REGENXBIO Inc.
Form 10-K
March 03, 2016

UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-K

(Mark One)

x ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2015

or

o TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the transition period from to

Commission file number: 001-37553

REGENXBIO Inc.

(Exact name of registrant as specified in its charter)

Delaware	47-1851754
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification Number)

9712 Medical Center Drive, Suite 100

Rockville, MD 20850

(Address of principal executive offices) (Zip Code)

(240) 552-8181

(Registrant's telephone number, including area code)

Securities registered pursuant to Section 12(b) of the Act:

Common Stock, $0.0001 par value per share	The NASDAQ Stock Market LLC
(Title of each class)	(Name of each exchange on which registered)

Securities registered pursuant to Section 12(g) of the Act:

None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes o No x

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes o No x

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes x No o

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Website, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes x No o

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§ 229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. o

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

Large accelerated filer	o	Accelerated filer	o

Non-accelerated filer x (Do not check if a smaller reporting company) Smaller reporting company o
Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes o
No x

As of June 30, 2015, the last business day of the registrant's most recently completed second fiscal quarter, the registrant's common stock was not listed on any exchange or over-the-counter market. The registrant's common stock began trading on The NASDAQ Global Select Market on September 17, 2015. As of December 31, 2015, the aggregate market value of shares of common stock held by non-affiliates of the registrant was $331.8 million based on the number of shares held by non-affiliates as of December 31, 2015 and based on the last reported sale price of the registrant's common stock on December 31, 2015. For purposes of this disclosure, shares of common stock held by each executive officer, director and stockholder known by the registrant to be affiliated with such individuals based on public filings and other information known to the registrant have been excluded since such persons may be deemed affiliates. This determination of executive officer or affiliate status is not necessarily a conclusive determination for other purposes.

As of March 1, 2016 there were 26,328,584 shares of the registrant's Common Stock issued and outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Specified portions of the registrant's proxy statement with respect to the registrant's 2016 Annual Meeting of Stockholders, which is to be filed pursuant to Regulation 14A within 120 days after the end of the registrant's fiscal year ended December 31, 2015, are incorporated by reference into Part III of this Annual Report on Form 10-K.

REGENXBIO INC.

Form 10-K

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PART I

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains "forward-looking statements" that involve substantial risks and uncertainties. All statements other than statements of historical facts contained in this Annual Report on Form 10-K, including statements regarding our future results of operations and financial position, strategy and plans, and our expectations for future operations, are forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. The words "believe," "may," "will," "estimate," "continue," "anticipate," "design," "intend," "expect," "could," "plan," "potential," "predict," "seek the negative version of these words and similar expressions are intended to identify forward-looking statements. We have based these forward-looking statements on our current expectations and projections about future events and trends that we believe may affect our financial condition, results of operations, strategy, short- and long-term business operations and objectives, and financial needs. These forward-looking statements are subject to a number of risks, uncertainties, assumptions and other important factors, including those described in the sections titled "Risk Factors" and "Management's Discussion and Analysis of Financial Condition and Results of Operations" included in this Annual Report on Form 10-K. In light of these risks, uncertainties, assumptions and other factors, the forward-looking events and circumstances discussed in this Annual Report on Form 10-K may not occur, and actual results could differ materially and adversely from those anticipated or implied in the forward-looking statements. Given these uncertainties, you should not place undue reliance on these forward-looking statements.

Forward-looking statements include, but are not limited to, statements about:

- the timing and success of preclinical studies and clinical trials conducted by us and our development partners;
- the ability to obtain and maintain regulatory approval of our product candidates, and the labeling for any approved products;
- the scope, progress, expansion and costs of developing and commercializing our product candidates;
- our ability to obtain and maintain intellectual property protection for our product candidates;
- our anticipated growth strategies;
- our expectations regarding competition;
- the anticipated trends and challenges in our business and the market in which we operate;
- our ability to attract or retain key personnel;
- the size and growth of the potential markets for our product candidates and the ability to serve those markets;
- the rate and degree of market acceptance of any of our product candidates;
- our ability to establish and maintain development partnerships;
- our expectations regarding federal, state and foreign regulatory requirements;
- regulatory developments in the United States and foreign countries; and
- our plans for the use of our cash and cash equivalents.

Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee future results, level of activity, performance or achievements. Any forward-looking statement made by us in this Annual Report on Form 10-K speaks only as of the date of this report. Except as required by law, we disclaim any duty to update any of these forward-looking statements after the date of such statements are made, or to update the reasons actual results could differ materially from those anticipated in these forward-looking statements, even if new information becomes available in the future.

We encourage you to read the discussion and analysis of our financial condition and our financial statements contained in this Annual Report on Form 10-K. We also encourage you to read Item 1A of Part I of this Annual Report on Form 10-K, entitled "Risk Factors," which contains a more complete discussion of the risks and uncertainties associated with our business. In addition to the risks described above and in Item 1A of Part I of this report, other

unknown or unpredictable factors also could affect our results. There can be no assurance that the actual results or developments anticipated by us will be realized or, even if substantially realized, that they will have the expected consequences to, or effects on, us. Therefore no assurance can be given that the outcomes stated in such forward-looking statements and estimates will be achieved.

As used in this Annual Report on Form 10-K, the terms “REGENXBIO,” “Registrant,” “we,” “us,” and “our” mean REGENXBIO Inc. unless the context indicates otherwise.

INDUSTRY AND MARKET DATA

We obtained the industry, market and competitive position data used throughout this Annual Report on Form 10-K from our own internal estimates and research, as well as from industry and general publications, in addition to research, surveys and studies conducted by third parties. Internal estimates are derived from publicly-available information released by industry analysts and third-party sources, our internal research and our industry experience, and are based on assumptions made by us based on such data and our knowledge of our industry and market, which we believe to be reasonable. In addition, while we believe the industry, market and competitive position data included in this Annual Report on Form 10-K is reliable and is based on reasonable assumptions, such data involves risks and uncertainties and are subject to change based on various factors, including those discussed in “Risk Factors.” These and other factors could cause results to differ materially from those expressed in the estimates made by the independent parties and by us.

ITEM 1. BUSINESS

Overview

We are a leading biotechnology company focused on the development, commercialization and licensing of recombinant adeno-associated virus (AAV) gene therapy. In AAV gene therapy, the viral genes are removed from the AAV, a small, non-pathogenic virus, creating a biological delivery vehicle called a vector. A therapeutic gene sequence is then inserted, creating a recombinant vector. Our proprietary AAV gene delivery platform (our NAV Technology Platform) consists of exclusive rights to over 100 novel AAV vectors, including AAV7, AAV8, AAV9 and AAVrh10 (NAV Vectors). Our mission is to transform the lives of patients suffering from severe diseases with significant unmet medical needs by developing and commercializing gene therapy products administered directly into the body, or in vivo, based on our NAV Technology Platform. We seek to accomplish our mission through a combination of our internal development efforts and the efforts of our third-party licensees (NAV Technology Licensees). As of December 31, 2015, our NAV Technology Platform was being applied in the development of 28 product candidates for a variety of diseases, including five internally developed product candidates and 23 partnered product candidates developed by our NAV Technology Licensees. Most of our NAV Technology Licensees have licensed specific NAV Vectors for the indications they are pursuing. We maintain rights to all unlicensed indications as well as retaining the right to our NAV Technology Platform for unlicensed vectors in disease indications for which we have granted licenses.

We are applying our NAV Technology Platform in an effort to generate a broad pipeline of best-in-class and often first-in-class AAV gene therapy treatments. Our NAV Technology Platform is covered by more than 100 licensed patents and patent applications worldwide. Our product candidates, which are designed for a variety of diseases, incorporate proprietary advances in AAV gene therapy that significantly enhance their profiles as potential therapeutics. The benefits of our NAV Technology Platform have been observed across several clinical trials and studies conducted by our development partners and third-party investigators. Approximately 70% of all AAV gene therapy clinical trials relating to new treatment Investigational New Drug applications (INDs) posted on the United States (U.S.) government clinical trials database from 2012 through 2014 used NAV Vectors.

The foundation of our NAV Technology Platform was discovered in an effort to identify next generation AAV vectors that could overcome the limitations of earlier generation AAV vectors (AAV1 through AAV6). We believe the key benefits of NAV Vectors over earlier generation AAV vectors include:

- higher gene expression;
- longer-term gene expression;
- broad and novel tissue selectivity;
- lower immune response; and
- improved manufacturability.

We believe that gene therapies using our NAV Technology Platform (NAV Gene Therapy) have the potential to transform the treatment paradigm for patients with a wide range of severe diseases with significant unmet medical needs. NAV Vectors have demonstrated stable expression in animals for over eight years. Moreover, AAV8 vectors have demonstrated stable expression for over four years in a clinical trial for the treatment of hemophilia B.

In certain monogenic, recessive diseases, NAV Gene Therapy may provide clinical benefits for patients that are substantially greater than currently available therapies. In other types of diseases, such as hemophilia, NAV Gene Therapy has the potential to replace a lifetime of continuous treatment of standard protein replacement therapy and other treatment approaches with a single treatment, which could reduce health care system costs while also improving patients' quality of life. We believe that the potential efficiency and broad applicability of our NAV Technology Platform may allow us to develop NAV Gene Therapy treatments that are injected or infused into the bloodstream, spinal fluid or directly into the target tissue to treat a wide range of diseases.

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Our internal and partnered product development program pipeline is shown below.

We currently plan to build internal gene therapy franchises in the metabolic, neurodegenerative and retinal therapeutic areas, and develop multiple product candidates in each area. Our most advanced programs are for the treatment of two severe genetic diseases, homozygous familial hypercholesterolemia (HoFH) and Mucopolysaccharidosis Type I (MPS I). An IND to support a Phase

I/II clinical trial to evaluate the effect of RGX-501 for the treatment of HoFH is active. We expect a Phase I/II clinical trial for RGX-501 to be initiated in the first half of 2016. We expect to file an IND with the U.S. Food and Drug Administration (the FDA) for RGX-111, our program for MPS I, in the first half of 2016 to support a Phase I/II clinical trial, which we expect to initiate in mid-2016. We also have a preclinical program for wet age-related macular degeneration (wet AMD) for which we expect to file an IND with the FDA in the second half of 2016 and a preclinical program for Mucopolysaccharidosis Type II (MPS II) for which we expect to file an IND with the FDA in the first half of 2017.

Our partnered development pipeline benefits from the disease-specific expertise of our NAV Technology Licensees. Our partnering strategy provides us the flexibility to sublicense development of treatments designed to address significant unmet medical needs, while remaining focused on our core programs and therapeutic areas internally, which we believe enables us to achieve maximum value. We believe that the broad applicability of our NAV Technology Platform and any clinical successes of the treatments utilizing NAV Vectors will create new internal and partnered pipeline opportunities.

As an innovator in AAV gene therapy development, our intellectual property strategy is designed to provide us with extensive protection for our product candidates and our NAV Technology Platform. We currently have exclusive rights to over 100 patents and patent applications worldwide covering our NAV Vectors, including composition of matter claims for AAV7, AAV8, AAV9 and AAVrh10, as well as methods for their manufacture and therapeutic uses. We believe this patent portfolio forms a strong foundation for our current programs and with our ongoing research and development, we expect to continue to expand this substantial patent portfolio. Our licensed patents not only seek to protect our key assets - our NAV Technology Platform and our internal product candidates - they also form the basis for licensing and partnering arrangements.

Our company was formed from a successful collaboration that began in February 2009 between FoxKiser LLP, the University of Pennsylvania (together with The Trustees of the University of Pennsylvania, Penn) and gene therapy pioneer James Wilson, M.D., Ph.D. We have built on the foundation of this collaboration to produce what we believe to be compelling NAV Gene Therapy product candidates derived from discoveries and research in Dr. Wilson’s lab. As our team has grown, we have continued to build on our scientific foundation, adding depth in gene therapy and biotechnology leadership. Our management team includes leaders who are experienced in building and operating innovative healthcare ventures and have expert knowledge in the development of AAV gene therapy. We believe the strength of our team coupled with the depth of knowledge of our scientific founder and advisors position us to succeed in developing and bringing to market, independently or with our development partners, unique, best-in-class gene therapy treatments for a range of severe diseases with significant unmet medical needs.

Our Strategy

Our mission is to transform the lives of patients suffering from severe diseases with significant unmet medical needs by developing and commercializing in vivo gene therapy products based on our NAV Technology Platform. We are seeking to develop, manufacture, commercialize and license product candidates across multiple therapeutic areas while continuing to expand our NAV Technology Platform. To achieve our mission, we are pursuing the following strategies:

- Apply our proprietary, next generation AAV vector technology to develop in vivo gene therapies for patients. We believe in vivo gene therapy is an ideal treatment paradigm for many diseases with sub-optimal or non-existent therapies because of its potential to correct an underlying genetic defect, rather than just treating a patient’s symptoms. We believe our NAV Technology Platform will prove to be a significant advancement over earlier AAV vectors. Based on data derived from third-party clinical studies using our NAV Vectors, we believe our NAV Technology Platform possesses unique, beneficial properties that are not seen in earlier generation AAVs. We

believe that our NAV Technology Platform, which underpins our internal development programs and the programs of our NAV Technology Licensees, will enable us and our partners to develop best-in-class gene therapy candidates for a wide range of disease targets due to these unique properties.

- Focus on rapidly advancing our internal lead proprietary development programs in metabolic, neurodegenerative and retinal diseases. Both HoFH and MPS I are diseases with high unmet clinical need and current treatments that are sub-optimal or non-existent. An IND to support a Phase I/II clinical trial to evaluate the effect of RGX-501 for the treatment of HoFH is active. We expect a Phase I/II clinical trial for RGX-501 to be initiated in the first half of 2016. We expect to file an IND for MPS I in the first half of 2016 and expect to initiate a Phase I/II clinical trial for MPS I in mid-2016. If we are successful in achieving proof-of-concept in the Phase I/II clinical trials for these diseases, we will pursue registration trials and commercialization of such product candidates. In addition, we plan to progress our product development programs for wet AMD and MPS II toward clinical trials and expect to file INDs for these programs in the second half of 2016 and the first half of 2017, respectively.

- Establish gene therapy franchises in our current core therapeutic areas of metabolic, neurodegenerative and retinal diseases. After human proof-of-concept is achieved in a disease, we believe we will be able to apply what we have learned and use our NAV Technology Platform to more rapidly develop new product candidates for many similar diseases. Once an appropriate vector and route of administration for a particular disease type have been established, a new gene can be inserted into the appropriate vector and the established route of administration can be used for other similar diseases. We expect to use this approach to further build the foundation for our neurodegenerative disease franchise by filing an IND in the first half of 2017 for our MPS II program and moving to clinical trials thereafter if we are able to demonstrate human proof-of-concept in MPS I. We believe that this approach is also applicable to metabolic and retinal diseases, as well as many other therapeutic areas, and will allow us to efficiently generate product candidates for diseases in and beyond our current areas of therapeutic focus.
- Further grow the pipeline of products based on our NAV Technology Platform through strategic in-licensing and sublicensing of new programs. We also plan to grow the pipeline of commercial product development programs using our NAV Technology Platform through licensing. For example, we plan to pursue in-licensing for programs we deem to be the most promising research programs using our NAV Vectors. We intend to continue to selectively sublicense our NAV Technology Platform for specific vector and indication combinations to additional NAV Technology Licensees. Strategic sublicensing allows us to maintain our internal product development focus in our core disease indications and therapeutic areas while still expanding the NAV Gene Therapy pipeline, developing a greater breadth of treatments for patients, providing additional technological and potential clinical proof-of-concept for our NAV Technology Platform, and creating potential additional revenue.
- Maintain and grow our extensive intellectual property portfolio. We plan to leverage our intellectual property rights and substantial expertise in AAV gene therapy in order to develop and commercialize NAV Gene Therapy treatments. We have licensed exclusive rights to a broad portfolio of certain fundamental AAV gene therapy patents and patent applications. In securing these rights, we have focused on obtaining robust rights for those intellectual property assets we believe will be most important in providing us with a competitive advantage with respect to AAV gene therapy treatments. We plan to continue to seek to protect and enhance the proprietary technology, inventions, and improvements that are commercially important to the development of our business.

Our Strengths

We believe our technology, expertise and know-how will allow us to maintain our leadership position in the gene therapy field. Our strengths include the following:

- Our NAV Technology Platform, for which we have an exclusive worldwide license.
- Strong clinical data supporting proof-of-concept of our NAV Technology Platform from three separate reported Phase I/II third-party clinical trials using AAV8 for the treatment of hemophilia B and a clinical trial using AAV9 for the treatment of spinal muscular atrophy type I (SMA Type I).
- The largest pipeline of programs in AAV gene therapy with 28 total product candidates that use our NAV Technology Platform as of December 31, 2015, consisting of our five internal programs and 23 partnered product candidates being developed by our NAV Technology Licensees.
- Two internal programs, RGX-501 for the treatment of HoFH and RGX-111 for the treatment of MPS I, which we expect to advance into clinical trials in the first half of 2016 and mid-2016, respectively.
- Three ongoing clinical trials being conducted by our NAV Technology Licensees targeting diseases with significant unmet needs: SMA Type I, Mucopolysaccharidosis Type IIIA (MPS IIIA) and hemophilia B. There are no currently approved treatments for SMA Type I or MPS IIIA.
- Our NAV Technology Platform expertise, which allows us to apply what we may learn in a specific disease program to similar diseases, enabling us to rapidly develop additional product candidates for related disease indications.
- Our long-standing relationships with academics, leading research institutions, scientists and scientific advisors who have vast experience in the field of gene therapy and contribute key insights and significant developments to the field.

The Broad Potential and Application of Gene Therapy

The concept of developing human therapies involving the delivery of external genes has existed for decades, driven by the arrival of recombinant technology and the early demonstrations by scientists of the ability to deliver and drive expression of external gene sequences in mammalian cells.

