shares of restricted stock of the Company on May 8, 2018, as amended (the "Founder's Grant", and the Founder's Grant Agreement collectively with the Option Documents, the "Stock Agreements");

WHEREAS, Employee's employment ended as a result of a "qualified termination," as defined in the Offer Letter, effective DATE (the "Termination Date"); and

WHEREAS, the Parties wish to resolve any and all disputes, claims, complaints, grievances, charges, actions, petitions, and demands that the Employee may have against the Company and any of the Releasees as defined below, including, but not limited to, any and all claims arising out of or in any way related to Employee's employment with or separation from the Company;

NOW, THEREFORE, in consideration of the mutual promises made herein, the Company and Employee hereby agree as follows:

COVENANTS

1. Consideration. In consideration of Employee's execution of this Agreement and Employee's fulfillment of all of its terms and conditions, and provided that Employee does not revoke the agreement under Section 6 below, if applicable, the Company agrees to provide the "Severance" outlined in the Offer Letter, subject to the terms and conditions, including payment timing, set forth in the Offer Letter. Employee acknowledges that without this Agreement, Employee is otherwise not entitled to the consideration listed in this Section 1.

2. Options and Stock The Parties agree that for purposes of determining the number of shares of the Company's common stock that Employee is entitled to purchase from the Company, pursuant to the exercise of outstanding options, Employee will be considered to have vested only up to the Termination Date, plus the acceleration of shares as set forth in the Severance section of the Offer Letter and subject to the following sentence. Employee acknowledges that as of the Termination Date, Employee will have vested in the options listed on the attached **Exhibit A** and no more, but may be eligible to continue vesting in such stock options pursuant to the terms of the applicable Stock Option Agreements under which such stock options were granted. The exercise of Employee's vested options and shares shall continue to be governed by the terms and conditions of the Company's Stock Agreements. Further, the Parties agree that for purposes of determining the number of shares of the Company's common stock in which Employee has vested pursuant to the Founder's Grant, Employee will be considered to have vested only up to the Termination Date, subject to the following sentence. Employee acknowledges that as of the Termination Date, plus the acceleration of shares as set forth in the Severance section of the Offer Letter, Employee will have vested in the number of shares subject to the Founder's Grant as listed on the attached **Exhibit A** and no more, but may be eligible to continue vesting in shares subject to the Founder's Grant pursuant to the terms of the Offer Letter and/or the Founder's Grant Agreement.

3. Benefits. Employee's health insurance benefits shall cease on the last day of the month in which the Termination Date occurs, subject to Employee's right to continue Employee's health insurance under COBRA. Employee's participation in all benefits and incidents of employment, including, but not limited to, vesting in stock options (subject to Sections 1 and 2 of this Agreement), and the accrual of bonuses (subject to Section 1 of this Agreement), vacation, and paid time off, ceased as of the Termination Date.

4. Payment of Salary and Receipt of All Benefits. The Company is obligated to pay all compensation due to Employee pursuant to the Offer Letter through the Termination Date. Once those payments are made, Employee acknowledges and represents that, other than the payments, benefits and vesting contemplated by this Agreement, the Company and its agents have paid or provided all salary, wages, bonuses, accrued vacation/paid time off, notice periods, premiums, leaves, housing allowances, relocation costs, interest, severance, outplacement costs, fees, reimbursable expenses, commissions, stock, stock options, vesting, and any and all other benefits and compensation due to Employee.

5. Release of Claims. Employee agrees that the foregoing consideration represents settlement in full of all outstanding obligations owed to Employee by the Company and its current and former officers, directors, employees, agents, investors, attorneys, shareholders, administrators, affiliates, benefit plans, plan administrators, insurers, trustees, divisions, and subsidiaries, and predecessor and successor corporations and assigns (including, but not limited to, the Company's professional employer organization, if applicable) (collectively, the "Releasees"). Employee, on Employee's own behalf and on behalf of Employee's respective heirs, family members, executors, agents, and assigns, hereby and forever releases the Releasees from, and agrees not to sue concerning, or in any manner to institute, prosecute, or pursue, any

claim, complaint, charge, duty, obligation, demand, or cause of action relating to any matters of any kind, whether presently known or unknown, suspected or unsuspected, that Employee may possess against any of the Releasees arising from any omissions, acts, facts, or damages that have occurred up until and including the Effective Date of this Agreement, including, without limitation:

a. any and all claims relating to or arising from Employee's employment relationship with the Company and the termination of that relationship;

b. any and all claims relating to, or arising from, Employee's right to purchase, or actual purchase of shares of stock of the Company, including, without limitation, any claims for fraud, misrepresentation, breach of fiduciary duty, breach of duty under applicable state corporate law, and securities fraud under any state or federal law;

c. any and all claims for wrongful discharge of employment; termination in violation of public policy; discrimination; harassment; retaliation; breach of contract, both express and implied; breach of covenant of good faith and fair dealing, both express and implied; promissory estoppel; negligent or intentional infliction of emotional distress; fraud; negligent or intentional misrepresentation; negligent or intentional interference with contract or prospective economic advantage; unfair business practices; defamation; libel; slander; negligence; personal injury; assault; battery; invasion of privacy; false imprisonment; conversion; and disability benefits;

d. any and all claims for violation of any federal, state, or municipal statute, including, but not limited to, Title VII of the Civil Rights Act of 1964; the Civil Rights Act of 1991; the Rehabilitation Act of 1973; the Americans with Disabilities Act of 1990; the Equal Pay Act; the Fair Labor Standards Act; the Fair Credit Reporting Act; the Age Discrimination in Employment Act of 1967; the Older Workers Benefit Protection Act; the Employee Retirement Income Security Act of 1974; the Worker Adjustment and Retraining Notification Act; the Family and Medical Leave Act; the Sarbanes-Oxley Act of 2002; the Uniformed Services Employment and Reemployment Rights Act; Massachusetts Law Prohibiting Unlawful Discrimination, as amended, Mass. Gen. Laws ch. 15IB, § 1 et seq., Massachusetts Discriminatory Wage Rates Penalized Law (Massachusetts Equal Pay Law), as amended, Mass. Gen. Laws ch. 149, § 105A et seq., Massachusetts Right to be Free from Sexual Harassment Law, Mass. Gen. Laws ch. 214, § 1C, Massachusetts Discrimination Against Certain Persons on Account of Age Law, Mass. Gen. Laws ch. 149, §24A et seq., Massachusetts Equal Rights Law, Mass. Gen. Laws ch. 93, § 102 et seq., Massachusetts Violation of Constitutional Rights Law, Mass. Gen. Laws ch. 12, § 111, Massachusetts Family and Medical Leave Law, Mass. Gen. Laws ch. 149, § 52D; Massachusetts Wage Act, Mass. Gen. Laws ch. 149, § 148, et seq.;

e. any and all claims for violation of the federal or any state constitution;

f. any and all claims arising out of any other laws and regulations relating to employment or employment discrimination;

g. any claim for any loss, cost, damage, or expense arising out of any dispute over the nonwithholding or other tax treatment of any of the proceeds received by Employee as a result of this Agreement; and

h. any and all claims for attorneys' fees and costs.

Employee agrees that the release set forth in this section shall be and remain in effect in all respects as a complete general release as to the matters released. This release does not extend to any obligations incurred under this Agreement. This release does not release claims that cannot be released as a matter of law, including any Protected Activity (as defined below). This release does not affect Employee's rights under this Agreement (including with respect to options and stock as set forth in Section 2), vested benefits under any employee benefit plan, indemnification against third party claims, or any right Employee may have to unemployment compensation benefits or workers' compensation benefits. Employee represents that Employee has made no assignment or transfer of any right, claim, complaint, charge, duty, obligation, demand, cause of action, or other matter waived or released by this Section.

6. Acknowledgment of Waiver of Claims under ADEA. **This section only applicable if Employee is over the age of 40 on the Termination Date.** Employee acknowledges that Employee is waiving and releasing any rights Employee may have under the Age Discrimination in Employment Act of 1967 ("ADEA"), and that this waiver and release is knowing and voluntary. Employee agrees that this waiver and release does not apply to any rights or claims that may arise under the ADEA after the Effective Date of this Agreement. Employee acknowledges that the consideration given for this waiver and release is in addition to anything of value to which Employee was already entitled. Employee further acknowledges that Employee has been advised by this writing that: (a) Employee should consult with an attorney prior to executing this Agreement; (b) Employee has twenty-one (21) days within which to consider this Agreement; (c) Employee has seven (7) days following Employee's execution of this Agreement to revoke this Agreement; (d) this Agreement shall not be effective until after the revocation period has expired; and (e) nothing in this Agreement prevents or precludes Employee from challenging or seeking a determination in good faith of the validity of this waiver under the ADEA, nor does it impose any condition precedent, penalties, or costs for doing so, unless specifically authorized by federal law. In the event Employee signs this Agreement and returns it to the Company in less than the 21-day period identified above, Employee hereby acknowledges that Employee has freely and voluntarily chosen to waive the time period allotted for considering this Agreement. Employee acknowledges and understands that revocation must be accomplished by a written notification to the undersigned Company representative that is received prior to the Effective Date. The Parties agree that changes, whether material or immaterial, do not restart the running of the 21-day period.

7. Unknown Claims. Employee acknowledges that Employee has been advised to consult with legal counsel and that Employee is familiar with the principle that a general release does not extend to claims that the releaser does not know or suspect to exist in Employee's favor at the time of executing the release, which, if known by Employee's, must have materially affected Employee's settlement with the releasee. Employee, being aware of said principle, agrees to expressly waive any rights Employee may have to that effect, as well as under any other statute or common law principles of similar effect.

8. No Pending or Future Lawsuits. Employee represents that Employee has no lawsuits, claims, or actions pending in Employee's name, or on behalf of any other person or entity, against the Company or any of the other Releasees. Employee also represents that Employee does not intend to bring any claims on Employee's own behalf or on behalf of any other person or entity against the Company or any of the other Releasees.

9. Confidentiality. Employee and the Company agree to maintain in complete confidence the existence of this Agreement, the contents and terms of this Agreement, and the consideration for this Agreement (hereinafter collectively referred to as "Separation Information"). Except as required by law, Employee and Company may disclose Separation Information only to immediate family members (in the case of Employee), the Court in any proceedings to enforce the terms of this Agreement, his/its counsel, and his/its accountant and any professional tax advisor to the extent that they need to know the Separation Information in order to provide advice on tax treatment or to prepare tax returns or financial statements, and must prevent disclosure of any Separation Information to all other third parties. Employee and the Company agree that neither Employee nor the Company will publicize, directly or indirectly, any Separation Information.

Employee acknowledges and agrees that the confidentiality of the Separation Information is of the essence. The Parties agree that if one Party proves that the other Party breached this Confidentiality provision, the non-breaching Party shall be entitled to an award of its costs spent enforcing this provision, including all reasonable attorneys' fees associated with the enforcement action, without regard to whether the non-breaching Party can establish actual damages from the breaching Party's breach, except to the extent that such breach constitutes a legal action by Employee that directly pertains to the ADEA, if applicable. Any such individual breach or disclosure shall not excuse the non-breaching Party from the non-breaching Party's obligations hereunder, nor permit either Party to make additional disclosures. The Parties each warrant that he/it has not disclosed, orally or in writing, directly or indirectly, any of the Separation Information to any unauthorized party.

10. Trade Secrets and Confidential Information Company Property. Employee reaffirms and agrees to observe and abide by the terms of the Confidentiality Agreement, specifically including the provisions therein regarding nondisclosure of the Company's trade secrets and confidential and proprietary information, noncompetition, and nonsolicitation of Company employees. Employee agrees that the above reaffirmation and agreement with the Confidentiality Agreement shall constitute a new and separately enforceable agreement to abide by the terms of the Confidentiality Agreement, entered and effective as of the Effective Date. Employee specifically acknowledges and agrees that any violation of the restrictive covenants in the Confidentiality Agreement shall constitute a material breach of this Agreement. Employee's signature below constitutes Employee's certification under penalty of perjury that Employee has returned all documents and other items provided to Employee by the Company, developed or obtained by Employee in connection with Employee's employment with the Company, or otherwise belonging to the Company, including, but not limited to, all passwords to any software or other programs or data that Employee used in performing services for the Company.

11. Mutual Nondisparagement. Employee agrees to refrain from any disparagement, defamation, libel, or slander of any of the Releasees, and agrees to refrain from any tortious interference with the contracts and relationships of any of the Releasees. The Company agrees to refrain from any disparaging statements, defamation, libel, or slander about Employee and agrees to refrain from any tortious interference with the contracts and relationships of Employee. Employee understands that the Company's obligations under this paragraph extend only to the Company's current executive officers and members of its Board of Directors and only for so long as each officer or member is an employee or Director of the Company.

12. Breach. In addition to the rights provided in the "Attorneys' Fees" section below, the Parties acknowledge and agree that any material breach of this Agreement, unless such breach constitutes a legal action by Employee challenging or seeking a determination in good faith of the validity of the waiver herein under the ADEA, if applicable, or of any provision of the Confidentiality Agreement shall entitle the non-breaching Party immediately to obtain damages, except as provided by law.