We believe that gene therapy has the potential to become a new and important class of treatment because it may offer the following benefits:

- Ability to treat a broad range of diseases. Given the availability of the sequence of the entire human genome, it could be possible to design gene therapy to express or effect expression of any human protein whose presence, absence or activity causes disease.
- Ability to target mechanisms that cannot be targeted effectively by existing drug classes. Many proteins that play roles in disease cannot be targeted effectively with small molecules and therapeutic proteins. These limitations on small molecule and protein drugs may not apply to gene therapy, which we believe can be designed to target any gene in the genome.
- Inherently specific, natural and therefore potent mechanism of action. Gene therapy is designed to result in proteins specifically targeting the underlying cause of a disease and that are produced naturally in humans. This mechanism has the inherent theoretical benefit of creating more potent treatments with a reduced risk of inactivation.
- Simplified discovery of treatment candidates. Identification of small molecule and protein drug candidates typically requires screening of a large number of potential candidates to find prospective leads. Identification of gene therapy candidates has the potential to be simpler and take considerably less time because it can involve relatively standard processes that can be applied in a similar fashion to many successive product candidates.
- Ability to create convenient treatment profiles. Because gene therapies are designed to deliver a long-term effect with a single administration, a single gene delivered via gene therapy could potentially do the same work of administering conventional drugs for many years.

Historically, the primary challenge for gene therapy has been the delivery of genes into cells. Genes are made of deoxyribonucleic acid (DNA), which is a large, highly charged molecule that is difficult to transport across a cell membrane and deliver to the nucleus, where it can be transcribed and translated into protein. The genetic material needs to be delivered efficiently and to the desired target tissues and cell types, which will vary depending on the disease to be treated. Based on this need, scientists have designed and developed a variety of gene vectors in order to facilitate gene delivery in cells.

To date, the study of gene vectors as treatments in humans has involved approaches with in vivo and ex vivo techniques using a variety of different gene vectors. Each approach presents different features and benefits for the treatment of a particular disease. Ex vivo gene therapy approaches generally are employed to target correction in blood and bone marrow. These methods typically involve harvesting and isolating a patient's own cells. Both the patient and cells undergo several preparatory steps to allow for modification of the cells by gene vectors. Ultimately, the modified cells are re-administered to the patient. In vivo gene therapy approaches involve directly administering (e.g., by infusion or injection) gene vectors into patients in order to reach desired cells in target tissues (e.g., liver, brain, eye, muscle, heart). These methods rely on a combination of the route of administration and the gene vectors themselves to facilitate the correction in the target tissues. We focus on in vivo gene therapy.

Among vectors available for in vivo gene therapy, viral vectors have been adopted with the greatest frequency because they have demonstrated the greatest efficiency in gene delivery to date. This efficiency exists because viral vectors are derived from naturally occurring viruses whose normal life-cycle relies on gene delivery of their own genomes. In other words, they are naturally optimized to deliver genes to cells. Many viral vectors have presented sub-optimal safety profiles for in vivo treatment in humans because the viruses from which they are derived are pathogenic (causing disease), immunogenic (causing immune response) or create genomic toxicity (delivering a gene to a place where it interrupts normal function). Vectors derived from adenovirus, herpes virus and retroviruses have been tested as in vivo viral vectors.

Vectors derived from AAV have among the best safety profiles for gene therapy given that AAVs are not known to be associated with disease in humans. The earlier generation AAV vectors were designed by scientists in the mid-1980s and the first clinical trials using AAV began in the mid-1990s. There were only a handful of AAV vectors available to

scientists at the time of the first clinical trials because AAV vectors were designed based on the capsid (the protein shell of a virus that encloses the genetic material of the virus) of AAV viruses known to be in existence and only six distinct serotypes (groups within a single species of microorganisms, such as bacteria or viruses, which share distinctive surface structures) had been discovered at that time. These earlier generation AAV vectors were shown to be limited in their application due to a variety of limitations and challenges, including:

- low or unmeasurable gene expression, meaning the delivered gene was enabling production of low or unmeasurable amounts of the therapeutic protein;
- short-term gene expression, meaning if gene expression was measurable, it was transient;

- limited tissue selectivity, meaning concentrated gene expression was not observed in the target organ; and
- high levels of immune response, meaning the body may neutralize the gene delivery vector with pre-existing antibodies or generate T-cells that inhibit the therapeutic effect.

Discovery of Next Generation AAV

In recognition of the limitations and challenges of earlier generation AAV vectors, an effort was undertaken in the early 2000s at Penn to discover other naturally occurring AAV sequences. The identification of such sequences was based on the observation that wild-type AAV (in contrast to recombinant AAV) can undergo a latent cycle in which the AAV genome stays within the cell, meaning the virus, including its capsid gene sequence, remains intact within the cell but does not reproduce. This allowed for identification of new sequences not by purifying viruses from tissues, but by searching for capsid gene sequences in a variety of tissues isolated from non-human primates and from humans, based on regions of the AAV capsid gene that did not vary between the known AAV vectors. By searching for capsid gene sequences in this manner, many more capsid protein sequences were discovered than would have been found by purifying viruses from tissues.

More than 100 new capsid sequences were identified by the process. The first few were initially designated AAV7, AAV8 and AAV9, after which, other sequences were identified by species from which it was isolated (e.g., “rh” indicating rhesus macaque) followed by a number (e.g., 10, for rh10). Early characterization of the initial discoveries of AAV7, AAV8, AAV9 and AAVrh10 suggested that these vectors may be significantly more efficient in various applications important for clinical translation than other previously known AAVs.

After patenting the next generation AAV vectors, Penn initiated a distribution program through a material-transfer process that enabled researchers to access the next generation AAV vectors for research use only, under specific restrictions. Thousands of custom reagents were sent to independent researchers, who began to characterize and validate the beneficial features of AAV vectors in animal models of disease. In 2010, the first clinical trials were conducted using the next generation AAV vectors and initial proof-of-concept and safety in humans was established from these trials. These clinical trials also produced longer-term efficacy results which reinforced our belief that these next generation vectors have beneficial properties not seen in the earlier generation AAV vectors.

We believe the next generation AAV vectors, which form the basis of our NAV Technology Platform, have many improved properties relative to earlier generation AAV vectors for development and commercialization of AAV treatments, including:

- higher gene expression;
- longer-term gene expression;
- broad and novel tissue selectivity;
- lower immune response; and
- improved manufacturability.

Our Proprietary NAV Technology Platform for Gene Delivery

Our NAV Technology Platform has been used in several clinical trials conducted by our partners and third-party investigators. In 2009, we licensed rights to the next generation AAV vectors discovered at Penn. Our NAV Vectors form the foundation of our NAV Technology Platform.

We are developing therapeutics using NAV Vectors that contain genes which are synthesized to code for the expression of therapeutic proteins in target cells to correct the underlying causes of the diseases we seek to treat. Each product candidate is designed with a NAV Vector for a specific cell target and to express a specific protein. We incorporate proprietary modifications to both the AAV and the gene which enhance properties such as potency, stability and tissue distribution. Our proprietary modifications, including the use of vectors derived from novel

sequences of AAV such as AAV7, AAV8, AAV9 and AAVrh10, are protected by over 100 licensed patents and patent applications. The rights to our NAV Technology Platform provide our product candidates with what we believe to be a competitive advantage over product candidates developed with earlier generation AAV vectors due to the novel and beneficial properties of our NAV Vectors.

Clinical Validation of Our NAV Technology Platform

History of the Development of AAV8 in the Treatment of Hemophilia B

Hemophilia is a genetic bleeding disorder that prevents the blood from clotting normally. The main symptom is uncontrolled, often spontaneous bleeding. Internal bleeding into the joints can result in pain, swelling and, if left untreated, can cause permanent damage. Hemophilia B is caused by mutations in the gene encoding the clotting factor, Factor IX (FIX).

A collaboration among scientists and clinicians at St. Jude Children's Research Hospital and University College London established the first human proof-of-concept using AAV8 to deliver and express a gene in the liver. The results of these translational studies and clinical trial present an informative translational road map.

- Mice studies demonstrate correction of bleeding episodes. In 2006, preclinical studies were reported involving a single intravenous administration of an AAV8 vector encoding the human Factor IX (hFIX) gene that resulted in greater than normal levels of hFIX and correction of the bleeding diathesis in FIX knock-out mice.
- Non-human primate studies demonstrate long-term hFIX expression. In 2011, preclinical studies were reported involving a single intravenous administration of an AAV8 vector encoding the hFIX gene that resulted in peak levels of hFIX of approximately 420% of normal.
- Human clinical trial demonstrates reduction in disease severity. In 2011, the New England Journal of Medicine published results from a clinical trial involving a single, intravenous administration of an AAV8 vector encoding the hFIX gene to six subjects with severe hemophilia B. This trial resulted in increased levels of hFIX sufficient to improve severe hemophilia B to a mild or moderate disease state.

Researchers at St. Jude Children's Research Hospital, studying hemophilia B patients, used AAV8 encoding the FIX protein delivered intravenously to target the liver, and used the liver as a depot for producing and secreting the needed FIX. In the study, six patients with FIX levels of less than one percent of normal were treated in an ascending dose study and then the highest dose was extended to another four patients. Reports indicate that the treatment was well-tolerated and demonstrated therapeutic, sustained levels of FIX expression in all patients. All patients were expressing levels of FIX post-treatment at levels at or above two percent of normal, converting them to patients with moderate disease. Several high dose patients have sustained levels at eight percent of normal, placing them in the mild disease group. Most patients have been able to stop prophylactic FIX infusions. The main vector-related adverse event was an elevated serum alanine aminotransferase level, which we believe may be attenuated by a short, tapering course of steroid.

The clinical trial described above was the strongest example of efficacy evidence in any AAV vector clinical trial. Expression has been stable, with the earliest dosed patient showing expression and long-lasting amelioration of bleeding episodes for over four years. A previous clinical trial in hemophilia B using AAV2 did not have observed evidence of efficacy, so the St. Jude clinical trial was notable for reporting evidence of preliminary efficacy in this disease and in suggesting the importance of NAV Vectors.

Subsequently, two additional groups have reported human proof-of-concept using AAV8-mediated gene therapy to deliver and express a gene in the liver for the treatment of hemophilia B. NAV Vectors have been further validated in a more recent clinical trial by Baxalta US Inc. (formerly Baxter Healthcare) (Baxalta) in hemophilia B. Baxalta employs an AAV8 vector which differs by encoding a gene for a naturally occurring mutant of FIX which has higher activity. Baxalta has recently reported that two patients in the mid-dose cohort have experienced no bleeds without regular infusions of FIX and one of these patients has had sustained FIX expression levels of 20% to 25% of normal FIX levels for 12 months. In the highest dose cohort, FIX expression levels have peaked above 50%, though the two patients in this cohort experienced an immune response which has led to decreased FIX expression, with one patient resuming regular FIX infusions. Baxalta has exclusive rights to use AAV8 for the treatment of hemophilia B from a

license executed directly with GSK which predates our licensing of the NAV Technology Platform.

Development of AAV9 in the Treatment of SMA Type I

SMA Type 1 is a lethal genetic disorder caused by a defect in the survival of motor neuron 1, telomeric (SMN1) gene that codes the survival motor neuron (SMN) protein, which is necessary for survival of motor neurons. Motor neurons are a critical component of the pathway that carries signals from the brain to muscle cells and SMA Type I is characterized by motor neuron loss and associated muscle deterioration. SMA Type I is the leading genetic cause of infant mortality and results in mortality or the need for permanent ventilation support before the age of two for greater than 90% of patients. There is currently no FDA-approved treatment for SMA Type 1.

Our NAV Technology Licensee, AveXis, Inc. (AveXis), is developing AAV9 encoding the SMN protein administered intravenously to target the lower motor neurons for the treatment of SMA Type I. AveXis has fully enrolled a Phase I clinical trial

with 15 patients, three in the low-dose cohort who completed dosing in September 2014 and 12 in the high-dose cohort who completed dosing in January 2016. Patients must have been no older than nine months of age (for the first nine patients) and six months of age (for the last six patients) when dosed. Recently, AveXis reported preliminary results in the study, which we believe has the potential to demonstrate strong efficacy evidence and proof-of-concept for treatment of a severe genetic CNS disease using AAV9.

Clinical Use of NAV Technology

Our NAV Technology has been used by our NAV Technology Licensees in clinical trials. In 2010, major milestones were achieved with the initiation of two investigator-sponsored studies using NAV Vectors. As noted above, clinical trials for hemophilia B using AAV8 have met safety and efficacy endpoints. Additionally, we believe preliminary clinical trial results for SMA Type I using AAV9 may demonstrate efficacy evidence and proof-of-concept. The hemophilia B study has generated evidence of durable gene expression in patients for over four years. Since the initial investigator-sponsored trials began in 2010, we believe 13 additional clinical trials have been initiated using NAV Vectors by our NAV Technology Licensees or other third parties. In addition, an IND for RGX-501 is active. All diseases targeted in 16 clinical trials using NAV Vectors of which we are aware as of December 31, 2015 are set forth in the graphic below.

Key Potential Benefits of NAV Technology

The properties that make NAV Vectors unique from and potentially an improvement to earlier generation AAV vectors, as well as provide support that they are potentially best-in-class for development and commercialization of AAV treatments, are set forth in the pages that follow.

Higher Gene Expression

NAV Vectors have been shown to generate higher levels of gene expression in animals than earlier generation AAV vectors such as AAV2. In mice livers, one of our NAV Vectors, AAV8, produced levels of gene expression that were 10- to 100-fold higher than was achieved with AAV2. The figure below shows the contrast in the amount of gene expressed using the two vectors.

AAV Transduction in Mouse Liver

In this experiment, the reporter gene LacZ, a gene which encodes a protein that turns a clear substrate blue in a specific medium, was included in the transgene sequence delivered by the vector so that cells expressing the transgene are stained blue, visually denoting expression level. It was possible to transduce the entire mouse liver and achieve long-term expression with AAV8. Higher gene expression creates the possibility of achieving therapeutic benefit in more diseases than was possible using earlier AAV vectors, as more therapeutic protein is generated with vectors that enable higher expression.

Longer-Term Gene Expression

We believe the longer-term gene expression seen using NAV Vectors is due to more stable genomic persistence and reduced cellular immunity, which are a function of novel capsid structure and lower dosing required using NAV Vectors due to the greater gene expression discussed earlier. NAV Vectors have demonstrated stable expression in animals for over eight years. Moreover, AAV8 vectors have demonstrated stable expression for over four years in clinical trials for hemophilia B patients.

Broad and Novel Tissue Selectivity

NAV Vectors also display high levels of tissue specificity. This property is important because it allows for development of therapeutics to target cells that earlier generation AAV vectors do not target or do not target well. In the CNS, AAV9 has emerged as a vector that enables efficient gene delivery when directly injected into the brain. This was aided by the ability of AAV9 to be transported throughout the brain, enabling broader delivery with a single injection.

NAV Gene Therapy has demonstrated novel tissue selectivity for the CNS when delivered intravenously. Intravenous delivery of AAV9 resulted in efficient gene expression in the brain and spinal cord, and this route of administration produced results in both small and large animals, including non-human primates. This was the first time a gene therapy vector was demonstrated to cross the blood-brain barrier. This route of administration has recently been used clinically by one of our NAV Technology Licensees to treat SMA Type I.

NAV Vectors have also shown novel properties in the eye when investigated for the treatment of acquired disease and inherited retinal degenerations. AAV8 expressing a fluorescent protein was administered by subretinal injection in the non-human primate eye in order to show gene expression in the retina itself, which contains the cell types to be treated. As is depicted in the graphic below, a cross-section of the non-human primate retina below showed more efficient gene delivery (as demonstrated by the much greater amount of the fluorescent protein expressed) with AAV8 as compared to AAV2 in the retinal pigment epithelium (RPE) and to the photoreceptor (PR) layer. The majority of genes associated with retinal degeneration are located in the RPE and PR layer. These genes influence the cell's development or function and are therefore critical to most inherited retinal degenerations.

AAV Transduction of Layers in the Non-Human Primate Eye[(1)]

(1) Science Translational Medicine: Dosage Thresholds for AAV2 and AAV8 Photoreceptor Gene Therapy in Monkey, Luk H. Vandenberghe, et al. (2011). Reprinted with permission from the American Association for the Advancement of Science.

Lower Immune Response

Lower immune response to the gene therapy vector used to deliver the transgene is important for longer-term gene expression, higher expression and higher potency. Data indicate that more than 50% of certain human populations have a high level of neutralizing antibodies (NAbs) for the earlier generation vector AAV2. This represents a major obstacle to the effective use of these earlier generation AAV vectors due to the inhibition of gene delivery via particle neutralization in circulation, meaning pre-existing antibodies neutralize the vector with the transgene before it can reach the target cells. By contrast, frequency of neutralizing antibodies for AAV8 is consistently lower than for AAV2. In a French study, for example, AAV2 NAbs occurred at a frequency of 59% compared to 19% for AAV8. Thus, AAV8 is a candidate for liver-directed gene delivery in a higher proportion of the population than AAV2.

Additionally, reduced effect from the generation and reactivity of T-cells to NAV Vectors has been demonstrated, relative to earlier generation AAV vectors. Activation of T-cells to the capsid of AAV2 vectors has been implicated in liver toxicity in a clinical trial for the treatment of hemophilia B. A patient in this clinical trial developed an elevation of liver enzymes and subsequently lost expression. This led to a hypothesis that capsid protein antigens and memory T-cell activation may lead to clearance of AAV-transduced cells. To further investigate this kind of toxicity, scientists reported a study that evaluated T-cell responses to AAV vectors after administration to mice and nonhuman primates. In this study, high levels of T-cells specific to capsids of AAV2 were detected. AAV8, however, did not lead to activation of capsid-specific T-cells. In a more recent clinical trial for the treatment of hemophilia B, using AAV8, there was less of an effect from T-cells generated and reactive with AAV8. We believe this is likely a function of the lower doses that can be used as well as the structure of the vector itself.