13. No Admission of Liability. Employee understands and acknowledges that this Agreement constitutes a compromise and settlement of any and all actual or potential disputed claims by Employee. No action taken by the Company hereto, either previously or in connection with this Agreement, shall be deemed or construed to be (a) an admission of the truth or falsity of any actual or potential claims or (b) an acknowledgment or admission by the Company of any fault or liability whatsoever to Employee or to any third party.

14. Costs. The Parties shall each bear their own costs, attorneys' fees, and other fees incurred in connection with the preparation of this Agreement.

15. ARBITRATION. THE PARTIES AGREE THAT ANY AND ALL DISPUTES ARISING OUT OF THE TERMS OF THIS AGREEMENT, THEIR INTERPRETATION, AND ANY OF THE MATTERS HEREIN RELEASED, SHALL BE SUBJECT TO ARBITRATION IN SUFFOLK COUNTY, BEFORE THE JUDICIAL ARBITRATION AND MEDIATION SERVICE ("JAMS") UNDER ITS COMPREHENSIVE ARBITRATION RULES ("JAMS RULES") AND MASSACHUSETTS LAW. THE ARBITRATOR MAY GRANT INJUNCTIONS AND OTHER RELIEF IN SUCH DISPUTES. THE ARBITRATOR SHALL ADMINISTER AND CONDUCT ANY ARBITRATION IN ACCORDANCE WITH MASSACHUSETTS LAW, AND THE ARBITRATOR SHALL APPLY SUBSTANTIVE AND PROCEDURAL MASSACHUSETTS LAW TO ANY DISPUTE OR CLAIM, WITHOUT REFERENCE TO ANY CONFLICT-OF-LAW PROVISIONS OF ANY JURISDICTION. TO THE EXTENT THAT THE JAMS RULES CONFLICT WITH MASSACHUSETTS LAW, MASSACHUSETTS LAW SHALL TAKE PRECEDENCE. THE DECISION OF THE ARBITRATOR SHALL BE FINAL, CONCLUSIVE, AND BINDING ON THE PARTIES TO THE ARBITRATION. THE PARTIES AGREE THAT THE PREVAILING PARTY IN ANY ARBITRATION SHALL BE ENTITLED TO INJUNCTIVE RELIEF IN ANY COURT OF COMPETENT JURISDICTION TO ENFORCE THE ARBITRATION AWARD. THE PARTIES TO THE ARBITRATION SHALL EACH PAY HALF OF THE COSTS AND EXPENSES OF SUCH ARBITRATION, AND EACH PARTY SHALL SEPARATELY PAY FOR ITS RESPECTIVE COUNSEL FEES AND EXPENSES; PROVIDED, HOWEVER, THAT THE ARBITRATOR SHALL AWARD ATTORNEYS' FEES AND COSTS TO THE PREVAILING PARTY, EXCEPT AS PROHIBITED BY LAW. THE PARTIES HEREBY AGREE TO WAIVE THEIR RIGHT TO HAVE ANY DISPUTE BETWEEN THEM

RESOLVED IN A COURT OF LAW BY A JUDGE OR JURY. NOTWITHSTANDING THE FOREGOING, THIS SECTION WILL NOT PREVENT EITHER PARTY FROM SEEKING INJUNCTIVE RELIEF (OR ANY OTHER PROVISIONAL REMEDY) FROM ANY COURT HAVING JURISDICTION OVER THE PARTIES AND THE SUBJECT MATTER OF THEIR DISPUTE RELATING TO THIS AGREEMENT AND THE AGREEMENTS INCORPORATED HEREIN BY REFERENCE. SHOULD ANY PART OF THE ARBITRATION AGREEMENT CONTAINED IN THIS PARAGRAPH CONFLICT WITH ANY OTHER ARBITRATION AGREEMENT BETWEEN THE PARTIES, THE PARTIES AGREE THAT THIS ARBITRATION AGREEMENT SHALL GOVERN.

16. Authority. The Company represents and warrants that the undersigned has the authority to act on behalf of the Company and to bind the Company and all who may claim through it to the terms and conditions of this Agreement. Employee represents and warrants that Employee has the capacity to act on Employee's own behalf and on behalf of all who might claim through Employee to bind them to the terms and conditions of this Agreement. Each Party warrants and represents that there are no liens or claims of lien or assignments in law or equity or otherwise of or against any of the claims or causes of action released herein.

17. Protected Activity Not Prohibited. Employee understands that nothing in this Agreement shall in any way limit or prohibit Employee from engaging for a lawful purpose in any Protected Activity. For purposes of this Agreement, "Protected Activity" shall mean filing a charge, complaint, or report with, or otherwise communicating with, cooperating with or participating in any investigation or proceeding that may be conducted by, any federal, state or local government agency or commission, including the Securities and Exchange Commission, the Equal Employment Opportunity Commission, the Occupational Safety and Health Administration, and the National Labor Relations Board ("Government Agencies"). Employee understands that in connection with such Protected Activity, Employee is permitted to disclose documents or other information as permitted by law, and without giving notice to, or receiving authorization from, the Company. Notwithstanding the foregoing, Employee agrees to take all reasonable precautions to prevent any unauthorized use or disclosure of any information that may constitute Company confidential information under the Confidentiality Agreement to any parties other than the relevant Government Agencies. Employee further understands that "Protected Activity" does not include the disclosure of any Company attorney-client privileged communications, and that any such disclosure without the Company's written consent shall constitute a material breach of this Agreement. In addition, pursuant to the Defend Trade Secrets Act of 2016, Employee is notified that an individual will not be held criminally or civilly liable under any federal or state trade secret law for the disclosure of a trade secret that (i) is made in confidence to a federal, state, or local government official (directly or indirectly) or to an attorney *solely* for the purpose of reporting or investigating a suspected violation of law, or (ii) is made in a complaint or other document filed in a lawsuit or other proceeding, if (and only if) such filing is made under seal. In addition, an individual who files a lawsuit for retaliation by an employer for reporting a suspected violation of law may disclose the trade secret to the individual's attorney and use the trade secret information in the court proceeding, if the individual files any document containing the trade secret under seal and does not disclose the trade secret, except pursuant to court order.

18. No Representations. Employee represents that Employee has had an opportunity to consult with an attorney, and has carefully read and understands the scope and effect of the provisions of this Agreement. Employee has not relied upon any representations or statements made by the Company that are not specifically set forth in this Agreement.

19. Severability. In the event that any provision or any portion of any provision hereof or any surviving agreement made a part hereof becomes or is declared by a court of competent jurisdiction or arbitrator to be illegal, unenforceable, or void, this Agreement shall continue in full force and effect without said provision or portion of provision.

20. Attorneys' Fees. Except with regard to a legal action challenging or seeking a determination in good faith of the validity of the waiver herein under the ADEA, if applicable, in the event that either Party brings an action to enforce or effect its rights under this Agreement, the prevailing Party shall be entitled to recover its costs and expenses, including the costs of mediation, arbitration, litigation, court fees, and reasonable attorneys' fees incurred in connection with such an action.