Improved Manufacturability

The manufacturing process for NAV Vectors can be designed to reduce the number of difficult processing steps required for the earlier AAV vectors, improving overall yield at larger scale. NAV Vectors are derived from naturally "fit" viruses, which are stable structures that efficiently assemble, in contrast to the earlier generation AAV vectors. During production, NAV Vectors are secreted by AAV producer cells, eliminating the need for lysing (breaking down of the membrane of a cell, often by viral, enzymic or osmotic mechanisms that compromise the cells integrity) of

cells, which can complicate purification and impact yield. This is a novel aspect of NAV Vectors that increases yield and efficiency in production.

Our NAV Gene Therapy Product Candidates

We have developed an internal pipeline of product candidates across the therapeutic areas of metabolic, neurodegenerative and retinal diseases. Below is a table summarizing our current internal development programs.

Metabolic Diseases

Our product development pipeline includes treatment candidates for liver-targeted expression of genes. The selected candidates for our programs seek to leverage lessons learned from previous reports of preclinical and human proof-of-concept studies conducted by third-party investigators and our partners using our NAV Technology Platform. Based on these studies and our own research, we believe our NAV Technology Platform demonstrates promising properties for applications that involve gene delivery to liver cells that may result in long-term, high-level expression of protein.

Historically, a clinical trial for the treatment of hemophilia B using AAV2 vectors that were administered to achieve expression of genes in the liver did not produce evidence of efficacy. Reported data from this study generally did not show any measureable levels of expression sufficient to correct disease symptoms. In subjects where measureable expression levels were reported, gene expression faded over a short period of time. We believe selecting different AAV vectors will increase the levels and duration of expression.

The first clinical milestone of AAV-mediated liver gene therapy occurred in 2011 in the trial described previously for the treatment of hemophilia B using AAV8 in which some patients were able to discontinue prophylactic FIX injections. In 2014, the same group reported in a study update that the treatment was shown to be durable for over four years and that long-lasting efficacy results were reported in the patients treated. Subsequently, two additional groups have reported human proof-of-concept using AAV8-mediated gene therapy to deliver and express a gene in the liver for the treatment of hemophilia B.

Recently, our academic collaborators demonstrated in a MPS I feline model that liver directed -l-iduronidase (IDUA) gene delivery using AAV8 resulted in persistent, normal levels of IDUA in the blood. In most cases, the treatment also resulted in cross-correction (cells that are transduced with vector can release enzyme, which is taken up by non-transduced cells) in most tissues including complete resolution of disease pathology in some tissues normally not responsive to enzyme replacement therapy (ERT).

We intend to advance a pipeline of programs in certain metabolic diseases that will be enhanced by the benefits of NAV-mediated liver gene therapy. Our initial focus will be on a severe lipid disorder, HoFH.

RGX-501 for the Treatment of HoFH Caused by LDLR Mutations

Overview of HoFH

HoFH is a monogenic disorder caused by abnormalities in the function or expression of the low-density lipoprotein receptor (LDLR) gene. LDLR plays an important role in the regulation of cholesterol by facilitating uptake and degradation of low-density lipoprotein (LDL) in the liver. LDL is the primary carrier of cholesterol in the blood and has been implicated in the development of plaque buildup in the arteries. HoFH patients have very low levels or are completely deficient of LDLR, resulting in very high total blood cholesterol levels which are typically greater than 500 milligrams per deciliter (mg/dl). This leads to premature and aggressive plaque buildup, life threatening coronary artery disease (CAD) and aortic valve disease. Over time, patients with HoFH develop atherosclerosis, or narrowing and blockage of the arteries, which leads to a high incidence of heart attacks in children and teenagers, among other severe symptoms. If untreated, HoFH patients usually die of causes related to CAD or aortic valve disease before the age of 30.

Recently published medical literature suggests that the worldwide prevalence of HoFH is estimated to be as high as 1 in 200,000. Based on disease severity and molecular characteristics, we estimate there are approximately 11,000 individuals globally who are primary candidates for gene therapy treatment of HoFH. Multiple studies have compared HoFH patients based on LDLR activity and have shown small differences in residual activity can lead to significant reductions in cholesterol levels and better long-term outcomes.

Current Therapies for HoFH

The current standard of care in HoFH focuses on early initiation of aggressive treatment because of the severe clinical effects of elevated LDL-C. Unfortunately, available treatment options are limited. Lipoprotein apheresis, a physical method of purging the plasma of LDL-C, requires weekly or biweekly treatment in order to maintain effect. The procedure is laborious, requiring frequent intravenous access that can be challenging, expensive and not readily available. Other available treatments include statins, a class of pharmaceuticals commonly used to lower cholesterol levels, cholesterol absorption inhibitors and other cholesterol lowering medications. Recently, two new drugs have been approved by the FDA as add-on therapy specifically for HoFH: lomitapide and mipomersen. Both result in a reduction of LDL-C, but their use is associated with an array of adverse events that may affect tolerance and long-term adherence. These therapies do not provide a cure for the disease and their use is limited due to tolerability and drug availability. Despite the implementation of an aggressive multi-drug therapy approach, the LDL-C levels of HoFH patients remain elevated and mean life expectancy remains at approximately 32 years. With all current therapies, even in combination, providing sub-optimal treatment for patients, a better solution is needed. We believe HoFH is a promising target for gene therapy.

In July and August 2015, respectively, the European Commission and the FDA approved Repatha (Amgen) for the treatment of high cholesterol and HoFH, among other indications. In July 2015, the FDA also approved Praluent (Sanofi-Aventis) for the treatment of high cholesterol. In September 2015, the European Commission approved Praluent for adults with primary hypercholesterolemia (heterozygous familial and non-familial) or mixed dyslipidaemia. Repatha and Praluent represent the first drug approvals in a new class of drug called PCSK9 inhibitors. PCSK9 inhibitors are designed to bind to a protein called PCSK9 and inhibit PCSK9 from binding to LDLR on the liver surface. In the absence of PCSK9, there is more LDLR on the surface of the liver to remove LDL-C from the blood. We believe that the emergence of PCSK9 inhibitors as therapy will increase the opportunity and awareness for the profile of RGX-501 by helping to identify more patients who may benefit from its product profile. A clinical trial evaluating a PCSK9 inhibitor demonstrated that its effectiveness relies on patients having functional LDLR. We believe that a substantial unmet medical need remains for the population of HoFH patients who are LDLR negative or severely deficient in LDLR function. We believe that RGX-501, by restoring or increasing LDLR function, may

enhance the impact of PCSK9 inhibitors in the treatment of many patients with high cholesterol and as prescribers explore combination therapies.

RGX-501

RGX-501 is our product candidate for the treatment of HoFH, which uses the AAV8 vector to deliver the human LDLR gene to liver cells. We believe that the liver is the preferred target organ for gene therapy of HoFH since LDLRs produced in the liver contribute to greater than 90% of the capture and breakdown of LDL, making the liver by far the most important LDLR producing organ. Additionally, the liver is also the only organ capable of excreting cholesterol from the body, a function that is critical to the maintenance of cholesterol balance. Finally, studies have shown that liver transplantation in HoFH patients corrects the disease, providing strong support that correction of hepatic LDL receptor activity by gene therapy is sufficient for metabolic correction of the disease.

Preclinical Proof of Concept for RGX-501

In order to evaluate the potential for RGX-501 for the treatment of HoFH, mouse LDLR liver-directed gene therapy with AAV8 was evaluated in mouse models of HoFH by our scientific collaborators at Penn. Mice were injected intravenously with the vector and followed for metabolic correction and reversal of pre-existing atherosclerotic lesions. Animals were also evaluated for gross clinical toxicity and abnormalities in serum transaminases, an indicator of liver damage. Animals in the Penn study receiving the vector showed a near complete normalization of hypercholesterolemia that remained stable for almost a year, as well as a substantial regression of atherosclerosis over two months as assessed by two independent methods of quantification at two different sites within the aorta. There was no vector induced toxicity of the liver based on histopathology and clinical chemistry.

(1) PLOS One: Gene Therapy in a Humanized Mouse Model of Familial Hypercholesterolemia Leads to Marked Regression of Atherosclerosis, Sadik H. Kassim and Hui Li, et al. (October 2010).

Planned Clinical Development of RGX-501

An IND to support the initiation of a dose-escalation Phase I/II clinical trial of intravenously administered RGX-501 in the U.S. in patients with HoFH became active in November 2015 (ClinicalTrials.gov Identifier: NCT02651675). We expect a Phase I/II clinical trial for RGX-501 to be initiated in the first half of 2016. The trial is a single ascending dose design with a formal safety assessment of the lower dose group prior to dose escalation. The trial design calls for enrollment of up to 12 subjects and is intended to be a single center study. The primary endpoint will be a safety assessment. The secondary endpoints will be reduction in LDL-C and other outcome measures. Based on previous clinical trials and recent approvals in HoFH, we believe reduction in LDL-C is an endpoint that is an acceptable measure on which regulatory approval could be based.

The U.S. National Institutes of Health (NIH) Office of Biotechnology Activities' Recombinant DNA Advisory Committee (the RAC) reviewed the draft protocol for our HoFH Phase I/II clinical trial which we submitted in January 2012. In March 2012, we presented the protocol to the RAC and received subsequent communication from the RAC in March 2012 endorsing the protocol with comments. We have incorporated the RAC's recommendations into the final protocol. Results from this Phase I/II clinical trial will guide us in finalizing the design of a pivotal Phase III clinical trial. If successful, we believe the results of this Phase III clinical trial could support submission of a Biologics License Application (BLA) to the FDA in the U.S. and a Marketing Authorization Application (MAA) to the European Medicines Agency (EMA) in the European Union for RGX-501.

We have received orphan drug product designation from the FDA for RGX-501.

Neurodegenerative Diseases

We are focused on developing NAV Gene Therapy for treatments for diseases with significant unmet medical need that involve neurodegeneration in the brain and spinal cord—which together comprise the CNS. We believe our NAV Technology Platform has optimal features for gene delivery to the CNS. In addition, our programs involve novel strategies for improved delivery of NAV Gene Therapy treatments to the CNS that enhance our candidate profiles.

For neurodegenerative disease, AAV2 vectors were historically applied via focal delivery in the brain by adopting existing direct injection techniques. In certain cases, investigators have attempted to use direct injection of vector into

multiple sites of the

brain to address neurodegenerative disorders that require gene delivery to larger areas. Although there are some examples in animal models in which focal delivery can be therapeutic, these techniques have not produced efficacy in humans.

For most neurodegenerative diseases, we believe that global delivery to the CNS will achieve optimal therapeutic efficacy. Widespread transduction of the CNS in animal models has been achieved by administration of NAV Vectors into the ventricles, cisterna magna, as well as lumbar puncture, which allows the vector to circulate through the cerebrospinal fluid (CSF). We are progressing similar delivery approaches through the CSF in humans to achieve global delivery to the CNS.

Additionally, as described above, one of our NAV Vectors, AAV9, has produced early evidence of potentially unique and beneficial properties for gene delivery in the CNS by having the ability to cross the blood-brain barrier. As a result, treatments may be delivered via intravenous injection to target the CNS. One of our NAV Technology Licensees is currently using this approach in a clinical trial for the treatment of SMA Type I, which has shown preliminary evidence of lower motor neuron transduction.

Based on these studies and our own research, we believe our NAV Technology Platform demonstrates promising properties for applications that involve gene delivery to the CNS that we believe will result in long-term, high-level expression of protein. We intend to advance a pipeline of programs in neurodegenerative diseases that will be enhanced by the benefits of using our NAV Technology Platform.

RGX-111 for the Treatment of MPS I Caused by Autosomal Recessive IDUA Mutations

Overview of MPS I

MPS I is a rare autosomal recessive, or non-sex-linked, genetic disease caused by deficiency of IDUA, an enzyme required for the breakdown of polysaccharides heparan sulfate and dermatan sulfate in lysosomes, which are intracellular structures that dispose of waste products inside cells. These polysaccharides, called glycosaminoglycans (GAGs), accumulate in tissues of MPS I patients, resulting in characteristic storage lesions and diverse clinical signs and symptoms. MPS I patients may exhibit short stature, bone and joint deformities, coarsened facial features, enlargement of both the liver and spleen (hepatosplenomegaly), cardiac valve disease, obstructive sleep apnea, recurrent upper respiratory infections, hearing impairment, carpal tunnel syndrome and vision impairment due to corneal clouding. In addition, many patients develop symptoms related to GAG storage in the CNS, which can include excessive accumulation of fluid in the brain, spinal cord compression and cognitive impairment. MPS I patients span a broad spectrum of disease severity and extent of CNS involvement. We believe this variability in severity correlates with residual IDUA expression. The severe form of MPS I is also referred to as Hurler syndrome. Hurler patients have two mutations of the IDUA gene, resulting in no active enzyme expression. These patients typically present with symptoms before two years of age and universally exhibit severe cognitive decline after an initial period of normal development. Patients with at least one mutation of the IDUA gene who are able to produce a small amount of active IDUA exhibit an attenuated, or less severe, phenotype. These phenotypes are referred to as Hurler-Scheie or Scheie syndrome. Hurler-Scheie represents an intermediate phenotype, with patients exhibiting some or all of the physical features of Hurler syndrome. Some Hurler-Scheie patients also experience neurological complications and cognitive decline.

MPS I is estimated to occur in 1 in 100,000 births. Based on global population, this equates to over 1,000 MPS I patients born each year worldwide. Studies suggest that severe forms of MPS I represent between one-half and two-thirds of all MPS I patients.

Current Therapies for MPS I

The current standard of care for patients with an attenuated form of MPS I is a recombinant form of human IDUA (Aldurazyme). Given as a weekly intravenous infusion, this ERT has demonstrated improvement in hepatosplenomegaly, growth, mobility and respiratory function. However, as the enzyme cannot cross the blood-brain barrier, ERT does not treat the CNS manifestations of MPS I.

The first disease modifying therapy developed for severe MPS I was bone marrow transplant (BMT). Though BMT has demonstrated improvements in survival, growth, cardiac and respiratory function, mobility and intellect, it is also associated with substantial morbidity and an estimated 15% to 25% mortality. Accordingly, the procedure is reserved for patients with severe disease before two years of age because the risk-benefit ratio is thought to be more favorable in younger patients who have not yet experienced advanced cognitive decline. Another critical limitation of BMT is that cognitive decline continues for up to a year after transplant before stabilizing, leaving permanent cognitive deficits. In an effort to find approaches that treat the CNS manifestations of neurodegenerative diseases, clinical trials to evaluate direct administration of ERT into the spinal fluid (intrathecal administration) for the treatment of MPS I and direct administration of ERT into the brain (intracerebroventricular administration) for Batten’s Disease (a neurodegenerative disease) have been initiated. These approaches, however, do not address the underlying cause of these neurodegenerative diseases. Furthermore, we believe the need for frequent (bi-weekly or monthly) intrathecal or intracerebroventricular administration is likely to lead to patient compliance issues, further reducing the treatment potential of this method of ERT.

Overall, the limitations of BMT and ERT leave a significant unmet need for a method to safely achieve long-term IDUA reconstitution in the CNS for MPS I patients experiencing neurological complications.

RGX-111

RGX-111 is our product candidate for the treatment of MPS I which uses the AAV9 vector to deliver the human IDUA gene to the CNS. Delivery of the enzyme that is deficient within cells in the CNS could provide a permanent source of secreted IDUA beyond the blood-brain barrier, allowing for long-term cross-correction of cells throughout the CNS. This strategy could also provide rapid IDUA delivery to the brain, potentially preventing the progression of cognitive deficits that otherwise occurs in MPS I patients.

Preclinical Proof of Concept of RGX-111

To assess the feasibility of achieving widespread IDUA expression and correction of storage pathology throughout the brain of MPS I patients, we carried out proof-of-concept studies of intrathecal AAV9 delivery of IDUA using large animal models of MPS I. These studies demonstrated that AAV9 delivery can safely restore IDUA expression to levels equivalent to or greater than non-affected animals. As can be seen in the diagram below, animals treated with an intracisternal injection of an AAV9 vector expressing feline IDUA from a CB promoter (gray symbols) or CMV promoter (black symbols) showed IDUA expression levels above those of untreated animals and in some cases above those of wild-type animals (the dotted line represents mean CSF IDUA expression for two wild-type animals). Storage correction was observed throughout the CNS. Some animals had IDUA activity at lower levels than wild-type animals post-treatment but also achieved significant correction relative to diseased animals. The extent of CNS correction in our studies was substantially greater than that observed in a previous study of MPS I cats treated with BMT at similar ages, thus demonstrating that gene delivery can achieve rapid onset and high levels of IDUA delivery. These findings provide proof of concept of AAV9 delivery of IDUA for treating the CNS pathology associated with MPS I.

IDUA Expression in Feline CSF Following IT AAV9 Delivery[(1)]

(1) Molecular Therapy: Intrathecal gene therapy corrects CNS pathology in a feline model of mucopolysaccharidosis I, Peter Bell, et al. (July 2014).

Planned Clinical Development of RGX-111

We intend to file an IND in the first half of 2016 to support the initiation of an early phase dose-escalation clinical trial of RGX-111 based gene delivery via CNS administration in mid-2016 in subjects with MPS I. The Phase I/II clinical trial currently being considered is expected to be a single ascending dose design with a formal safety assessment of the lower dose group prior to dose escalation. The trial design is expected to call for enrollment of approximately 10 adult subjects. The primary endpoint will be a safety assessment. The secondary and exploratory endpoints will be evaluation of biomarkers and clinical outcomes.

In September 2015, we received endorsement from the RAC for our RGX-111 protocol. We have received orphan drug product designation and rare pediatric disease designation from the FDA for RGX-111.

RGX-121 for the Treatment of MPS II Caused by X-Linked Recessive IDS Mutations

Overview of MPS II

MPS II, also known as Hunter syndrome, is a rare, X-linked recessive, or sex-linked, disease caused by a deficiency in the lysosomal enzyme iduronate-2-sulfatase (IDS). IDS is another enzyme responsible for the breakdown of polysaccharides heparan sulfate and dermatan sulfate in the lysosomes of cells resulting in a progressive, multisystem disorder with a similar phenotype to MPS I. In severe forms of the disease, early developmental milestones may be met, but developmental delay is readily apparent by 18 to 24 months. Developmental progression begins to plateau between three and five years of age, with regression reported to begin around six and a half years. By the time of death, most patients with CNS involvement are severely mentally handicapped and require constant care.

MPS II is estimated to occur in approximately 1 in 200,000 births. Based on global population, this equates to approximately 500 to 1,000 MPS II patients born each year worldwide.

Current Therapies for MPS II

In 2006, recombinant IDS (Elaprase), an ERT, was approved by the FDA for the treatment of Hunter syndrome and has subsequently been approved for use internationally. ERT in MPS II patients is not expected to result in improvement of CNS dysfunction since IDS is not expected to cross the blood-brain barrier. Specific treatment to address the neurological manifestations of MPS II and prevent or stabilize cognitive decline remains a significant unmet medical need. Overall, the limitations of ERT leave a significant unmet need for a method to safely achieve long-term IDS reconstitution in the CNS.

RGX-121

RGX-121 is our product candidate for the treatment of MPS II, which uses the AAV9 vector to deliver the human IDS gene to the CNS. Delivery of the gene encoding the enzyme that is deficient within cells in the CNS could provide a permanent source of secreted IDS beyond the blood-brain barrier, allowing for long-term cross-correction of cells throughout the CNS. We believe this strategy could also provide rapid IDS delivery to the brain, potentially preventing the progression of cognitive deficits that otherwise occur in Hunter syndrome patients.

As noted above, this approach has been successfully used in the treatment of animal models of monogenic CNS diseases. Previously conducted studies of AAV9 directed gene therapy in the CNS with MPS I animal models have shown that AAV9 can successfully be used to achieve wide biodistribution within the CNS, robust expression of transgene product that benefits from cross-correction and overall acceptable safety profile. We believe these studies have validated the use of AAV9 in the development of CNS directed gene therapy products and that by using AAV9 for the development of both RGX-111 and RGX-121, we will be able build upon the learnings and experience generated in our RGX-111 program to rapidly and efficiently focus our development efforts for RGX-121.

Preclinical Development of RGX-121

To assess the feasibility of achieving widespread IDS expression and correction of storage pathology throughout the brain of MPS II patients, we carried out proof-of-concept studies of CNS AAV9 delivery using a mouse model of MPS II. There are no known large animal models of MPS II. MPS II mice were administered with AAV9 vector encoding a gene for IDS in the CNS, which resulted in higher levels of IDS enzyme activity in the brain. As shown in the diagram below, these higher levels of IDS enzyme activity resulted in a statistically significant reduction of neuronal storage lesions in the brains of treated mice as measured by cells positive for GM3, a ganglioside which accumulates in cells as a result of IDS deficiency. These results show the potential therapeutic benefit of AAV9-mediated IDS gene delivery to the CNS through the CSF to address neurological manifestations of MPS II.

GM3 Positive Cells in Mouse Tissue Following IT AAV9 Delivery[(1)]

(1) Penn and REGENXBIO internal data

Planned Development of RGX-121

We intend to file an IND in the first half of 2017 to support the initiation of an early phase dose-escalation clinical trial of RGX-121 based gene delivery via CNS administration in subjects with MPS II. The Phase I/II clinical trial currently being considered is expected to be a single ascending dose design with a formal safety assessment of the lower dose group prior to dose escalation. The trial design is expected to include approximately 10 subjects. The primary endpoint will be a safety assessment. The secondary and exploratory endpoints will be evaluation of biomarkers and clinical outcomes.

We have received orphan drug product designation from the FDA for RGX-121.

Retinal Diseases

We are developing applications of our NAV Technology Platform to treat inherited and acquired forms of retinal disease that can result in visual loss or complete blindness. The retina is the light-sensitive layer of cells that lines the inside of the eye and sends visual messages to the brain. The effects of retinal diseases are isolated to the eye, which is an ideal target for gene therapy due to its immunoprivileged state, small size and relative physical isolation from the rest of the body. The molecular basis of many retinal diseases is becoming well-understood and many retinal diseases are monogenic diseases whose complementary DNA has already been successfully cloned. Also, diagnosis with many forms of inherited blindness is becoming quicker and simpler, due to improved research and application of technology to characterize the variable, unique patterns of different retinal diseases. We believe our NAV Gene Therapy will have improved profiles for achieving therapeutic efficacy where highly efficient gene delivery to the retina is required.

Third party studies reported early evidence of the safety and efficacy of subretinal injection of AAV2 in clinical trials for a retinal disease called Leber congenital amaurosis type 2 (LCA2). Other programs are studying the safety and efficacy profile of AAV2 to treat neovascularization in wet AMD. For LCA2, retinal function was restored by reconstituting gene function in the retinal pigment epithelium (RPE). However, for most retinal degeneration disorders, photoreceptor cells are the primary cell type involved and have

historically been a more difficult cellular target in the retina for AAV gene therapy. We believe our NAV Technology Platform will be more efficient at gene delivery into many retinal cell types, particularly photoreceptor cells, than earlier generation AAV vectors such as AAV2. Data from mice, dogs and non-human primates suggests that, compared to other AAVs, NAV Vectors can safely and more effectively target a diverse set of retinal cells, including RPE cells and photoreceptors, when compared to other AAVs. For instance, in most retinal cells, NAV-mediated gene delivery reaches maximal levels of expression much sooner than AAV2-mediated delivery. Furthermore, in the same set of retinal cells, NAV Vectors achieve equivalent expression to AAV2 at a dose that is ten times less. Our NAV Technology Platform has been used successfully in a gene therapy approach in animal models of achromatopsia, LCA2, autosomal recessive retinitis pigmentosa, retinoschisis and wet AMD.

We believe that retinal diseases are an ideal target for NAV Gene Therapy due to early evidence indicating efficiency at achieving gene delivery in a wide-array of cell types in the retina. We believe the first use of our NAV Technology Platform in a clinical trial for retinal diseases could result in robust safety and efficacy data but could also serve as a stepping stone for using NAV Gene Therapy in other human retinal diseases.

RGX-314 for the Treatment of Wet AMD

Overview of Wet AMD

Age-related macular degeneration (AMD) is a disease that results in diminution and eventual loss of central vision due to progressive damage to the macula. A subset of AMD patients have wet AMD which is characterized by loss of vision due to the formation of new blood vessels into space between two layers of cells in the retina. This excess blood vessel formation results in fluid leakage that can result in physical changes in the structure of the retina and changes in vision. As this process becomes more severe, blindness can result from scar formation due to hemorrhaging.

Wet AMD is a leading cause of total and partial vision loss in the U.S., Europe and Japan. Wet AMD consists of approximately 10% of all cases of AMD, but accounts for approximately 90% of the vision loss associated with AMD. As indicated by the name, the risk for developing AMD increases with age and we anticipate the diagnosis rate will continue to increase as the population continues to trend towards an aging population. In the U.S., the prevalence of wet AMD is estimated to be nearly 600,000 individuals. Globally, the prevalence of wet AMD may exceed three million individuals based on extrapolations using global population figures. In developed countries, an estimated two-thirds of people with AMD have been diagnosed, of whom about two-thirds are treated.

Current Therapies for Wet AMD

Anti-vascular endothelial growth factor (VEGF) therapies have significantly changed the landscape for treatment of wet AMD. They have quickly become the standard of care due to their ability to either halt or significantly impede the loss of vision in the majority of patients with wet AMD. Currently there are three VEGF inhibitors that are commonly used for the treatment of wet AMD. All of these therapies require repetitive intravitreal injections typically ranging from every four to eight weeks in frequency to maintain efficacy, and patients often experience vision loss with reduced frequency of treatment. Due to a variety of factors, including inconvenience and discomfort associated with frequent injections in the eye, patient compliance is a significant concern with anti-VEGF therapies.

We are aware of multiple gene therapy product candidates currently in development to address the unmet medical need described above for wet AMD by targeting VEGF inhibition using AAV2 as the gene therapy vector. Recently, an ongoing clinical trial using one of these AAV2 gene therapy vectors reported data that indicated there may be patients who benefited with reduced injection frequency. We believe these data may also indicate that some patients may benefit from greater inhibition of VEGF activity and that utilizing NAV Technology could allow us to achieve

better VEGF inhibition than our competitors using AAV2 to treat wet AMD.

RGX-314

RGX-314 is our product candidate for the treatment of wet AMD, which acts by neutralizing the activity of VEGF and modifying the pathway for formation of new, leaky blood vessels and retinal fluid accumulation. We plan on delivering RGX-314 subretinally using an AAV8 vector encoding a gene for a monoclonal antibody fragment which binds to VEGF and neutralizes VEGF activity. Ranibizumab is an FDA-approved monoclonal antibody fragment that binds to VEGF and has been extensively shown to be both efficacious and safe in wet AMD patients when delivered repeatedly through intraocular injections.

Planned Development of RGX-314

We expect to file an IND for RGX-314 in the second half of 2016.

X-linked Retinitis Pigmentosa (XLRP)

Retinitis pigmentosa (RP) is the most common inherited form of blindness, with an estimated 100,000 patients in the U.S. XLRP accounts for approximately 10% of RP, with 75% to 80% of XLRP cases due to mutations in the gene for retinitis pigmentosa GTPase regulator (RPGR). Mutations in RPGR are associated with a more severe form of the disease, causing early onset of disease, and a relatively fast progression. No therapies exist for RP beyond vitamin supplementation and sun protection, which may or may not slow disease progression. We currently have a preclinical program in development, RGX-321, for the treatment of XLRP.

License Agreements and Commercial Licenses

Platform Licenses

We have exclusively licensed many of our rights in our NAV Technology Platform from Penn and GlaxoSmithKline LLC (GSK), which together we refer to as our Platform Licenses. We currently use our NAV Technology Platform to develop treatments for metabolic, neurodegenerative, and retinal diseases. We also sublicense our NAV Technology Platform to third parties in order to develop and bring to market NAV Gene Therapy for a range of severe diseases with significant unmet medical needs outside of our core disease indications and therapeutic areas. For further information regarding our commercial sublicenses, please see “License Agreements and Commercial Licenses—Commercial Licenses to NAV Technology Licensees” located elsewhere in this Annual Report on Form 10-K.

The Trustees of the University of Pennsylvania. In February 2009, we entered into an exclusive, worldwide license agreement with Penn for patent and other intellectual property rights relating to a gene therapy technology platform based on AAVs discovered at Penn in the laboratory of our Chief Scientific Advisor, James M. Wilson, M.D., Ph.D. This license was amended in September 2014. In February 2009, we also entered into a sponsored research agreement (SRA) with Penn (2009 SRA) under which we funded the nonclinical research of Dr. Wilson relating to AAV gene therapy and obtained an option to acquire an exclusive worldwide license in certain intellectual property created pursuant to such 2009 SRA. In December 2014, we entered into another sponsored research agreement with Penn funding related nonclinical research of Dr. Wilson (2014 SRA). We entered into an additional sponsored research agreement (2013 SRA) with Penn in November 2013 which was funded entirely by our NAV Technology Licensee, Dimension Therapeutics, Inc. (Dimension).

Our license agreement with Penn, as amended, provides us with an exclusive, worldwide license under certain patents and patent applications in order to make, have made, use, import, offer for sale and sell products covered by the claims of the licensed patents and patent applications as well as all patentable inventions (to the extent they are or become available for license) that:

- were discovered by Dr. Wilson or other Penn researchers working under his direct supervision at Penn prior to September 2014;
- are related to the AAV technology platform discovered by Dr. Wilson at Penn prior to February 2009 or pursuant to a sponsored research agreement or subsequent amendment to a sponsored research agreement; and
- are owned by Penn and available for licensing.

Prior to entering into the license agreement with us, Penn had previously entered into two license agreements with third parties with respect to certain of the licensed patents and patent applications. Our license from Penn is subject to those preexisting license grants. With respect to the first third party license granted by Penn, our license is non-exclusive with respect to the patents and patent applications licensed to the third party for so long as that preexisting license grant remains in effect and will become exclusive upon the expiration or termination of that existing license agreement. The pre-existing licenses also include a license agreement Penn entered into with GSK in May 2002 granting a license to certain patents and patent applications, of which we subsequently sublicensed certain

rights to from GSK in March 2009. For further information regarding our GSK sublicense, please see "License Agreements and Commercial Agreements—Platform Licenses—GlaxoSmithKline LLC" located elsewhere in this Annual Report on Form 10-K. Our license agreement with Penn provides that should the rights Penn licensed to GSK ever revert to Penn, such rights shall automatically be included in our license agreement with Penn.

The Penn license agreement, as amended, also provides us with a non-exclusive, worldwide license to use all know-how that:

- was developed by Dr. Wilson, or other Penn researchers working under his direct supervision at Penn; and
- is related to the AAV technology platform discovered by Dr. Wilson prior to February 2009; or
- is related to the AAV technology platform discovered by Dr. Wilson at Penn after February 2009 pursuant to the 2009 SRA, the 2013 SRA or subsequent amendment to a sponsored research agreement; and

- is owned by Penn and available for licensing; and
- is necessary or useful for the practice of the licensed patent rights.

Under the terms of the Penn license agreement, we issued equity to Penn now represented by 213,150 shares of our common stock. We are also obligated to pay Penn:

- low- to mid-single digit royalties on net sales of licensed pharmaceutical products sold by us or our affiliates;
- low-single digit to low-double digit royalty percentages of net sales on products intended for research purposes only;
- low- to mid-double digit royalty percentage on royalties received from third parties on net sales of licensed pharmaceutical products by such third parties;
- low-double digit to mid-teen digit percentages of sublicense fees we receive for the licensed intellectual property rights from sublicensees; and
- reimbursements for ongoing patent prosecution and maintenance expenses.

As of December 31, 2015, we have incurred expenses of $2.3 million to Penn under the license agreement. There are no future potential milestones to be paid under the license agreement. Our Penn license agreement, as amended, will terminate on a product-by-product and country-by-country basis on the date each particular licensed product ceases to be covered by at least one valid claim, issued or pending, under the licensed patent rights. We can terminate this license agreement by giving Penn prior written notice. Penn has the right to terminate:

- with notice if we are late in paying money due under the license agreement;
- with notice if we fail to achieve a diligence event on or before the applicable completion date or otherwise breach the license agreement;
- if we or our affiliates experience insolvency; or
- if we commence any action against Penn to declare or render any claim of the licensed patent rights invalid or unenforceable.

Under the current 2014 SRA, we fund research at Penn and pay certain intellectual property legal and filing expenses and receive the rights to the research results, if any. Under the Penn license agreement, as amended, and the 2014 SRA, all patentable inventions conceived, created, or conceived and reduced to practice pursuant to the 2014 SRA, together with patent rights represented by or issuing from the U.S. patents and patent applications, including provisional patent applications, automatically become exclusively licensed to us and all research results are automatically licensed to us as know-how. Our 2014 SRA with Penn will expire on December 31, 2016. We expect to seek to amend the SRA in order to continue to fund work and receive rights to the results of the research we fund at Penn.

GlaxoSmithKline LLC. In March 2009, we entered into a license agreement with GSK in order to secure the exclusive rights to patents and patent applications covering NAV Technology that GSK had previously licensed from Penn (subject to certain rights retained by GSK and Penn). Under this GSK license agreement, we receive an exclusive, worldwide sublicense under the licensed patent rights to make, have made, use, import, sell and offer for sale products covered by the licensed patent rights anywhere in the world. Our rights under this GSK license agreement are subject to certain rights retained by GSK for the benefit of itself and other third parties, including rights relating to: domain antibodies; RNA interference and antisense drugs; internal research purposes and GSK's discovery research efforts with non-profit organizations and GSK collaborators; AAV8 for the treatment of hemophilia B; AAV9 for the treatment of Muscular Dystrophy, congestive heart failure suffered by Muscular Dystrophy patients and cardiovascular diseases by delivery of certain genes; and non-commercial research in the areas of Muscular Dystrophy, hemophilia B, congestive heart failure suffered by Muscular Dystrophy patients, and other cardiovascular disease. Under the terms of the license agreement, we issued to GSK 1,085,824 shares of our common stock. We are obligated to pay GSK:

- up to $1.5 million in aggregate milestone payments;
- low- to mid-single digit royalty percentages on net sales of licensed products;

- low- to mid-double digit percentages of any sublicense fees we receive from sublicensees for the licensed intellectual property rights; and
- reimbursements for certain patent prosecution and maintenance expenses.

As of December 31, 2015, we have incurred expenses of $4.0 million to GSK under the license agreement and no milestone payments have been made. Under our GSK license agreement, we are required to use commercially reasonable efforts to develop and commercialize licensed products. Our GSK license agreement will terminate upon the expiration, lapse, abandonment or invalidation of the last licensed claim to expire, lapse, become abandoned or unenforceable in all the countries of the world where the licensed patent rights existed. However, if no patent ever issues from patent rights licensed from GSK, this license agreement will terminate a specified number of years after the first commercial sale of the first licensed product in any country. We may terminate this license agreement for any reason upon a specified number of days' written notice. GSK can terminate this license agreement if:

- we are late in paying GSK any money due under the agreement and do not pay in full within a specified number of days of GSK's written demand;
- we materially breach the agreement and fail to cure within a specified number of days; or
- we file for bankruptcy.