21. Entire Agreement. This Agreement represents the entire agreement and understanding between the Company and Employee concerning the subject matter of this Agreement and Employee's employment with and separation from the Company and the events leading thereto and associated therewith, and supersedes and replaces any and all prior agreements and understandings concerning the subject matter of this Agreement and Employee's relationship with the Company, including the Offer Letter (except for the provisions incorporated herein), with the exception of the Confidentiality Agreement and the Stock Agreements.

22. No Oral Modification. This Agreement may only be amended in a writing signed by Employee and the Company's Chief Executive Officer.

23. Governing Law. This Agreement shall be governed by the laws of the Commonwealth of Massachusetts, without regard for choice-of-law provisions. Employee consents to personal and exclusive jurisdiction and venue in the Commonwealth of Massachusetts.

24. Effective Date. If Employee is over the age of 40 on the Termination Date, Employee understands that this Agreement shall be null and void if not executed by Employee, and returned to the Company, within the twenty-one (21) day period set forth above. Employee has seven (7) days after signing this Agreement to revoke it. This Agreement will become effective on the eighth (8th) day after Employee signed this Agreement, so long as it has been signed by the Parties and has not been invoked before that date (the "Effective Date"). If Employee is under the age of 40 on the Termination Date, Employee understands that this Agreement shall be null and void if not executed by Employee, and returned to the Company, within seven (7) days after receipt of the Agreement from the Company. This Agreement will become effective on the date it has been signed by both Parties (the "Effective Date").

25. Counterparts. This Agreement may be executed in counterparts and each counterpart shall be deemed an original and all of which counterparts taken together shall have the same force and effect as an original and shall constitute an effective, binding agreement on the part of each of the undersigned. The counterparts of this Agreement may be executed and delivered by facsimile, photo, email PDF, Docusign/Echosign or a similarly accredited secure signature service, or other electronic transmission or signature. This Agreement may be executed in one or more counterparts, and counterparts may be exchanged by electronic transmission (including by email), each of which will be deemed an original, but all of which together constitute one and the same instrument.

26. Voluntary Execution of Agreement. Employee understands and agrees that Employee executed this Agreement voluntarily, without any duress or undue influence on the part or behalf of the Company or any third party, with the full intent of releasing all of Employee's claims against the Company and any of the other Releasees. Employee acknowledges that:

a. Employee has read this Agreement;

b. Employee has been represented in the preparation, negotiation, and execution of this Agreement by legal counsel of Employee's own choice or has elected not to retain legal counsel;

c. Employee understands the terms and consequences of this Agreement and of the releases it contains; and

d. Employee is fully aware of the legal and binding effect of this Agreement.

Remainder of Page Intentionally Left Blank; Signature Page Follows

IN WITNESS WHEREOF, the Parties have executed this Agreement on the respective dates set forth below.

SEKAR KATHIRESAN, M.D., an individual

Dated: _____

Sekar Kathiresan, M.D.

VERVE THERAPEUTICS, INC.

Dated: _____

By: _____

[Company Representative]
[Title]

July 26, 2019

Andrew D. Ashe
[**]

Dear Andrew:

On behalf of Verve Therapeutics, Inc. (“Verve” or the “Company”), you for your excellent and ongoing work as the President and Chief Operating Officer of Verve Therapeutics, Inc. (f/k/a Endcadia, Inc., “Verve” or the “Company”), the company you helped us to get up and running! It has been a pleasure to work with you and I look forward to working together on Verve’s mission to offer patients throughout the world life-long protection against coronary artery disease.

Below are the terms that will apply to your employment by Verve from and after the date of this letter.

Responsibilities:

As President and Chief Operating Officer, you will be responsible for providing strategic leadership of the Company’s operational and administrative functions. In light of your legal background, you will also serve as the Company’s Secretary and General Counsel and be responsible for all aspects of the Company’s legal and compliance functions. In your role, you will report directly to me. All your duties are to be performed and discharged faithfully, diligently and to the best of your ability and in compliance with internal procedures and all applicable laws and regulations.

Compensation:

As a full-time, exempt employee, you will receive a monthly salary of $31,250.00 ($375,000 on an annualized basis), to be paid in accordance with Verve’s standard payroll practice. In addition to your base salary, you will be eligible for an annual bonus target of thirty-five percent (35%) of your base salary. Bonus eligibility and amounts will be discretionary and determined based upon periodic assessments of performance and the achievement of specific individual and corporate objectives that will be determined by the Board, after consultation with you, and provided to you in writing no later than January 31 of the applicable bonus year. Furthermore, please note that (i) you must be an employee on the last date of the applicable bonus year to receive the applicable bonus, and (ii) the determination of whether a bonus is paid in any given year is subject to the approval of the Board. Any bonus will be paid no later than March 15 of the calendar year following the calendar year to which the bonus relates.

Any compensation paid to you will be less applicable deductions, taxes, and other amounts required by federal and state laws.

Stock Options:

Upon or promptly after you sign and return this letter agreement, Verve will grant you an option to purchase 1,000,000 shares of the Company's common stock at an exercise price of $0.15 per share which is equal to the fair market value per share of the common stock on the date of the grant. This option award will be subject to the provisions of the Company's 2018 Equity Incentive Plan, as may be amended from time to time (the "Plan") or any successor plan and stock option agreements on the Company's standard form (as modified as appropriate to reflect the terms set forth herein) to be entered into by you and the Company following the grant (collectively, the "Equity Documents"), which in relevant part will provide that such option (i) vests over a period of four years, with an initial 25% one-year cliff and monthly vesting thereafter, subject to your continued service relationship as an employee or a consultant ("service relationship") through each applicable vesting date; (ii) expires ten (10) years from the grant date, subject to earlier termination pursuant to the terms of the Plan relating to mergers, changes in control, dissolutions and liquidations and similar events; and (iii) may be exercised (as to the vested portion) for twenty four (24) months following the termination of your service relationship with the Company (including in the event the termination of your service relationship is due to your death or Disability (as defined in the Plan)).

Notwithstanding anything to the contrary in the Equity Documents or in any other agreement, in the event of a Change in Control (as defined in the Plan), 100% of the unvested shares underlying all equity awards made hereunder, previously made to you or issued to you as of the date of such Change in Control, shall immediately vest and, if applicable, become fully exercisable (or if restricted stock nonforfeitable).

Benefits:

You will be eligible to participate in Verve's employee benefits in the same manner provided generally to Verve's exempt employees, including its 401(k) savings plan, health and dental insurance, and life and disability insurance, subject to the satisfaction of any eligibility requirements and subject to the terms of such benefit programs. You should note that the Company may modify or terminate benefits from time to time as it deems necessary or appropriate.