Commercial Licenses to NAV Technology Licensees

We sublicense our NAV Technology Platform to third parties in order to develop and bring to market NAV Gene Therapy for a range of severe diseases with significant unmet medical needs. Sublicensing allows us to maintain our internal product development focus on our core disease indications and therapeutic areas while still expanding the NAV Gene Therapy pipeline, developing a greater breadth of treatments for patients, providing additional technological and potential clinical proof-of-concept for our NAV Technology Platform, and creating potential additional revenue. Each sublicense specifies the vector or vectors and disease indication or indications as well as whether the sublicense is exclusive or non-exclusive. In determining whether to sublicense, we first evaluate whether the disease indication is of interest to us in which case we may develop a therapeutic for the disease indication internally using our NAV Technology Platform. If it is not, we consider the size of the potential market and unmet need, competition, licensee development history and licensee's ability to pay in evaluating whether to enter into a license agreement. As of December 31, 2015, we have granted 12 commercial licenses covering 23 partnered product candidates in development by our NAV Technology Licensees, most under a license to specific NAV Vectors. Our license agreements include upfront fees, annual maintenance fees, milestone fees based on licensee candidate progression, and low-single to low-double digit royalties on sales. Such royalties are subject to customary reductions, such as if the licensee must obtain a license from a third party to avoid infringement of such third party's rights in order to exercise its rights under the license granted by us. We are obligated to make payments to our licensors with respect to the revenues we receive from our licensees for these sublicenses, in accordance with the terms of our agreements with our licensors.

As of December 31, 2015, our NAV Technology Licensees had three on-going clinical trials using NAV Vectors. The chart below provides an overview of the development status of the programs of our NAV Technology Licensees.

Annapurna Therapeutics Limited. In April 2014, we entered into an exclusive license agreement with Annapurna Therapeutics Limited (formerly known as AAVLife) (Annapurna) for the development and commercialization of products to treat Friedreich's Ataxia using NAV Vectors. Under this license agreement, we granted Annapurna an exclusive worldwide license under the licensed intellectual property to make, have made, use, import, sell and offer for sale licensed products using AAVrh10 for Friedreich's Ataxia where the vector is administered by any route except directly to the central nervous system (Friedreich's Ataxia Systemic). Under the terms of this license agreement, we also granted Annapurna an option (the "commercial option") to obtain a non-exclusive worldwide license to make, have made, use, import, sell and offer for sale licensed products using a single vector for each of Friedreich's Ataxia where the vector is administered directly to the central nervous system (Friedreich's Ataxia CNS) and Friedreich's Ataxia Systemic.

Under the terms of this license agreement, we received or are eligible to receive:

- an initial fee of $600,000 and an additional fee of $300,000 if the commercial option to Friedreich's Ataxia CNS is exercised;
- an annual maintenance fee per disease indication licensed;
- up to $13.85 million in combined milestone fees;

- mid- to high-single digit royalty percentages on net sales of licensed products; and
- mid-single to lower mid-double digit royalty percentages of any sublicense fees Annapurna receives from sublicensees for the licensed intellectual property rights.

Annapurna is obligated to achieve certain development milestones with respect to each licensed disease indication, including the filing of an IND for each licensed disease indication within a specified time period, which Annapurna may extend for additional time for a specified number of extensions upon the payment of a fee.

As of December 31, 2015, we have received $650,000 under the license agreement and have not received any milestone payments. This license agreement expires upon the expiration, lapse, abandonment, or invalidation of the last claim of the licensed intellectual property to expire, lapse, or become abandoned or unenforceable in all the countries of the world. The option to obtain a non-exclusive license for Friedreich's Ataxia CNS expires in April 2016 and the option to obtain a non-exclusive license to Friedreich's Ataxia Systemic expired in April 2015. Annapurna may terminate this license agreement upon six months' prior written notice. We may terminate this license agreement if Annapurna is a specified number of days late in paying money due under the license agreement, or if Annapurna, its affiliates, or any sublicensees become insolvent or, effective immediately, if they commence any action against us or our licensors to declare or render any claim of the licensed patent rights invalid or unenforceable. Either party may terminate this license agreement for material breach if such breach is not cured within a specified number of days.

Audentes Therapeutics, Inc. In July 2013, we entered into an exclusive license agreement with Audentes Therapeutics, Inc. (Audentes) for the development and commercialization of products to treat X-Linked Myotubular Myopathy (XLMTM) and Pompe disease using AAV8 and AAV9. Under this license agreement, we granted Audentes an exclusive worldwide license under the licensed intellectual property to make, have made, use, import, sell, and offer for sale licensed products in the treatment of XLMTM and Pompe disease using AAV8 or AAV9.

Under the terms of this license agreement, we received or are eligible to receive:

- an initial fee of $600,000, half of which was paid in the form of 111,999 shares of Audentes' common stock;
- an annual maintenance fee;
- up to $17.7 million in combined milestone fees, a small portion of which may be paid in the form of shares of Audentes' common stock;
- mid- to high-single digit royalty percentages on net sales of licensed products; and
- mid-single to lower mid-double digit percentages of any sublicense fees Audentes receives from sublicensees for the licensed intellectual property rights.

Audentes is obligated to achieve certain development milestones with respect to each licensed disease indication, including the filing of an IND for the licensed indication within a specified time period, which Audentes may extend for additional time for a specified number of extensions upon the payment of a fee.

As of December 31, 2015, we have received $430,000 in cash payments under the license agreement and have not received any milestone payments. Our license agreement with Audentes will expire upon the expiration, lapse, abandonment or invalidation of the last claim of the licensed intellectual property to expire, lapse or become abandoned or unenforceable in all the countries of the world. Audentes may terminate this license agreement upon prior written notice. We may terminate this license agreement immediately if Audentes or its affiliates become insolvent, if Audentes is late by a specified number of days in paying money due under the license agreement, or, effective immediately, if Audentes or its affiliates commence any action against us or our licensors to declare or render any claim of the licensed patent rights invalid or unenforceable. Either party may terminate this license agreement for material breach that is not cured within a specified number of days.

AveXis, Inc. In March 2014, we entered into an exclusive license agreement with AveXis, Inc. (AveXis) for the development and commercialization of products to treat spinal muscular atrophy using AAV9. Under this license

agreement, we granted AveXis an exclusive, sublicensable worldwide license under the licensed intellectual property to make, have made, use, import, sell and offer for sale licensed products in the field of spinal muscular atrophy using AAV9.

Under the terms of this license agreement, we received or are eligible to receive:

- an initial fee of $2.0 million;
- an annual maintenance fee;

- up to $12.25 million in milestone fees for all licensed products;
- mid-single to low-double digit royalty percentages on net sales of licensed products; and
- lower mid-double digit percentages of any sublicense fees AveXis receives from sublicensees for the licensed intellectual property rights.

Under the agreement, AveXis is obligated to achieve certain development milestones with respect to the licensed disease indication.

As of December 31, 2015, we have received $2.3 million under the license agreement which includes $250,000 in aggregate milestone payments. Our license agreement with AveXis will expire upon the expiration, lapse, abandonment or invalidation of the last claim of the licensed intellectual property to expire, lapse or become abandoned or unenforceable in all the countries of the world. AveXis may terminate this license agreement upon a specified period of prior written notice. We may terminate this license agreement if AveXis or its affiliates become insolvent, if AveXis is greater than a specified number of days late in paying money due under the license agreement, or, effective immediately, if AveXis, its affiliates, or sublicensees commence any action against us or our licensors to declare or render any claim of the licensed patent rights invalid or unenforceable. Either party may terminate this license agreement for material breach if such breach is not cured within a specified number of days.

Baxalta US Inc. In November 2010, we entered into a non-exclusive license agreement with Chatham Therapeutics, LLC (Chatham) for the research and development of, and an option to obtain an exclusive worldwide license to commercialize, products to treat hemophilia A using AAV8. In December 2012, Chatham exercised the commercial option. In May 2014, Baxter Healthcare Corporation (Baxter) acquired Chatham and assumed the license agreement. In June 2015, Baxter assigned, transferred and conveyed all of its rights and obligations under the license agreement to Baxalta US Inc. (Baxalta). Under this license agreement, we granted Baxalta an exclusive worldwide license under the licensed intellectual property to make, have made, use, import, sell, and offer for sale licensed products in the treatment of hemophilia A using AAV8.

Under the terms of this license agreement, we received or are eligible to receive:

- an initial fee of $100,000;
- an annual maintenance fee in the mid-five digits, until Chatham exercised the commercial option, which required the additional payment of $2.0 million, and increased the annual maintenance fee up to a number in the lower mid-six digits;
- up to $7.5 million in milestone fees per each licensed product in the field;
- single digit royalty percentages on net sales of licensed products; and
- low- to mid-double digit percentages of any sublicense fees Baxalta receives from sublicensees for the licensed intellectual property rights.

As of December 31, 2015, we have received $2.6 million under the license agreement and have not received any milestone payments. Our license agreement with Baxalta will expire upon the expiration, lapse, abandonment or invalidation of the last claim of the licensed intellectual property to expire, lapse, become abandoned or unenforceable. The license granted to Baxalta pursuant to the exercise of the commercial option will become a fully paid-up, non-exclusive, royalty-free license, on a country-by-country basis, upon the expiration, lapse, abandonment or invalidation of the last claim of the licensed intellectual property to expire, lapse, become abandoned or unenforceable in the applicable country. Baxalta may terminate this license agreement upon prior written notice. We may terminate this agreement if Baxalta is greater than a specified number of days late in paying money due under the license agreement or if Baxalta, its affiliates, or sublicensees commence any action against Penn to declare or render any claim of the licensed patent rights invalid or unenforceable. Either party may terminate this license agreement if the other party becomes insolvent or materially breaches the license agreement and does not cure the breach within a specified number of days.

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Dimension Therapeutics, Inc.

2013 License Agreement. In October 2013, we entered into an exclusive license agreement with Dimension which, as amended, granted Dimension the right to develop and commercialize products using our NAV Technology to treat hemophilia A and hemophilia B and an option to include up to two additional indications in the scope of the license, which were to be selected by Dimension on or before April 2015. This license agreement was amended in June 2014 and September 2014. Dimension selected ornithine transcarbamylase (OTC) deficiency and glycogen storage disease type Ia (GSDIa) as the additional licensed disease indications in September 2014 and January 2015, respectively. Under the license agreement, we granted Dimension an exclusive worldwide license under our NAV Technology to make, have made, use, import, sell, and offer to sell licensed products for the treatment of hemophilia A, hemophilia B, OTC and GSDIa. The rights granted to Dimension under this license are subject to certain terms and conditions, including the exclusion of rights to use AAV8 for the treatment of hemophilia A and hemophilia B, as well as the addition of any intellectual property in the licensed indications resulting from the 2013 SRA.

Under the terms of the agreement, we received or are eligible to receive:

- 10,000 shares of Dimension's common stock;
- an annual maintenance fee per disease indication licensed; and
- low- to mid-single digit royalty percentages on net sales of licensed products.

In addition, Dimension will pay any milestone fees owed by us to GSK or sublicense fees owed by us to Penn or GSK as a result of Dimension's activities under this license agreement.

The royalty payments owed to us by Dimension are subject to reduction if our royalty obligations under the Platform Licenses are reduced under certain circumstances, including if certain competitive products are launched by a third party or if the Platform Licenses are amended.

Dimension is required to develop licensed products in accordance with certain performance milestones, which include the receipt of certain financing and development milestones, and the filing of an IND for each of the two additional disease indications optioned by Dimension. In the event that Dimension fails to meet a particular development performance milestone, Dimension may extend the deadline to achieve such milestone for additional time for a specified number of extensions in exchange for separate payments to us.

As of December 31, 2015, we have received $360,000 in cash payments under the license agreement and have not received any milestone payments. Our license agreement with Dimension will expire upon the expiration, lapse, abandonment, or invalidation of the last claim of the licensed intellectual property to expire, lapse, or become abandoned or unenforceable in all the countries of the world. Upon expiration, Dimension's know-how license will become non-exclusive, perpetual, irrevocable and royalty-free with respect to licensed know-how in the field that we own and will continue with respect to all of our other know-how in the field under our GSK and/or Penn licenses for so long as our rights from these licensors continue. Dimension may terminate this license agreement upon a specified period of written notice. We may terminate the license agreement if Dimension or its affiliates become insolvent, if Dimension is greater than a specified number of days late in paying money due under the license agreement, or, effective immediately, if Dimension or its affiliates commence any action against us or our licensors to declare or render any claim of the licensed patent rights invalid or unenforceable. Either party may terminate this license agreement for a material breach that is not cured within a specified number of days.

2015 Option and License Agreement. In March 2015, we entered into an option and license agreement with Dimension that grants Dimension the option to exclusively license NAV Technology for the development and commercialization of products to treat up to four additional disease indications. Under this agreement, we granted Dimension four distinct options to obtain an exclusive worldwide license under the licensed intellectual property to

make, have made, use, import, sell, and offer for sale licensed products with respect to a single disease indication. Dimension exercised options to exclusively license three disease indications, one in each of May 2015, August 2015 and December 2015.

When Dimension exercises any or all of the commercial options, we received or are eligible to receive:

- an upfront fee of $1.0 million per commercial option;
- an annual maintenance fee per commercial option;
- up to $36.0 million in milestone fees for all disease indications;

- mid- to high-single digit royalty percentages on net sales of licensed products; and
- mid-single to low-double digit percentages of any sublicense fees Dimension receives from sublicensees for the licensed intellectual property rights.

Dimension is obligated to use diligent efforts to meet certain development and regulatory milestones for each optioned disease indication, which may be extended for additional time for a specified number of extensions upon the payment of an additional sum per licensed indication.

As of December 31, 2015, we have received $3.0 million under the license agreement and have not received any milestone payments. Our option and license agreement with Dimension will expire upon the expiration of the royalty obligations with respect to all licensed products for all licensed indications under all licenses granted under all exercised commercial options. Upon expiration, Dimension's know-how license will become non-exclusive, perpetual, irrevocable and royalty-free with respect to licensed know-how in the field that we own and will continue with respect to all of our other know-how in the field under our GSK and/or Penn licenses for so long as our rights from these licensors continue. Dimension may terminate this option and license agreement upon a specified period of prior written notice. We may terminate the option and license agreement if Dimension or its controlling affiliates become insolvent, if Dimension is greater than a specified number of days late in paying money due under the option and license agreement, or, effective immediately, if Dimension or its affiliates commence any action against us or our licensors to declare or render any claim of the licensed patent rights invalid or unenforceable. Either party may terminate this option and license agreement for a material breach that is not cured within a specified number of days.

Laboratorios Del Dr. Esteve. In March 2014, we entered into a non-exclusive license agreement with Laboratorios Del Dr. Esteve, S.A. (Esteve) for the development and commercialization of products to treat MPS IIIA using AAV9. Under the agreement, we granted Esteve a non-exclusive, sublicensable worldwide license under the licensed intellectual property to develop, make, have made, use, import, sell, and offer for sale licensed products in the MPS IIIA field using AAV9 and a non-exclusive license under the licensed intellectual property to practice the licensed patents for internal research and preclinical development of AAV9 agents, including the right to make and use research reagents for such internal research purposes, which research license is only sublicensable to the Universidad Autonoma de Barcelona and Esteve's affiliates.

Under the terms of this license agreement, we received or are eligible to receive:

- an initial fee of $500,000;
- an annual maintenance fee;
- up to $8.5 million in milestone fees per licensed product;
- mid-single digit to low double-digit royalty percentages on net sales of licensed products; and
- low-double digit percentages of any sublicense fees Esteve receives from sublicensees for the licensed intellectual property rights.

As of December 31, 2015, we have received $550,000 under the license agreement and have not received any milestone payments. Our license agreement with Esteve will expire upon the expiration, lapse, abandonment, or invalidation of the last claim of the licensed intellectual property to expire, lapse or become abandoned or unenforceable in all the countries of the world. Esteve may terminate this license agreement upon a specified number of days' prior written notice. We may terminate the license agreement if Esteve, its affiliates, or sublicensees becomes insolvent, if Esteve is more than a specified number of days late in paying money due under the license agreement, or if Esteve or its affiliates commence any action against us or our licensors to declare or render any claim of the licensed patent rights invalid or unenforceable. Either party may terminate this license agreement for a material breach uncured for more than a specified number of days.

Lysogene Société Anonyme. In December 2013, we entered into an exclusive license agreement with Lysogene Société Anonyme (formerly known as Lysogene Société par Actions Simplifiée) (Lysogene) for the development and

commercialization of products to treat MPS IIIA using AAVrh10. Under this license agreement, we granted Lysogene an exclusive worldwide license under the licensed intellectual property to make, have made, use, import, sell, and offer for sale licensed products in the field of MPS IIIA using AAVrh10.

Under the terms of the license agreement, we received or are eligible to receive:

- an initial fee of $500,000;
- an annual maintenance fee;

- up to $7.75 million in milestone fees for the first licensed product to achieve the specified milestone events;
- mid-single to high-single digit royalty percentages on net sales of licensed products; and
- mid-teen to low-double digit percentages of any sublicense fees Lysogene receives from sublicensees for the licensed intellectual property rights.

Lysogene is obligated to achieve certain development milestones, including the first treatment in a Phase III clinical trial within a specified time period, which Lysogene may extend for additional time for a specified number of extensions upon the payment of a fee.

As of December 31, 2015, we have received $600,000 under the license agreement and have not received any milestone payments. Our license agreement with Lysogene will expire upon the expiration, lapse, abandonment, or invalidation of the last claim of the licensed intellectual property to expire, lapse, or become abandoned or unenforceable in all the countries of the world. Lysogene may terminate this license agreement upon a specified number of days' prior written notice. We may terminate this license agreement if Lysogene or its affiliates or sublicensees become insolvent, if Lysogene is greater than a specified number of days late in paying money due under the license agreement, or if Lysogene or its affiliates commence any action against us or our licensors to declare or render any claim of the licensed patent rights invalid or unenforceable. Either party may terminate this license agreement if a material breach remains uncured for greater than a specified number of days.

Voyager Therapeutics, Inc. In May 2014, we entered into a license agreement with Voyager Therapeutics, Inc. (Voyager) for the development and commercialization of gene therapies to treat Amyotrophic Lateral Sclerosis (ALS), Friedreich's Ataxia CNS, Friedreich's Ataxia Systemic and Huntington's disease (HD). Under this license agreement, we granted Voyager a non-exclusive worldwide license to make, have made and use NAV Technology solely for internal research and pre-clinical development for the identification of specific vectors which could be commercialized pursuant to an option to obtain a non-exclusive worldwide license under the licensed intellectual property to make, have made, use, import, sell, and offer for sale licensed products using a specified vector which can be exercised for each of ALS, Friedreich's Ataxia CNS, Friedreich's Ataxia Systemic, and/or HD indication(s) which we granted to Voyager. The rights granted to Voyager under this option are subject to certain limitations, such as the exclusion of rights to use AAVrh10 for the treatment of Friedreich's Ataxia Systemic.