Severance:

In the event that your employment is terminated by the Company without Cause (as defined below) other than as a result of your death or Disability (as defined in the Plan), or you resign for Good Reason (as defined below) (collectively, your "qualifying termination") and provided that you execute and do not revoke a Separation and Release Agreement in a form attached as Exhibit A, but with such changes as may be determined by the Company in good faith to be necessary or appropriate to reflect changes to applicable law and/or your then-current equity awards, that becomes effective and irrevocable within 60 days of your qualifying termination date, then you will be entitled to the following severance benefits effective as of your termination date:

- a lump-sum payment equal to your full annual base salary and target bonus (less all applicable tax-related deductions);
- the Company will pay, for a period of twelve months following your termination date, or until you have secured other employment, or the date on which you are no longer eligible for coverage under COBRA, whichever occurs first, the full employer and employee premium for benefits that you continue pursuant to the Consolidated Omnibus Benefits Reconciliation Act of 1984, as amended ("COBRA"), provided that you timely elect continuation coverage pursuant to COBRA, within the time period prescribed pursuant to COBRA; and
- immediate vesting and exercisability, or immediate release from the Company's repurchase option, as applicable, of the number of shares subject to any unvested stock options or restricted stock previously granted or issued to you that would have vested or been released, as applicable, had you remained an employee for twelve months following your termination date (assuming no Change in Control (as defined under the Plan) occurred within such twelve month period), provided that a stock option will be subject to such accelerated vesting only if such stock option had commenced vesting (that is, had reached at least its first scheduled vesting date) on or prior to such termination date.

Subject to the Section 409A-related section of this offer letter, the amounts payable to you upon termination, to the extent taxable, shall be paid or commence to be paid within 60 days of your qualifying termination date; provided, however, that if the 60-day period begins in one calendar year and ends in a second calendar year, such payments to the extent they qualify as "non-qualified deferred compensation" within the meaning of Section 409A of the Internal Revenue Code of 1986, as amended (the "Code"), shall be paid or commence to be paid in the second calendar year by the last day of such 60-day period.

For the purposes of this offer letter and any stock option agreement:

"Cause" shall mean, as determined by the Board pursuant to the process below: (i) your continued willful failure, as determined in the reasonable good faith discretion of the Board, to perform your assigned duties or responsibilities as directed or assigned by the Board (other than due to death or Disability) after written notice thereof from the Board describing in reasonable detail the failure to perform providing you a reasonable opportunity to address such alleged failure; (ii) engaging in knowing and intentional illegal conduct that was or is materially injurious to the Company or its affiliates; (iii) any willful violation of a federal or state law or regulation directly or indirectly applicable to the business of the Company or its affiliates, which violation was or is reasonably likely to be injurious to the Company or its affiliates; (iv) any material breach of the terms of any confidentiality agreement or invention assignment agreement between you and the Company (or any affiliate of the Company); or (v) being convicted of, or entering a plea of nolo contendere to, a felony or committing any act of moral turpitude, dishonesty or fraud against the Company or its affiliates. No finding of Cause shall be effective unless and until the Board votes to terminate your employment for Cause at a Board meeting.

"Good Reason" shall mean that you have complied with the "Good Reason Process" (hereinafter defined) following the occurrence of any of the following events without your prior consent: (i) material reduction of your base salary; (ii) your removal from the Board or a change in your reporting structure such that you are required to report to anyone other than the Board; (iii) material diminution in your authority, duties, or responsibilities with the Company; (iv) relocation of the Company's offices more than 30 miles away from the current location; or (v) any material breach by the Company or any successor thereto of this offer letter. "Good Reason Process" shall mean that (i) you have reasonably determined in good faith that a "Good Reason" condition has occurred; (ii) you have notified the Company in writing of the first occurrence of the Good Reason condition within 90 days of the first occurrence of such condition; (iii) you have cooperated in good faith with the Company's efforts, for a period not less than 30 days following such notice (the "Cure Period"), to remedy the condition; (iv) notwithstanding such efforts, the Good Reason condition continues to exist; and (v) you terminate your employment within 30 days after the end of the Cure Period. If the Company cures the Good Reason condition during the Cure Period, Good Reason shall be deemed not to have occurred.

Vacation, Sick Leave and Holidays:

Over the first year of your employment commencing as of the date of this letter, you will accrue twenty (20) days of vacation. Thereafter, you will continue to accrue one additional day per year of employment in accordance with the Company's vacation policies, up to a maximum of thirty (30) days of vacation per year. All vacation is to be taken in accordance with the Company's vacation policies. In addition, should you become ill, you will be allowed up to five (5) paid sick days, provided that any unused sick days will not to be carried over from year to year and will not to be cashed out upon termination, unless otherwise required by applicable law. Additionally, the Company will offer employees at least ten (10) paid holidays per year, as determined annually according to the Company calendar.

Employment-At-Will:

The Company is excited about your continued employment and looks forward to continuing this beneficial and fruitful relationship. Nevertheless, you should be aware that your employment with the Company is for no specified period and constitutes at-will employment. As a result, the Company is free to terminate its employment relationship with you at any time, with or without cause, and with or without notice you. Similarly, you are free to resign at any time, for any reason or for no reason. However, given the importance of your position at the Company, we request that in the event of resignation, you give the Company at least thirty (30) days' prior notice.

Additional Documents and Company Policies:

As a condition of your continued employment and your acceptance of the additional consideration offered to you hereunder, you will also be required to sign and comply with another At-Will Employment, Confidential Information, Invention Assignment, and Arbitration Agreement (the "Employee Agreement"), which requires, among other provisions, the assignment of patent rights to any invention made during your employment at the Company, and non-disclosure of proprietary information. In the event of any dispute or claim relating to or arising out of our employment relationship, you and the Company agree to resolve the matter through binding arbitration in which (i) you are waiving any and all rights to a jury trial, and (ii) a neutral arbitrator who shall issue a written opinion, as set forth more fully in the Employee Agreement.

You will also be expected to continue to abide by all other Company policies and procedures.

Prior Agreements, Relationships and Conflicts:

If you have not already done so, we ask that you disclose to the Company any and all agreements relating to your prior employment and consulting roles that may affect your eligibility to be employed by the Company or limit the manner in which you may be employed. It is the Company's understanding that any such agreements will not prevent you from performing the duties of your position and you represent that such is the case. Moreover, you agree that, during the term of your employment with the Company, you will not engage in any other employment, occupation, consulting, or other business activity directly related to the business in which the Company is now involved or becomes involved during the term of your employment without the prior written consent of the Chief Executive Officer and the Chairman of the Board, nor will you engage in any other activities that conflict with your obligations to the Company.