Under the terms of this license agreement, we received or are eligible to receive:

- an upfront fee of $500,000;
- an annual maintenance fee;
    - should Voyager exercise any or all of the commercial options by a specified date, we will receive an upfront fee ranging from $650,000 to $1.45 million and an annual maintenance fee ranging from low-five digits to low-six digits depending on the number of disease indication options exercised;
- up to $5.0 million in milestone fees per disease indication;
- mid- to high-single digit royalty percentages on net sales of licensed products; and
- mid-single digit percentages of any sublicense fees Voyager receives from sublicensees for the licensed intellectual property rights.

As of December 31, 2015, we have received $630,000 under the license agreement and have not received any milestone payments. Our license agreement with Voyager will expire upon the expiration, lapse, abandonment, or invalidation of the last claim of the licensed intellectual property to expire, lapse, or become abandoned or unenforceable in all the countries of the world. The license agreement will automatically terminate with respect to all unexercised disease indications if Voyager does not exercise all of its commercial options under the agreement within a specified time period after entering into the license agreement, which has been extended for a fee. Voyager may terminate this license agreement upon a specified number of days prior written notice. We may terminate the license agreement if Voyager, its affiliates, or sublicensees experience insolvency, if Voyager is more than a specified number of days late in paying money due under the license agreement, or, effective immediately, if Voyager or its affiliates

commence any action against us or our licensors to declare or render any claim of the licensed patent rights invalid or unenforceable. Either party may terminate this license agreement for material breach that is not cured within a specified number of days.

Other NAV Licenses. In addition to the agreements with the NAV Technology Licensees described above, we have also entered into licenses with the NAV Technology Licensees for the NAV Vectors and indications set forth below.

Other Licenses

Regents of the University of Minnesota. In November 2014, we entered into a license agreement with Regents of the University of Minnesota (Minnesota) for the exclusive rights to Minnesota's undivided interest in intellectual property jointly owned by Minnesota and us relating to the delivery of AAV vectors to the central nervous system for MPS I and MPS II. Under this Minnesota license agreement, we receive an exclusive license under the licensed patent rights to make, have made, use, offer to sell or sell, offer to lease or lease, import or otherwise offer to dispose or dispose of products covered by the licensed patent rights in all fields of use in any country or territory in which a licensed patent has been issued and is unexpired or a licensed patent application is pending.

Under the terms of the Minnesota license agreement, we are obligated to pay Minnesota:

- an upfront payment of $25,000;
- up to $125,000 in aggregate milestone payments per licensed product;
- low-single digit royalty percentages on net sales of licensed products;
- mid-single to low-double digit percentages of sublicense fees;
- annual maintenance fees; and
- patent-related maintenance expenses and fees.

We are obligated to achieve certain development performance milestones, each of which may be extended upon the payment of specified fees, related to our efforts to develop and commercialize products incorporating the licensed intellectual property.

As of December 31, 2015, we have incurred expenses of $52,646 paid to Minnesota under the license agreement. This license agreement expires when there is no licensed patent or pending patent application in any country. Upon expiration, our license becomes a royalty-free, fully-paid up, perpetual, and irrevocable license. Minnesota may terminate the license agreement if we materially breach or materially fail to perform one or more of our obligations under the license agreement and we have not cured in full within a specified number of days after delivery of notice of default for payment or a specified number of days if the default relates to any other matter. Minnesota may terminate the license agreement if we become bankrupt or if we commence or maintain an action challenging any patent or patent application licensed under the license agreement. We may terminate the agreement if Minnesota materially breaches or materially fails to perform one or more of its duties under this agreement. We may terminate for any reason upon a specified number of days' prior written notice but must pay an early termination fee.

ARIAD Pharmaceuticals, Inc. In November 2010, we entered into a license agreement with ARIAD Pharmaceuticals, Inc. (ARIAD) in order to secure the exclusive rights for certain gene expression regulation technology. Under this ARIAD license agreement, we receive an exclusive worldwide license under the licensed intellectual property to develop, make, have made, use, sell, offer for sale and import licensed products and perform licensed services in the field of human gene therapy and a non-exclusive license to conduct internal research using related technology. In exchange, we granted to ARIAD a non-exclusive, royalty free, worldwide license to certain improvements and inventions based on the licensed intellectual property for any and all uses outside of the field of human gene therapy. We also issued ARIAD 687,139 shares of our common stock. Under the terms of the ARIAD license agreement, we are obligated to pay ARIAD:

- up to $2.3 million in milestone payments;
- low-single digit royalty percentages on net sales of licensed products;
- an additional low- to mid-single digit royalty percentages on net sales of licensed products to reimburse ARIAD for royalty payments payable to ARIAD's licensors;
- low-double digit percentages of royalties received from our sublicensees;
- following achievement of a milestone event, annual maintenance fees to ARIAD for remittance to one of ARIAD's licensors; and
- reimbursement for ongoing patent prosecution and maintenance costs.

As of December 31, 2015, we have made no cash payments to ARIAD under the license agreement.

Our ARIAD license agreement will expire on a country-by-country, licensed product-by-licensed product, licensed service-by-licensed service basis on the later of ten years from the first commercial sale of the applicable licensed product or licensed service in such country or the date when there is no longer any valid claim covering such licensed product or licensed service in such country. Either party may terminate the ARIAD license agreement for material breach, effective a specified number of days after written notice in the event of nonpayment or a specified number of days for any other breach. We may terminate this license agreement upon a specified number of days' notice to ARIAD. Either party may terminate this license agreement if the other party files for bankruptcy.

Process Development and Manufacturing

We believe that we have access to the resources necessary to enable us to successfully commercialize NAV Gene Therapy products following regulatory approval, if any, by developing scalable processes to manufacture such products efficiently and at commercial quantity.

AAV Vector Expertise

We believe that Dr. Wilson's lab at Penn is among the leading centers in the world for the cloning, production and characterization of AAV vectors. Since our inception we have funded the research of Dr. Wilson relating to the development of manufacturing processes and the analytical characterization of NAV Vectors. We believe that our significant investments in process development and characterization at Penn will help us develop a scalable, proprietary manufacturing process for NAV Gene Therapy products.

We have also entered into two agreements with WuXi Apptec, Inc. (WuXi), a leading technology platform company, with expertise in characterization of biologics. In May 2015, we entered into a collaboration agreement with WuXi in order to establish a proprietary production process for our NAV Gene Therapy. The proprietary production process is designed to enable the manufacturing for our, as well as our NAV Technology Licensees', therapeutic programs from clinical trials through commercialization. Under the terms of the collaboration agreement, WuXi will work with us to establish standard processes applicable to our NAV Technology Platform which may be applied for the development, testing and manufacture of our products or those of our NAV Technology Licensees. WuXi will provide us and our

NAV Technology Licensees substantially the same access to process development, testing and manufacturing resources to that received by WuXi's key commercial clients. WuXi will provide us with preferred scheduling and performance of services supporting our gene therapy programs and those of our NAV Technology Licensees. The collaboration agreement with WuXi will remain in force unless terminated in accordance with its terms. Either party may terminate the collaboration agreement upon a specified number of days' prior written notice, for a material breach uncured for more than a specified number of days or if the other party becomes insolvent.

We also entered into an agreement with WuXi in April 2015 setting forth the terms and conditions that would govern future work orders with WuXi. Under this agreement, WuXi would carry out services set forth in future work orders as agreed to by the

parties. All work product developed as a result of WuXi's performance of the services under these future work orders would be our sole and exclusive property. This agreement will expire on the later of April 2017 or the completion of all services under the last work order executed by the parties prior to April 2017. Either party may terminate this agreement or future work order upon a specified number of days' prior written notice, for a material breach uncured for more than a specified number of days or if the other party becomes insolvent.

As part of our collaboration with WuXi, we have initiated production of NAV Vectors for use in our planned clinical trial for RGX-111 and have been invoiced $1.0 million by WuXi as of December 31, 2015.

Proprietary Methods

We have obtained rights to all of the proprietary technology underlying our NAV Technology Platform through our Platform Licenses and our SRAs, under which we have exclusively licensed rights to certain manufacturing-related patents and non-exclusively licensed rights to certain know-how owned or developed by Penn. This intellectual property encompasses areas including scalable AAV production methods, methods of increasing the packaging yield of AAV and methods of purification of AAV vectors.

Through our SRAs with Penn, we have examined several methods of larger-scale manufacturing of AAV which have been optimized to yield high titer and quality vectors. However, further improvements to the efficiency and simplicity of the process remain important to address future needs for commercial applications. We have paid particular attention to how the scale-up of AAV vector production occurs during downstream processing of the vector. Many production protocols have vector particles purified from a cell lysate, necessitating extensive downstream purification. These methods were largely developed using AAV2 vectors.

Scientists at Penn discovered that in contrast to earlier generation AAV2, most NAV Vectors were released primarily into the medium of production cultures and not retained in the cell. Because this distribution occurs in the absence of cell lysis, the production culture medium represents a relatively pure source of NAV Vectors and a lower level of cellular contaminants reduces the need for complicated purification steps. This method, for which we have licensed from Penn the exclusive patent rights, is high-yielding and versatile for the production of different NAV Vectors.

Other Capabilities

We have prepared and characterized a proprietary HEK293 master cell bank and other components (plasmid DNA banks) required for clinical vector production. Our master cell bank and other components are being used by us and certain of our NAV Technology Licensees for the production of NAV Vectors under cGMP for use in clinical trials that we expect will begin in 2015 and 2016. For example, as part of a European Union grant consortium, we were selected to manage the production of NAV Vectors for use in a clinical trial to be initiated in Italy for the treatment of MPS VI, a severe lysosomal storage disorder, expected to begin in 2016.

Intellectual Property

Our commercial success depends in part on our ability to obtain and maintain proprietary or intellectual property protection for our product candidates, our core technologies, and other know-how, to operate without infringing on the proprietary rights of others and to prevent others from infringing our proprietary or intellectual property rights. We strive to protect and enhance the proprietary technology, inventions, and improvements that are commercially important to the development of our business, including by seeking, maintaining and defending patent rights, whether developed internally or licensed from third parties. We also rely on trade secrets relating to our proprietary technology platform and on know-how, continuing technological innovation and in-licensing opportunities to develop, strengthen and maintain our proprietary position in the field of gene therapy. Additionally, we intend to rely on regulatory

protection afforded through orphan drug designations, data exclusivity and market exclusivity as well as patent term extensions, where available.

We have exclusively licensed rights relevant to our NAV Technology which includes novel recombinant AAV vectors AAV7, AAV8, AAV9, and AAVrh10, among others. Our licensed patent portfolio includes exclusive rights to more than 100 patents and patent applications worldwide relating to composition of matter patents and/or patent applications for our novel AAV vectors, as well as methods for their manufacture and therapeutic uses. We also possess substantial know-how and trade secrets relating to NAV Technology.

As of December 31, 2015, our patent portfolio included the following licensed patents and patent applications relating to our novel AAV vectors:

- One issued U.S. patent relating to AAV7 vectors and uses thereof, currently scheduled to expire in 2026, including patent term adjustment;
- One granted European patent relating to AAV7 vectors and uses thereof, currently scheduled to expire in 2022;
- Five issued U.S. patents relating to AAV8 vectors and uses thereof, which are currently scheduled to expire in 2022 to 2026, including patent term adjustment;
- Two pending European patent applications relating to AAV8 vectors - any European patent that issues from these pending patent applications would currently be expected to expire in 2022;
- One issued U.S. patent relating to AAV9 vectors and uses thereof, currently scheduled to expire in 2026, including patent term adjustment;
- One granted European patent relating to AAV9 vectors and uses thereof, currently scheduled to expire in 2024;
- One pending U.S. patent application relating to AAVrh10 vectors - any U.S. patent that issues from this pending patent application is currently scheduled to expire in 2022; and
- One granted European patent relating to AAVrh10 vectors is currently scheduled to expire in 2022.

As of December 31, 2015, our licensed patent portfolio also included patents and patent applications relating to the following product candidates:

- A U.S. patent relating to RGX-501 that is currently scheduled to expire in 2026, including patent term adjustment;
- Two pending U.S. provisional patent applications relating to RGX-501; upon conversion to a U.S. non-provisional application and/or International patent application, the expected expiration date of any U.S. patent and European patent that issues from these applications would be 2036; and
- Two International Patent applications filed pursuant to the Patent Cooperation Treaty (PCT) and pending U.S. patent applications relating to RGX-111 and RGX-121 - any U.S. patent and European patent that issues from these pending PCT applications relating to RGX-111 and RGX-121 is currently scheduled to expire in 2034.

Except as indicated above, the anticipated expiration dates referred to above are without regard to potential patent term extension, patent term adjustment or other market exclusivity that may be available to us.

In addition to our licensed patents and patent applications relating to composition of matter protection for novel AAV vectors having AAV7 capsid, AAV8 capsid, AAV9 capsid, and AAVrh10 capsid, our licensed patent portfolio includes composition of matter claims for novel AAV vectors having AAV11 and AAV12 capsids; Rh.1 to Rh.38, Rh.40, Rh.43, Rh.48 to Rh.62, and Rh.64; Cy.1 to Cy.6 capsids; bb.1 and bb.2 capsids; Ch.1 to Ch.4 capsids; hu.1 to hu.4, hu.6, hu.7, hu.9 to hu.25, hu.27 to hu.29, hu.31, hu.32, hu.34, hu.35, hu.37, hu.39 to hu.49, hu.51 to hu.58, hu.60 to hu.64, hu.66, and hu.67 capsids; pi.1 to pi.3 capsids; and AAV vectors that have amino acid sequences that are at least 95% identical to these capsids.

Our licensed patent portfolio also includes exclusive rights to patents and patent applications relating to:

- therapeutic compositions and methods involving the foregoing AAV vectors further comprising certain transgenes that encode therapeutic products, and their use in treating specified diseases;
- specific formulations or methods of delivery of the recombinant AAV vectors of interest for our in-house development programs;
- technology related to engineering AAV therapeutics including recombinant AAV vectors engineered to target conducting airway cells, methods of altering the targeting and cellular uptake efficiency of an AAV viral vector having a capsid containing an AAV9 cell surface binding domain, the design of recombinant AAV viral vectors that confer passive immunization to airborne pathogens (the aforementioned gene therapy systems can include the use of certain gene expression regulation technology; we have exclusively licensed the patents and patent applications relating to this technology);

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- methods of detecting an AAV nucleotide sequence useful in diagnostics; and
- methods of manufacture of AAV, including patents and applications directed to scalable AAV production methods; methods of increasing the packaging yield, transduction efficiency, and gene transfer efficiency of an AAV, and methods of purification of viral vectors, such as AAV vectors.

We anticipate that our patent portfolio will continue to expand as a result of our sponsored research agreements with academic institutions, including the 2014 SRA with Penn where all patentable inventions conceived, created, or conceived and reduced to practice pursuant to the 2014 SRA, together with patent rights represented by or issuing from the U.S. patents and patent applications (including provisional patent applications) related thereto automatically become exclusively licensed to us under our existing licensing agreement with Penn and all research results are automatically non-exclusively licensed to us as know-how under that existing license agreement. We also anticipate further expansion of our patent portfolio through our commercial licenses to NAV Technology Licensees which grant us non-exclusive, worldwide, royalty-free, perpetual licenses to use and practice, subject to certain limitations, any patentable modifications or improvements developed by our licensees, their affiliates, or sublicensees to any vector that is the subject of a claim within the licensed patents. For further information regarding our commercial sublicenses, please see “License Agreements and Commercial Licenses—Commercial Licenses to NAV Technology Licensees” located elsewhere in this Annual Report on Form 10-K.

Customers

Our revenue for the fiscal years ended December 31, 2015, 2014 and 2013 consisted of license revenue, reagent sales and grant revenue. Three customers, two of which were based in the U.S. and one of which was based in Ireland, accounted for approximately 79% of our total revenue for the year ended December 31, 2015. No other customer accounted for more than 15% of revenue in 2015. Two customers, one of which was based in the U.S. and another which was based in the European Union, accounted for approximately 47% of our total revenue for the year ended December 31, 2014. No other customer accounted for more than 15% of revenue in 2014. Three customers, two of which were based in the U.S. and one of which was based in the European Union, accounted for approximately 76% of our total revenue for the year ended December 31, 2013. No other customer accounted for more than 15% of revenue in 2013. Future license revenue is uncertain due to the contingent nature of our licenses granted to third-parties. We expect grant revenue to decrease in the future as we are not currently seeking any further grant awards. Future revenue is uncertain and may fluctuate significantly from period to period.

Research and Development

We are in the process of building a research and development organization that includes extensive expertise in AAV gene therapy and related scientific disciplines. We operate cross-functionally and are led by an experienced research and development management team. We use rigorous project management techniques to assist us in making disciplined strategic research and development program decisions and to help limit the risk profile of our product pipeline. We also access relevant market information and key opinion leaders in creating target product profiles when appropriate, as we advance our programs towards commercialization. We engage third parties to conduct portions of our preclinical research. In addition, we plan to utilize multiple clinical sites to conduct our clinical trials; however, we are not substantially dependent upon any one of these sites for our clinical trials nor do any of them conduct a major portion of our clinical trials.

We incurred $17.3 million, $5.0 million and $5.1 million in research and development expenses in the years ended December 31, 2015, 2014 and 2013, respectively.