Section 409A:

Anything in this offer letter to the contrary notwithstanding, if at the time of your separation from service within the meaning of Section 409A of the Code, the Company determines that you are a "specified employee" within the meaning of Section 409A(a)(2)(B)(i) of the Code, then to the extent any payment or benefit that you become entitled to under this offer letter on account of your separation from service constitutes "non-qualified deferred compensation" under Section 409A of the Code or the regulations and guidance thereunder (collectively, "Section 409A"), such payment shall not be payable and such benefit shall not be provided until the date that is the earlier of (A) six months and one day after your separation from service, or (B) your death. If any such delayed cash payment is otherwise payable on an installment basis, the first payment shall include a catch-up payment covering amounts that would otherwise have been paid during the six-month period but for the application of this provision, and the balance of the installments shall be payable in accordance with their original schedule. Each payment, installment and benefit payable under this offer letter is intended to constitute a separate payment for purposes of Section 1.409A-2(b)(2) of the Treasury Regulations. All in-kind benefits provided and expenses eligible for reimbursement under this offer letter shall be provided by the Company or incurred by you during the time periods set forth in this offer letter. All reimbursements shall be paid as soon as administratively practicable, but in no event shall any reimbursement be paid after the last day of the taxable year following the taxable year in which the expense was incurred. The amount of in-kind benefits provided or reimbursable expenses incurred in one taxable year shall not affect the in-kind benefits to be provided or the expenses eligible for reimbursement in any other taxable year. Such right to reimbursement or in-kind benefits is not subject to liquidation or exchange for another benefit. To the extent that any payment or benefit described in this offer letter constitutes "non-qualified deferred compensation" under Section 409A, and to the extent that such payment or benefit is payable upon your termination of employment, then such payments or benefits shall be payable only upon your "separation from service." Similarly, no

severance payable to you, if any, pursuant to this offer letter that otherwise would be exempt from Section 409A pursuant to Treasury Regulation Section 1.409A-1(b)(9) will be payable until you have a "separation from service" within the meaning of Section 409A. The determination of whether and when a separation from service has occurred shall be made in accordance with the presumptions set forth in Treasury Regulation Section 1.409A 1(h). The Company and you intend that this offer letter will be exempt from or otherwise comply with Section 409A so that none of the severance or other payments and benefits to be provided hereunder will be subject to the additional tax imposed under Section 409A, and this offer letter will be administered in accordance with such intent. To the extent that any terms or provision of this offer letter is ambiguous as to its exemption from or compliance with Section 409A of the Code, the term or provision, as applicable, shall be read in such a manner so that all payments hereunder are exempt from or comply with Section 409A. In no event will the Company have any obligation to reimburse you for any taxes or costs that may be imposed on or incurred by you as a result of Section 409A. You and the Company agree to work together in good faith to consider amendments to this offer and to take such reasonable actions which are necessary, appropriate or desirable to avoid imposition of any additional tax or income recognition prior to actual payment to you under Section 409A.

Acknowledgements:

In accepting this offer, you give us your assurance that you have not relied on any agreements, promises or representations, express or implied, with respect to your employment that are not set forth expressly in this letter. This offer letter may not be modified or amended except in a writing signed by both you and the me, as Chief Executive Officer. This letter, along with the Employee Agreement and the Equity Documents, sets forth the entire agreement and understanding between you and Verve with respect to the subject matter hereof and will supersede all prior oral or written agreements relating to such matters.

If this letter correctly sets forth our agreement on the subject matter hereof, kindly sign and return this letter.

I look forward to our working together to create one of the great biotech companies of the 21st century!

Sincerely,

/s/ Sekar Kathiresan

Sekar Kathiresan, M.D.
Chief Executive Officer

Acknowledged and accepted:

/s/ Andrew D. Ashe
Andrew D. Ashe

July 26, 2019

Andrew Bellinger
[**]

Dear Andrew:

On behalf of Verve Therapeutics, Inc. (“Verve” or the “Company”), I would like to thank you for your excellent work as our Chief Medical Adviser. In a short time, you have demonstrated your commitment to our mission to offer patients throughout the world life-long protection against coronary artery disease. Based on that commitment and the skill, expertise and “verve” you have brought to the Company, I am pleased to present you with an offer to join us as our Chief Scientific Officer. The terms of our offer are as follows:

Start Date and Responsibilities:

It is anticipated that your employment will commence as soon as possible. The exact date will be determined by you and I following your acceptance of this offer and will be mindful of your need to thoughtfully transition out of your current role at Lyndra Therapeutics.

As Chief Scientific Officer at Verve, you will be responsible for providing strategic leadership for the Company’s research and development activities, including the Company’s product pipeline and research collaborations. In this role, you will report directly to me. All your duties are to be performed and discharged faithfully, diligently and to the best of your ability and in compliance with internal procedures and all applicable laws and regulations.

Compensation:

As a full-time, exempt employee, you will receive a monthly salary of $29,166.00 ($350,000 on an annualized basis), to be paid in accordance with Verve’s standard payroll practice. In addition to your base salary, you will be eligible for an annual bonus target of thirty percent (30%) of your base salary. Bonus eligibility and amounts will be discretionary and determined based upon periodic assessments of performance and the achievement of specific individual and corporate objectives that will be determined by the Board of Directors of the Company (the “Board”), after consultation with you, and provided to you in writing no later than January 31 of the applicable bonus year. Furthermore, please note that (i) you must be an employee on the last date of the applicable bonus year to receive the applicable bonus, and (ii) the determination of whether a bonus is paid in any given year is subject to the approval of the Board. Any bonus will be paid no later than March 15 of the calendar year following the calendar year to which the bonus relates.

Any compensation paid to you will be less applicable deductions, taxes, and other amounts required by federal and state laws.

Stock Options:

In addition, following your start date and subject to formal approval by the Board, you will be granted (i) an option to purchase 1,500,000 shares of the Company's common stock (the "First Employee Option"), and (ii) an option to purchase an additional 400,000 shares of the Company's common stock (the "Second Employee Option"), each at an exercise price per share equal to the fair market value on the date of grant, as determined by the Board. Each of the First Employee Option and the Second Employee Option will be subject to the provisions of the Company's 2018 Equity Incentive Plan, as may be amended from time to time (the "Plan"), and stock option agreements on the Company's standard form (as modified as appropriate to reflect the terms set forth herein) to be entered into by you and the Company following the grant (collectively, the "Equity Documents"), which in relevant part will provide that each such option (i) expires ten (10) years from the grant date, subject to earlier termination pursuant to the terms of the Plan relating to mergers, changes in control, dissolutions and liquidations and similar events, and (ii) may be exercised (as to the vested portion) for three (3) months following the termination of your status as a Service Provider (as defined in the Plan), including in the event the termination is due to your death or Disability (as defined in the Plan).

Subject to your continued status as a Service Provider through each applicable vesting date, (i) the First Employee Option shall vest in 48 equal monthly installments beginning on your first day as an employee of the Company, and (ii) the Second Employee Option shall vest over a period of four years following your first day as an employee of the Company, with an initial 25% one-year cliff and monthly vesting thereafter. No right to any stock is earned or accrued until such time that vesting occurs, nor does either option grant confer any right to continue vesting or to continued retention as a Service Provider to the Company. In the event of any inconsistencies between this offer letter and the applicable Equity Documents, the terms of the applicable Equity Documents shall govern.

Additional options may be granted over time as determined by the Board. Specifically, it is anticipated that the Board will consider one or more additional option grants to you, as determined by the Board in its discretion, to adjust for dilution of your equity interest in the Company resulting from the completion (if applicable) of the Third Tranche Closing, as such term is defined under the Series A Preferred Stock Purchase Agreement among the Company and the investors listed therein, dated as of August 7, 2018, as amended.

Notwithstanding anything to the contrary in the Equity Documents or in any other agreement, in the event of a Change in Control (as defined in the Plan), 100% of the unvested shares underlying all equity awards made hereunder, previously made to you or issued to you as of the date of such Change in Control, shall immediately vest and, if applicable, become fully exercisable (or, if in the form of restricted stock, become non-forfeitable).

Benefits:

You will be eligible to participate in Verve's employee benefits in the same manner provided generally to Verve's exempt employees, including its 401(k) savings plan and health and dental insurance, subject to the satisfaction of any eligibility requirements and subject to the terms of such benefit programs. You should note that the Company may modify or terminate benefits from time to time as it deems necessary or appropriate.

Severance:

In the event that your employment is terminated by the Company without Cause (as defined below) other than as a result of your death or Disability (as defined in the Plan), or you resign for Good Reason (as defined below) (collectively, your "qualifying termination") and provided that you execute and do not revoke a Separation and Release Agreement in a form reasonably acceptable to the Company that becomes effective and irrevocable within 60 days of your qualifying termination date, then you will be entitled to the following severance benefits effective as of your termination date:

- a lump-sum payment equal to two-thirds of your base salary and target bonus (less all applicable tax-related deductions);
- the Company will pay, for a period of nine months following your termination date, or until you have secured other employment, or the date on which you are no longer eligible for coverage under COBRA, whichever occurs first, the full employer and employee premium for benefits that you continue pursuant to the Consolidated Omnibus Benefits Reconciliation Act of 1984, as amended ("COBRA"), provided that you timely elect continuation coverage pursuant to COBRA, within the time period prescribed pursuant to COBRA; and
- immediate vesting and exercisability, or immediate release from the Company's repurchase option, as applicable, of the number of shares subject to any unvested stock options or restricted stock previously granted or issued to you that would have vested or been released, as applicable, had you remained an employee for nine months following your termination date (assuming no Change in Control (as defined under the Plan) occurred within such nine month period), provided that a stock option will be subject to such accelerated vesting only if such stock option had commenced vesting (that is, had reached at least its first scheduled vesting date) on or prior to such termination date.

Subject to the Section 409A-related section of this offer letter, the amounts payable to you upon termination, to the extent taxable, shall be paid or commence to be paid within 60 days of your qualifying termination date; provided, however, that if the 60-day period begins in one calendar year and ends in a second calendar year, such payments to the extent they qualify as "non-qualified deferred compensation" within the meaning of Section 409A of the Internal Revenue Code of 1986, as amended (the "Code"), shall be paid or commence to be paid in the second calendar year by the last day of such 60-day period.

For the purposes of this offer letter and any stock option agreement:

“Cause” shall mean, as determined by the Board pursuant to the process below: (i) your continued willful failure, as determined in the reasonable good faith discretion of the Board, to perform your assigned duties or responsibilities as directed or assigned by the Board (other than due to death or Disability) after written notice thereof from the Board describing in reasonable detail the failure to perform providing you a reasonable opportunity to address such alleged failure; (ii) engaging in knowing and intentional illegal conduct that was or is materially injurious to the Company or its affiliates; (iii) any willful violation of a federal or state law or regulation directly or indirectly applicable to the business of the Company or its affiliates, which violation was or is reasonably likely to be injurious to the Company or its affiliates; (iv) any material breach of the terms of any confidentiality agreement or invention assignment agreement between you and the Company (or any affiliate of the Company); or (v) being convicted of, or entering a plea of nolo contendere to, a felony or committing any act of moral turpitude, dishonesty or fraud against the Company or its affiliates. No finding of Cause shall be effective unless and until the Board votes to terminate your employment for Cause at a Board meeting.

“Good Reason” shall mean that you have complied with the “Good Reason Process” (hereinafter defined) following the occurrence of any of the following events without your prior consent: (i) material reduction of your base salary; (ii) a change in your reporting structure such that you are required to report to anyone other than the Chief Executive Officer of the Company or any successor thereto; (iii) material diminution in your authority, duties, or responsibilities with the Company; provided, however, that a reduction in authority, duties, or responsibilities primarily by virtue of the Company being acquired and made part of a larger entity whether as a subsidiary, business unit or otherwise (as, for example, when the Chief Scientific Officer of the Company remains as such following an acquisition where the Company becomes a wholly owned subsidiary of the acquirer, but is not made the Chief Scientific Officer of the acquiring corporation) will not constitute “Good Reason”; (iv) relocation of the Company’s offices more than 30 miles away from the current location; or (v) any material breach by the Company or any successor thereto of this offer letter. “Good Reason Process” shall mean that (i) you have reasonably determined in good faith that a “Good Reason” condition has occurred; (ii) you have notified the Company in writing of the first occurrence of the Good Reason condition within 90 days of the first occurrence of such condition; (iii) you have cooperated in good faith with the Company’s efforts, for a period not less than 30 days following such notice (the “Cure Period”), to remedy the condition; (iv) notwithstanding such efforts, the Good Reason condition continues to exist; and (v) you terminate your employment within 30 days after the end of the Cure Period. If the Company cures the Good Reason condition during the Cure Period, Good Reason shall be deemed not to have occurred.

Vacation, Sick Leave and Holidays:

Over the first year of your employment, you will accrue twenty (20) days of vacation. Thereafter, you will continue to accrue one additional day per year of employment in accordance with the Company’s vacation policies, up to a maximum of thirty (30) days of vacation per year. All vacation is to be taken in accordance with the Company’s vacation policies. In addition, should you become ill, you will be allowed up to five (5) paid sick days, provided that any unused sick days will not be carried over from year to year and will not to be cashed out upon termination, unless otherwise required by applicable law. Additionally, the Company will offer employees at least ten (10) paid holidays per year, as determined annually according to the Company calendar.