Competition

The biotechnology and pharmaceutical industries, including in the field of gene therapy, are characterized by rapidly advancing technologies, intense competition and a strong emphasis on intellectual property. While we believe that our NAV Technology Platform, strong intellectual property portfolio and scientific expertise in the gene therapy field provide us with competitive advantages, we face potential competition from many different sources, including larger and better-funded pharmaceutical and biotechnology companies, new market entrants and new technologies.

We are aware of several companies focused on developing gene therapies in various disease indications, including Applied Genetic Technologies Corporation, Avalanche Biotechnologies, Inc., BioMarin Pharmaceutical Inc., bluebird bio, Inc., Genzyme Corporation (Genzyme), Sangamo BioSciences, Inc., Spark Therapeutics, Inc. and uniQure N.V. as well as several companies addressing other methods for modifying genes and regulating gene expression. Additionally, we have sublicensed our NAV Technology Platform for developing gene therapies in various disease indications to our NAV Technology Licensees. Not only must we compete with other companies that are focused on gene therapy products using earlier generation AAV technology and other gene

therapy platforms, but any products that we may commercialize will have to compete with existing therapies and new therapies that may become available in the future.

There are other organizations working to improve existing therapies or to develop new therapies for our initially selected disease indications. Depending on how successful these efforts are, it is possible they may increase the barriers to adoption and success for our product candidates, if approved. These efforts include the following:

- HoFH. There are several companies with marketed products for the treatment of HoFH, including Aegerion (Juxtapid), Genzyme (Kynamro) and Amgen (Repatha).
- MPS I. There is one principal competitor with a marketed product for the treatment of MPS I, Sanofi (Aldurazyme).
- MPS II. The principal marketed competition for MPS II is a systemic enzyme replacement therapy, Elaprase (idursulfase), which is marketed by Shire.
- Wet AMD. Marketed competition for wet AMD largely consists of anti-VEGF therapies developed by Roche/Genentech (Lucentis, Avastin) and Regeneron (Eylea).

Many of our competitors, either alone or with their strategic partners, have substantially greater financial, technical and human resources than we do. Our competitors may be more successful than us in obtaining approval for treatments and achieving widespread market acceptance. Our competitors' treatments may be more effective, or more effectively marketed and sold, than any treatment we may commercialize and may render our treatments obsolete or non-competitive before we can recover the expenses of developing and commercializing any of our treatments.

Mergers and acquisitions in the biotechnology and pharmaceutical industries may result in even more resources being concentrated among a smaller number of our competitors. 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. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies.

We anticipate that we will face intense and increasing competition as new drugs enter the market and advanced technologies become available. We expect any treatments that we develop and commercialize to compete on the basis of, among other things, efficacy, safety, convenience of administration and delivery, price, the level of generic competition and the availability of reimbursement from government and other third-party payors.

Government Regulation

In the U.S., biological products, including gene therapy products, are subject to regulation under the Federal Food, Drug, and Cosmetic Act (FD&C Act) and the Public Health Service Act (PHS Act) and other federal, state, local and foreign statutes and regulations. Both the FD&C Act and the PHS Act and their corresponding regulations govern, among other things, the testing, manufacturing, safety, efficacy, labeling, packaging, storage, record keeping, distribution, reporting, advertising and other promotional practices involving biological products. Applications to the FDA are required before conducting clinical testing of biological products, and each clinical study protocol for a gene therapy product is reviewed by the FDA and, in some instances, the NIH, through its RAC. FDA approval also must be obtained before marketing of biological products. The process of obtaining regulatory approvals and the subsequent compliance with appropriate federal, state, local and foreign statutes and regulations require the expenditure of substantial time and financial resources and we may not be able to obtain the required regulatory approvals.

Within the FDA, the Center for Biologics Evaluation and Research (CBER) regulates gene therapy products. The CBER works closely with the NIH and its RAC, which makes recommendations to the NIH on gene therapy issues and engages in a public discussion of scientific, safety, ethical and societal issues related to proposed and ongoing

gene therapy protocols. The FDA and the NIH have published guidance documents with respect to the development and submission of gene therapy protocols. The FDA also has published guidance documents related to, among other things, gene therapy products in general, their preclinical assessment, observing subjects involved in gene therapy studies for delayed adverse events, potency testing, and chemistry, manufacturing and control information in gene therapy INDs.

Ethical, social and legal concerns about gene therapy, genetic testing and genetic research could result in additional regulations restricting or prohibiting the processes we may use. Federal and state agencies, congressional committees and foreign governments have expressed interest in further regulating biotechnology. More restrictive regulations or claims that our products are unsafe or pose a hazard could prevent us from commercializing any products. 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.

U.S. Biological Products Development Process

The process required by the FDA before a biological product may be marketed in the U.S. generally involves the following:

- completion of nonclinical laboratory tests, including evaluations of product chemistry, toxicity and formulation, and animal studies according to good laboratory practice (GLP) and applicable requirements for the humane use of laboratory animals or other applicable regulations;
- submission to the FDA of an IND, which must become effective before human clinical studies may begin;
- performance of adequate and well-controlled human clinical studies according to the FDA's regulations on good clinical practice (GCP) and any additional requirements for the protection of human research subjects and their health information, to establish the safety and efficacy of the proposed biological product for its intended use;
- submission to the FDA of a Biologics License Application (BLA) for marketing approval that includes substantive evidence of safety, purity, and potency from results of nonclinical testing and clinical studies;
- satisfactory completion of an FDA inspection of the manufacturing facility or facilities where the biological product is produced to assess compliance with current Good Manufacturing Practices (cGMP), to assure that the facilities, methods and controls are adequate to preserve the biological product's identity, strength, quality and purity and, if applicable, the FDA's current good tissue practice (GTP), for the use of human cellular and tissue products;
- potential FDA inspection of the nonclinical and clinical study sites that generated the data in support of the BLA; and
- FDA review and approval, or licensure, of the BLA.

Where a gene therapy study is conducted at, or sponsored by, institutions receiving NIH funding for recombinant DNA research, prior to the submission of an IND to the FDA, a protocol and related documentation is submitted to and the study is registered with the NIH Office of Biotechnology Activities (OBA) pursuant to the NIH Guidelines for Research Involving Recombinant DNA Molecules (NIH Guidelines). Compliance with the NIH Guidelines is mandatory for investigators at institutions receiving NIH funds for research involving recombinant DNA, however many companies and other institutions not otherwise subject to the NIH Guidelines voluntarily follow them. The NIH is responsible for convening the RAC, a federal advisory committee, which discusses protocols that raise novel or particularly important scientific, safety or ethical considerations at one of its quarterly public meetings. The OBA will notify the FDA of the RAC's decision regarding the necessity for full public review of a gene therapy protocol. RAC proceedings and reports are posted to the OBA web site and may be accessed by the public.

The clinical study sponsor must submit the results of the preclinical tests, together with manufacturing information, analytical data, any available clinical data or literature and a proposed clinical protocol, to the FDA as part of the IND. Some preclinical testing may continue even after the IND is submitted. The IND automatically becomes effective 30 days after receipt by the FDA, unless the FDA places the clinical study on a clinical hold within that 30-day time period. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns before the clinical study can begin. With gene therapy protocols, if the FDA allows the IND to proceed, but the RAC decides that full public review of the protocol is warranted, the FDA will request at the completion of its IND review that sponsors delay initiation of the protocol until after completion of the RAC review process. The FDA may also impose clinical holds on a biological product candidate at any time before or during clinical studies due to safety concerns or non-compliance. If the FDA imposes a clinical hold, studies may not recommence without FDA authorization and then only under terms authorized by the FDA. Accordingly, we cannot be sure that submission of an IND will result in the FDA allowing clinical studies to begin, or that, once begun, issues will not arise that suspend or terminate such studies.

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Clinical studies involve the administration of the biological product candidate to healthy volunteers or patients under the supervision of qualified investigators, generally physicians not employed by or under the study sponsor's control. Clinical studies are conducted under protocols detailing, among other things, the objectives of the clinical study, dosing procedures, subject selection and exclusion criteria, and the parameters to be used to monitor subject safety, including stopping rules that assure a clinical study will be stopped if certain adverse events should occur. Each protocol and any amendments to the protocol must be submitted to the FDA as part of the IND. Clinical studies must be conducted and monitored in accordance with the FDA's regulations imposing the GCP requirements, including the requirement that all research subjects provide informed consent. Further, each clinical study must be reviewed and approved by an independent institutional review board (IRB) at or servicing each institution at which the clinical study will be conducted. An IRB is charged with protecting the welfare and rights of study participants and considers such items as whether the risks to individuals participating in the clinical studies are minimized and are reasonable in relation to anticipated benefits. The IRB also approves the form and content of the informed consent that must be signed by each clinical study subject or his or her legal representative and must monitor the clinical study until completed. Clinical studies also must be reviewed by an institutional biosafety committee (IBC), a local institutional committee that reviews and oversees basic and clinical research conducted at that institution. The IBC assesses the safety of the research and identifies any potential risk to public health or the environment.

Human clinical studies are typically conducted in three sequential phases that may overlap or be combined:

- Phase I. The biological product is initially introduced into healthy human subjects and tested for safety. In the case of some products for severe or life-threatening diseases, especially when the product may be too inherently toxic to ethically administer to healthy volunteers, the initial human testing is often conducted in patients.
- Phase II. The biological product is evaluated in a limited patient population to identify possible adverse effects and safety risks, to preliminarily evaluate the efficacy of the product for specific targeted diseases and to determine dosage tolerance, optimal dosage and dosing schedule.
- Phase III. Clinical studies are undertaken to further evaluate dosage, clinical efficacy, potency, and safety in an expanded patient population at geographically dispersed clinical study sites. These clinical studies are intended to establish the overall risk/benefit ratio of the product and provide an adequate basis for product labeling.
  Post-approval clinical studies, sometimes referred to as Phase IV clinical studies, may be conducted after initial marketing approval. These clinical studies are used to gain additional experience from the treatment of patients in the intended therapeutic indication, particularly for long-term safety follow-up. The FDA recommends that sponsors observe subjects for potential gene therapy-related delayed adverse events for a 15-year period, including a minimum of five years of annual examinations followed by ten years of annual queries, either in person or by questionnaire, of study subjects.

During all phases of clinical development, regulatory agencies require extensive monitoring and auditing of all clinical activities, clinical data, and clinical study investigators. Annual progress reports detailing the results of the clinical studies must be submitted to the FDA. Written IND safety reports must be promptly submitted to the FDA, the NIH and the investigators for serious and unexpected adverse events, any findings from other studies, tests in laboratory animals or in vitro testing that suggest a significant risk for human subjects, or any clinically important increase in the rate of a serious suspected adverse reaction over that listed in the protocol or investigator brochure. The sponsor must submit an IND safety report within 15 calendar days after the sponsor determines that the information qualifies for reporting. The sponsor also must notify the FDA of any unexpected fatal or life-threatening suspected adverse reaction within seven calendar days after the sponsor's initial receipt of the information. Phase I, Phase II and Phase III clinical studies may not be completed successfully within any specified period, if at all. The FDA or the sponsor or its data safety monitoring board may suspend a clinical study at any time on various grounds, including a finding that the research subjects or patients are being exposed to an unacceptable health risk. Similarly, an IRB can suspend or terminate approval of a clinical study at its institution if the clinical study is not being conducted in accordance with the IRB's requirements or if the biological product has been associated with unexpected serious harm to patients.

Human gene therapy products are a new category of therapeutics. Because this is a relatively new and expanding area of novel therapeutic interventions, there can be no assurance as to the length of the study period, the number of patients the FDA will require to be enrolled in the studies in order to establish the safety, efficacy, purity and potency of human gene therapy products, or that the data generated in these studies will be acceptable to the FDA to support marketing approval. The NIH and the FDA have a publicly accessible database, the Genetic Modification Clinical Research Information System, which includes information on gene transfer studies and serves as an electronic tool to facilitate the reporting and analysis of adverse events on these studies.

Concurrent with clinical studies, companies usually complete additional animal studies and must also develop additional information about the physical characteristics of the biological product as well as finalize a process for manufacturing the product in commercial quantities in accordance with cGMP requirements. To help reduce the risk of the introduction of adventitious agents with use of biological products, the PHS Act emphasizes the importance of manufacturing control for products whose attributes cannot be precisely defined. The manufacturing process must be capable of consistently producing quality batches of the product candidate and,

among other things, the sponsor must develop methods for testing the identity, strength, quality, potency and purity of the final biological product. Additionally, appropriate packaging must be selected and tested and stability studies must be conducted to demonstrate that the biological product candidate does not undergo unacceptable deterioration over its shelf life.

U.S. Review and Approval Processes

After the completion of clinical studies of a biological product, FDA approval of a BLA must be obtained before commercial marketing of the biological product. The BLA must include results of product development, laboratory and animal studies, human studies, information on the manufacture and composition of the product, proposed labeling and other relevant information. In addition, under the Pediatric Research Equity Act (PREA) a BLA or supplement to a BLA must contain data to assess the safety and effectiveness of the biological 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. The FDA may grant deferrals for submission of pediatric data or full or partial waivers of pediatric requirements. Unless otherwise required by regulation, PREA does not apply to any biological product for an indication for which orphan designation has been granted. The testing and approval processes require substantial time and effort and there can be no assurance that the FDA will accept the BLA for filing and, even if filed, that any approval will be granted on a timely basis, if at all.

Within 60 days following submission of the application, the FDA reviews a BLA submitted to determine if it is substantially complete before the agency accepts it for filing. The FDA may refuse to file any BLA that it deems incomplete or not properly reviewable at the time of submission and may request additional information. In this event, the BLA must be resubmitted with the additional information. The resubmitted application also is subject to review before the FDA accepts it for filing. Once the submission is accepted for filing, the FDA begins an in-depth substantive review of the BLA. The FDA reviews the BLA to determine, among other things, whether the proposed product is safe and potent, including whether it is effective, for its intended use, and has an acceptable purity profile, and whether the product is being manufactured in accordance with cGMP to assure and preserve the product's identity, strength, quality, potency and purity as those factors relate to the safety or effectiveness of the product. The FDA may refer applications for novel biological products or biological products that present difficult questions of safety or efficacy to an advisory committee, typically a panel that includes clinicians and other experts, for review, evaluation and 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. During the biological product approval process, the FDA also will determine whether a Risk Evaluation and Mitigation Strategy (REMS) is necessary to assure the safe use of the biological product. If the FDA concludes a REMS is needed, the sponsor of the BLA must submit a proposed REMS; the FDA will not approve the BLA without a REMS, if required.

Before approving a BLA, the FDA will inspect the facilities at which the product is manufactured. The FDA will not approve the product unless it determines that the manufacturing processes and facilities are in compliance with cGMP requirements and adequate to assure consistent production of the product within required specifications. For a gene therapy product, the FDA also will not approve the product if the manufacturer is not in compliance with GTP. These are FDA regulations that govern the methods used in, and the facilities and controls used for, the manufacture of human cells, tissues, and cellular and tissue based products (HCT/Ps) which are human cells or tissue intended for implantation, transplant, infusion, or transfer into a human recipient. The primary intent of the GTP requirements is to ensure that cell and tissue based products are manufactured in a manner designed to prevent the introduction, transmission and spread of communicable disease. FDA regulations also require tissue establishments to register and list their HCT/Ps with the FDA and, when applicable, to evaluate donors through screening and testing. Additionally, before approving a BLA, the FDA will typically inspect one or more clinical sites to assure that the clinical studies were conducted in compliance with IND study requirements and GCP requirements. To assure cGMP, GTP and GCP

compliance, an applicant must incur significant expenditure of time, money and effort in the areas of training, record keeping, production, and quality control.

Notwithstanding the submission of relevant data and information, the FDA may ultimately decide that the BLA does not satisfy its regulatory criteria for approval and deny approval. Data obtained from clinical studies are not always conclusive and the FDA may interpret data differently than we interpret the same data. If the agency decides not to approve the BLA in its present form, the FDA will issue a complete response letter that usually describes all of the specific deficiencies in the BLA identified by the FDA. The deficiencies identified may be minor, for example, requiring labeling changes, or major, for example, requiring additional clinical studies. Additionally, the complete response letter may include recommended actions that the applicant might take to place the application in a condition for approval. If a complete response letter is issued, the applicant may either resubmit the BLA, addressing all of the deficiencies identified in the letter, or withdraw the application.

If a product receives regulatory approval, the approval may be significantly limited to specific diseases and dosages or the indications for use may otherwise be limited, which could restrict the commercial value of the product. Further, the FDA may require that certain contraindications, warnings or precautions be included in the product labeling. The FDA may impose restrictions and conditions on product distribution, prescribing, or dispensing in the form of a risk management plan, or otherwise limit the scope of

any approval. In addition, the FDA may require post marketing clinical studies, sometimes referred to as Phase IV clinical studies, designed to further assess a biological product's safety and effectiveness, and testing and surveillance programs to monitor the safety of approved products that have been commercialized.

One of the performance goals agreed to by the FDA under the Prescription Drug User Fee Act (PDUFA) is to review 90% of standard BLAs in 10 months of the 60-day filing date and 90% of priority BLAs in six months of the 60-day filing date, whereupon a review decision is to be made. The FDA does not always meet its PDUFA goal dates for standard and priority BLAs and its review goals are subject to change from time to time. The review process and the PDUFA goal date may be extended by three months if the FDA requests or the BLA sponsor otherwise provides additional information, or clarification regarding information already provided in the submission, constituting a major amendment to the BLA.

Orphan Drug Designation

Under the Orphan Drug Act, the FDA may grant orphan designation to a drug or biological product intended to treat a rare disease or condition, which is defined under the FD&C Act as a disease or condition that affects fewer than 200,000 individuals in the U.S., or more than 200,000 individuals in the U.S. and for which there is no reasonable expectation that the cost of developing and making a drug or biological product available in the U.S. for this type of disease or condition will be recovered from sales of the product. Orphan product designation must be requested before submitting a BLA. After the FDA grants orphan product designation, the identity of the therapeutic agent and its potential orphan use are disclosed publicly by the FDA. Orphan product designation does not convey any advantage in or shorten the duration of the regulatory review and approval process.