Employment-At-Will:

The Company is excited about your commencement of employment and looks forward to continuing a beneficial and fruitful relationship. Nevertheless, you should be aware that your employment with the Company is for no specified period and constitutes at-will employment. As a result, the Company is free to terminate its employment relationship with you at any time, with or without cause, and with or without notice to you. Similarly, you are free to resign at any time, for any reason or for no reason. However, given the importance of your position at the Company, we request that in the event of resignation, you give the Company at least thirty (30) days' prior notice.

Additional Documents and Company Policies:

As a condition of your employment, you will also be required to sign and comply with an At-Will Employment, Confidential Information, Invention Assignment, and Arbitration Agreement (the "Employee Agreement"), which requires, among other provisions, the assignment of patent rights to any invention made during your employment at the Company, and non-disclosure of proprietary information. In the event of any dispute or claim relating to or arising out of our employment relationship, you and the Company agree to resolve the matter through binding arbitration in which (i) you are waiving any and all rights to a jury trial, and (ii) a neutral arbitrator who shall issue a written opinion, as set forth more fully in the Employee Agreement.

You will also be expected to continue to abide by all other applicable Company policies and procedures.

Verification of Eligibility for Employment:

For purposes of federal immigration law, you will be required to provide to the Company documentary evidence of your identity and eligibility for employment in the United States. Such documentation must be provided to us within three (3) business days of your date of hire, or our employment relationship with you may be terminated.

Prior Agreements, Relationships and Conflicts:

If you have not already done so, we ask that you disclose to the Company any and all agreements relating to your prior employment and consulting roles that may affect your eligibility to be employed by the Company or limit the manner in which you may be employed. It is the Company's understanding that any such agreements will not prevent you from performing the duties of your position and you represent that such is the case. Moreover, you agree that, during the term of your employment with the Company, you will not engage in any other employment, occupation, consulting, or other business activity directly related to the business in which the Company is now involved or becomes involved during the term of your employment without the prior written consent of the Chief Executive Officer and the Chairman of the Board, nor will you engage in any other activities that conflict with your obligations to the Company. You agree not to bring any third-party confidential information to the Company, including that of your former employer, and that you will not in any way utilize any such information in performing your duties for the Company.

Section 409A:

Anything in this offer letter to the contrary notwithstanding, if at the time of your separation from service within the meaning of Section 409A of the Code, the Company determines that you are a "specified employee" within the meaning of Section 409A(a)(2)(B)(i) of the Code, then to the extent any payment or benefit that you become entitled to under this offer letter on account of your separation from service constitutes "non-qualified deferred compensation" under Section 409A of the Code or the regulations and guidance thereunder (collectively, "Section 409A"), such payment shall not be payable and such benefit shall not be provided until the date that is the earlier of (A) six months and one day after your separation from service, or (B) your death. If any such delayed cash payment is otherwise payable on an installment basis, the first payment shall include a catch-up payment covering amounts that would otherwise have been paid during the six-month period but for the application of this provision, and the balance of the installments shall be payable in accordance with their original schedule. Each payment, installment and benefit payable under this offer letter is intended to constitute a separate payment for purposes of Section 1.409A-2(b)(2) of the Treasury Regulations. All in-kind benefits provided and expenses eligible for reimbursement under this offer letter shall be provided by the Company or incurred by you during the time periods set forth in this offer letter. All reimbursements shall be paid as soon as administratively practicable, but in no event shall any reimbursement be paid after the last day of the taxable year following the taxable year in which the expense was incurred. The amount of in-kind benefits provided or reimbursable expenses incurred in one taxable year shall not affect the in-kind benefits to be provided or the expenses eligible for reimbursement in any other taxable year. Such right to reimbursement or in-kind benefits is not subject to liquidation or exchange for another benefit. To the extent that any payment or benefit described in this offer letter constitutes "non-qualified deferred compensation" under Section 409A, and to the extent that such payment or benefit is payable upon your termination of employment, then such payments or benefits shall be payable only upon your "separation from service." Similarly, no severance payable to you, if any, pursuant to this offer letter that otherwise would be exempt from Section 409A pursuant to Treasury Regulation Section 1.409A-1(b)(9) will be payable until you have a "separation from service" within the meaning of Section 409A. The determination of whether and when a separation from service has occurred shall be made in accordance with the presumptions set forth in Treasury Regulation Section 1.409A 1(h). The Company and you intend that this offer letter will be exempt from or otherwise comply with Section 409A so that none of the severance or other payments and benefits to be provided hereunder will be subject to the additional tax imposed under Section 409A, and this offer letter will be administered in accordance with such intent. To the extent that any terms or provision of this offer letter is ambiguous as to its exemption from or compliance with Section 409A of the Code, the term or provision, as applicable, shall be read in such a manner so that all payments hereunder are exempt from or comply with Section 409A. In no event will the Company have any obligation to reimburse you for any taxes or costs that may be imposed on or incurred by you as a result of Section 409A. You and the Company agree to work together in good faith to consider amendments to this offer letter and to take such reasonable actions which are necessary, appropriate or desirable to avoid imposition of any additional tax or income recognition prior to actual payment to you under Section 409A.

Acknowledgements:

In accepting this offer, you give us your assurance that you have not relied on any agreements, promises or representations, express or implied, with respect to your employment that are not set forth expressly in this letter. This offer letter may not be modified or amended except in a writing signed by both you and me, as Chief Executive Officer. This letter, along with the Employee Agreement and the Equity Documents, sets forth the entire agreement and understanding between you and Verve with respect to the subject matter hereof and will supersede all prior oral or written agreements relating to such matters. You hereby agree and acknowledge that, effective upon your first day as an employee of the Company, that certain Consulting Agreement, dated May 1, 2019, between you and the Company (the "Consulting Agreement") shall be terminated and you shall cease to accrue additional compensation thereunder, provided that Sections 4, 5, 7 and 8 of the Consulting Agreement shall survive such termination and remain in effect (notwithstanding anything to the contrary in the Consulting Agreement). You further acknowledge that the First Employee Option will be granted in lieu of, and in full replacement for, the Employee Option Grant referenced in the Consulting Agreement.

If this letter correctly sets forth our agreement on the subject matter hereof, kindly sign and return this letter.

Andrew ... I have very much enjoyed working with you over the past few months and I look forward to continuing that work to create one of the great biotech companies of the 21st century!

Sincerely,

/s/ Sekar Kathiresan
Sekar Kathiresan, M.D.,
Chief Executive Officer

Acknowledged and accepted:

/s/ Andrew Bellinger
Andrew Bellinger

Exhibit 21.1

List of Subsidiaries

Name	**Jurisdiction of Incorporation**
Verve Securities Corporation	Massachusetts