If a product that has orphan designation subsequently receives the first FDA approval for the disease or condition for which it has such designation, the product is entitled to orphan product exclusivity, which means that the FDA may not approve any other applications to market the same drug or biological product for the same indication for seven years, except in limited circumstances, such as a showing of clinical superiority to the product with orphan exclusivity. Competitors, however, may receive approval of different products for the indication for which the orphan product has exclusivity or obtain approval for the same product but for a different indication for which the orphan product has exclusivity. Orphan product exclusivity also could block the approval of one of our products for seven years if a competitor obtains approval of the same biological product as defined by the FDA or if our product candidate is determined to be contained within the competitor's product for the same indication or disease. If a drug or biological product designated as an orphan product receives marketing approval for an indication broader than what is designated, it may not be entitled to orphan product exclusivity. Orphan drug status in the European Union has similar, but not identical, benefits.

Expedited Development and Review Programs

The FDA has a Fast Track program that is intended to expedite or facilitate the process for reviewing new drugs and biological products that meet certain criteria. Specifically, new drugs and biological 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 and the specific indication for which it is being studied. The sponsor of a new drug or biologic may request the FDA to designate the drug or biologic as a Fast Track product at any time during the clinical development of the product. Also under the Fast Track program, the FDA may consider for review sections of the marketing application on a rolling basis before the complete application is submitted, if the sponsor provides a schedule for the submission of the sections of the application, the FDA agrees to accept sections of the application and determines that the schedule is acceptable, and the sponsor pays any required user fees upon submission of the first section of the application.

Any product 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. Under the Breakthrough Therapy program, products intended to treat a serious or life-threatening disease or condition may be eligible for the benefits of the Fast Track program when preliminary clinical evidence demonstrates that such product may have substantial improvement on one or more clinically significant endpoints over existing therapies. Additionally, FDA will seek to ensure the sponsor of a breakthrough therapy product receives timely advice and interactive communications to help the sponsor design and conduct a development program as efficiently as possible. Any product is eligible for priority review if it has the potential to provide safe and effective therapy where no satisfactory alternative therapy exists or a significant improvement in the treatment, diagnosis or prevention of a disease compared to marketed products. The FDA will attempt to direct additional resources to the evaluation of an application for a new drug or biological product designated for priority review in an effort to facilitate the review. Additionally, a product may be eligible for accelerated approval. Drug or biological 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, which means that they may be approved on the basis of adequate and well-controlled clinical studies establishing that the product 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. As a condition of approval, the FDA may require that a sponsor of a

drug or biological product receiving accelerated approval perform adequate and well-controlled post-marketing clinical studies. In addition, the FDA currently requires as a condition for accelerated approval pre-approval of promotional materials, which could adversely impact the timing of the commercial launch of the product. Fast Track designation, Breakthrough Therapy designation, priority review and accelerated approval do not change the standards for approval. Rather, these programs are intended to expedite the development and approval process, but do not necessarily accomplish that intent.

Post-Approval Requirements

Maintaining substantial compliance with applicable federal, state, and local statutes and regulations requires the expenditure of substantial time and financial resources. Rigorous and extensive FDA regulation of biological products continues after approval, particularly with respect to cGMP. We will rely, and expect to continue to rely, on third parties for the production of clinical and commercial quantities of any products that we may commercialize. Manufacturers of our products are required to comply with applicable requirements in the cGMP regulations, including quality control and quality assurance and maintenance of records and documentation. Other post-approval requirements applicable to biological products, include reporting of cGMP deviations that may affect the identity, strength, quality, potency, or purity of a distributed product in a manner that may impact the safety or effectiveness of the product, record-keeping requirements, reporting of adverse effects, reporting updated safety and efficacy information, and complying with electronic record and signature requirements. After a BLA is approved, the product also may be subject to official lot release. As part of the manufacturing process, 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 release by the FDA, the manufacturer submits samples of each lot of product to the FDA 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. The FDA also may perform certain confirmatory tests on lots of some products, such as viral vaccines, before releasing the lots for distribution by the manufacturer. In addition, the FDA conducts laboratory research related to the regulatory standards on the safety, purity, potency, and effectiveness of biological products.

We also must comply with the FDA's advertising and promotion requirements, such as those related to direct-to-consumer advertising, the prohibition on promoting products for uses or in patient populations that are not described in the product's approved labeling (known as "off-label use"), industry-sponsored scientific and educational activities, and promotional activities involving the internet. Discovery of previously unknown problems or the failure to comply with the applicable regulatory requirements may result in restrictions on the marketing of a product or withdrawal of the product from the market as well as possible civil or criminal sanctions. Failure to comply with the applicable U.S. requirements at any time during the product development process, approval process or after approval, may subject an applicant or manufacturer to administrative or judicial civil or criminal sanctions and adverse publicity. FDA sanctions could include refusal to approve pending applications, withdrawal of an approval, clinical hold, warning or untitled letters, product recalls, product seizures, total or partial suspension of production or distribution, injunctions, fines, refusals of government contracts, mandated corrective advertising or communications with doctors, debarment, restitution, disgorgement of profits, or civil or criminal penalties. Any agency or judicial enforcement action could have a material adverse effect on us.

Biological product manufacturers and other entities involved in the manufacture and distribution of approved biological products 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 cGMP and other laws. Accordingly, manufacturers must continue to expend time, money, and effort in the area of production and quality control to maintain cGMP compliance. Discovery of problems with a product after approval may result in restrictions on a product, manufacturer, or holder of an approved BLA, including withdrawal of the product from the market. In addition, changes to the manufacturing process or facility generally require prior FDA approval before being implemented and other types of changes to the approved product, such as adding new indications and additional

labeling claims, are also subject to further FDA review and approval.

U.S. Patent Term Restoration and Marketing Exclusivity

Depending upon the timing, duration and specifics of the FDA approval of the use of our product candidates, some of our U.S. patents may be eligible for limited patent term extension under the Drug Price Competition and Patent Term Restoration Act of 1984, commonly referred to as the Hatch-Waxman Amendments. The Hatch-Waxman Amendments permit a patent restoration term of up to five years as compensation for patent term lost during product development and the FDA regulatory review process. However, patent term restoration cannot extend the remaining term of a patent beyond a total of 14 years from the product's approval date. The patent term restoration period is generally one-half the time between the effective date of an IND and the submission date of a BLA plus the time between the submission date of a BLA and the approval of that application. Only one patent applicable to an approved biological product is eligible for the extension and the application for the extension must be submitted prior to the expiration of the patent. The U.S. Patent and Trademark Office, in consultation with the FDA, reviews and approves the application for any patent term extension or restoration. In the future, we may intend to apply for restoration of patent term for one of our currently owned or licensed patents to add patent life beyond its current expiration date, depending on the expected length of the clinical studies and other factors involved in the filing of the relevant BLA.

A biological product can obtain pediatric market exclusivity in the U.S. Pediatric exclusivity, if granted, adds six months to existing exclusivity periods and patent terms. This six-month exclusivity, which runs from the end of other exclusivity protection or patent term, may be granted based on the voluntary completion of a pediatric study in accordance with an FDA-issued "Written Request" for such a study.

The Patient Protection and Affordable Care Act (Affordable Care Act) signed into law on March 23, 2010, includes a subtitle called the Biologics Price Competition and Innovation Act of 2009, which created an abbreviated approval pathway for biological products shown to be similar to, or interchangeable with, an FDA-licensed reference biological product. This amendment to the PHS Act attempts to minimize duplicative testing. Biosimilarity, which requires that there be no clinically meaningful differences between the biological product and the reference product in terms of safety, purity, and potency, can be shown through analytical studies, animal studies, and a clinical study or studies. Interchangeability requires that a product is biosimilar to the reference product and the product must demonstrate that it can be expected to produce the same clinical results as the reference product and, for products administered multiple times, 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. However, complexities associated with the larger, and often more complex, structure of biological products, as well as the process by which such products are manufactured, pose significant hurdles to implementation that are still being worked out by the FDA.

A reference biologic is granted 12 years of exclusivity from the time of first licensure of the reference product. The first biologic product submitted under the abbreviated approval pathway that is determined to be interchangeable with the reference product has exclusivity against other biologics submitting under the abbreviated approval pathway for the lesser of (i) one year after the first commercial marketing, (ii) 18 months after approval if there is no legal challenge, (iii) 18 months after the resolution in the applicant's favor of a lawsuit challenging the biologics' patents if an application has been submitted, or (iv) 42 months after the application has been approved if a lawsuit is ongoing within the 42-month period.

Additional Regulation

In addition to the foregoing, state and federal laws regarding environmental protection and hazardous substances, including the Occupational Safety and Health Act, the Resource Conservancy and Recovery Act and the Toxic Substances Control Act, affect our business. These and other laws govern our use, handling and disposal of various biological, chemical and radioactive substances used in, and wastes generated by, our operations. If our operations result in contamination of the environment or expose individuals to hazardous substances, we could be liable for damages and governmental fines. We believe that we are in material compliance with applicable environmental laws and that continued compliance therewith will not have a material adverse effect on our business. We cannot predict, however, how changes in these laws may affect our future operations. Equivalent laws have been adopted in other countries that impose similar obligations.

Other U.S. Healthcare Laws and Regulations

Healthcare providers, physicians and third-party payors play a primary role in the recommendation and use of pharmaceutical products that are granted marketing approval. Arrangements with third-party payors, existing or potential customers and referral sources are subject to broadly applicable fraud and abuse and other healthcare laws and regulations, and these laws and regulations may constrain the business or financial arrangements and relationships through which manufacturers market, sell and distribute the products for which they obtain marketing approval. Such restrictions under applicable federal and state healthcare laws and regulations include the following:

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the federal Anti-Kickback Statute, which prohibits, among other things, persons from knowingly and willfully soliciting, receiving, offering or paying remuneration, directly or indirectly, in cash or kind, in exchange for, or to induce, 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 healthcare programs such as the Medicare and Medicaid programs. This statute has been interpreted to apply to arrangements between pharmaceutical manufacturers, on the one hand, and prescribers, purchasers and formulary managers on the other. The PPACA amends the intent requirement of the federal Anti-Kickback Statute. A person or entity no longer needs to have actual knowledge of this statute or specific intent to violate it;

- the federal False Claims Act (FCA), which prohibits, among other things, individuals or entities from knowingly presenting, or causing to be presented, claims for payment from Medicare, Medicaid or other third-party payors that are false or fraudulent. Federal Anti-Kickback Statute violations and certain marketing practices, including off-label promotion, also may implicate the FCA:
- federal criminal laws that prohibit executing a scheme to defraud any healthcare benefit program or making false statements relating to healthcare matters;

- the federal Physician Payment Sunshine Act, which requires certain manufacturers of drugs, devices, biologics and medical supplies to report annually to CMS information related to payments and other transfers of value to physicians, other healthcare providers and teaching hospitals, and ownership and investment interests held by physicians and other healthcare providers and their immediate family members;
- the Health Insurance Portability and Accountability Act of 1996 (HIPAA) imposes criminal and civil liability for executing a scheme to defraud any healthcare benefit program or making false statements relating to healthcare matters;
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, which governs the conduct of certain electronic healthcare transactions and protects the security and privacy of protected health information; and
- state and foreign law equivalents of each of the above federal laws, such as anti-kickback and false claims laws which may apply to: items or services reimbursed by any third-party payor, including commercial insurers; 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 or otherwise restrict payments that may be made to healthcare providers and other potential referral sources; state laws that require drug manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers or marketing expenditures; and state laws governing the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways and may not have the same effect, thus complicating compliance efforts.

Violation of any of the laws described above or any other governmental laws and regulations may result in penalties, including civil and criminal penalties, damages, fines, the curtailment or restructuring of operations, the exclusion from participation in federal and state healthcare programs and imprisonment. Furthermore, efforts to ensure that business activities and business arrangements comply with applicable healthcare laws and regulations can be costly for manufacturers of branded prescription products.

Coverage and Reimbursement

Significant uncertainty exists as to the coverage and reimbursement status of any products for which we may obtain regulatory approval. In the U.S. and markets in other countries, sales of any product candidates for which regulatory approval for commercial sale is obtained will depend in part on the availability of coverage and reimbursement from third-party payors. Third-party payors include government authorities, managed care providers, private health insurers and other organizations. The process for determining whether a payor will provide coverage for a drug product may be separate from the process for setting the reimbursement rate that the payor will pay for the drug product. Third-party payors may limit coverage to specific drug products on an approved list, or formulary, which might not include all of FDA-approved drugs for a particular indication. Moreover, a payor's decision to provide coverage for a drug product does not imply that an adequate reimbursement rate will be approved.

Third-party payors are increasingly challenging the price and examining the medical necessity and cost-effectiveness of medical products and services, in addition to their safety and efficacy. New metrics frequently are used as the basis for reimbursement rates, such as average sales price, average manufacturer price and actual acquisition cost. In order to obtain coverage and reimbursement for any product that might be approved for sale, it may be necessary to conduct expensive pharmacoeconomic studies in order to demonstrate the medical necessity and cost-effectiveness of the products, in addition to the costs required to obtain regulatory approvals. If third-party payors do not consider a product to be cost-effective compared to other available therapies, they may not cover the product after approval as a benefit under their plans or, if they do, the level of payment may not be sufficient to allow a company to sell its products at a profit. Health Technology Assessment which is intended to take account of medical, social, economic and ethical issues when determining the suitability of a medicinal product for reimbursement has increasingly become an element of the pricing and reimbursement decisions of the competent authorities in European Union Member States.

The U.S. government, state legislatures and foreign governments have shown significant interest in implementing cost containment programs to limit the growth of government-paid health care costs, including price controls, restrictions on reimbursement and requirements for substitution of generic products for branded prescription drugs. By way of example, the PPACA contains provisions that may reduce the profitability of drug products, including, for example, increasing the minimum rebates owed by manufacturers under the Medicaid Drug Rebate Program, extending the rebate program to individuals enrolled in Medicaid managed care plans, addressing a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for drugs that are inhaled, infused, instilled, implanted or injected and establishing annual fees based on pharmaceutical companies' share of sales to federal health care programs. Adoption of government controls and measures, and tightening of restrictive policies in jurisdictions with existing controls and measures, could limit payments for pharmaceuticals.

U.S. Foreign Corrupt Practices Act

The U.S. Foreign Corrupt Practices Act, to which we are subject, prohibits corporations and individuals from engaging in certain activities to obtain or retain business or to influence a person working in an official capacity. It is illegal to pay, offer to pay or authorize the payment of anything of value to any foreign government official, government staff member, political party or political candidate in an attempt to obtain or retain business or to otherwise influence a person working in an official capacity. Equivalent laws have been adopted in other countries that impose similar obligations.

Government Regulation Outside of the U.S.

In addition to regulations in the U.S., we will be subject to a variety of regulations in other jurisdictions governing, among other things, clinical studies and any commercial sales and distribution of our products. Because biologically sourced raw materials are subject to unique contamination risks, their use may be restricted in some countries.

Whether or not we obtain FDA approval for a product, we must obtain the requisite approvals from regulatory authorities in foreign countries prior to the commencement of clinical studies or marketing of the product in those countries. Many countries outside of the U.S. have a similar process that requires the submission of a clinical study application much like the IND prior to the commencement of human clinical studies. In the European Union, for example, an application for authorization of a clinical trial must be submitted to the competent regulatory authorities and a request for a related positive opinion must be submitted to the competent Ethics Committees in the European Union Member States in which the clinical trial takes place, much like the FDA and the IRB, respectively. Once the clinical trial has been approved by the competent regulatory authorities and a positive opinion has been provided by the competent Ethics Committees in accordance with the European Union and the European Union Member State requirements, the corresponding clinical study may proceed.

To obtain regulatory approval of a biological medicinal product under European Union regulatory systems, we must submit a marketing authorization application. 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 and Regulation (EC) No 726/2004 of the European Parliament and of the Council of 31 March 2004 laying down Community procedures for the authorization and supervision of medicinal products for human and veterinary use and establishing the EMA, commonly referred to as the EMA Regulation. 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 the EMA which provides an opinion regarding the application for marketing authorization. The European Commission grants or refuses marketing authorization after the EMA has delivered its opinion.

Innovative medicinal products are authorized in the European Union on the basis of a full marketing authorization application (as opposed to an application for marketing authorization that relies, in whole or in part, on data in the marketing authorization dossier for another, previously approved medicinal product). Applications for marketing authorization for innovative medicinal products must contain the results of pharmaceutical tests, pre-clinical tests and clinical trials conducted with the medicinal product for which marketing authorization is sought. Innovative medicinal products for which marketing authorization is granted are entitled to eight years of data exclusivity. During this period, applicants for approval of generics or biosimilars of these innovative products cannot rely on data contained in the marketing authorization dossier submitted for the innovative medicinal product to support their application. Innovative medicinal products for which marketing authorization is granted are also entitled to ten years of market

exclusivity. During these ten years' of market exclusivity, no generic or biosimilar medicinal product may be placed on the European Union market even if a marketing authorization for approval of a generic or biosimilar of the innovative product has been submitted to the EMA or to the competent regulatory authorities in the European Union Member States and marketing authorization has been granted. The ten years of market exclusivity 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 their authorization, are held to bring a significant clinical benefit in comparison with existing therapies. However, there is no guarantee that a product will be considered by the European Union's regulatory authorities to be an innovative medicinal product which is eligible for the relevant periods of data and market exclusivity.

Products authorized as "orphan medicinal products" in the European Union are entitled to benefits additional to those granted in relation to innovative medicinal products. In accordance with Article 3 of Regulation (EC) No. 141/2000 of the European Parliament and of the Council of 16 December 1999 on orphan medicinal products, a medicinal product may be designated as an orphan medicinal product if (1) it is intended for the diagnosis, prevention or treatment of a life-threatening or chronically debilitating condition; (2) either (a) such condition affects no more than five in 10,000 persons in the European Union when the application is made, or (b) the product, without the incentives derived from orphan medicinal product status, would not generate sufficient return in

the European Union to justify investment; and (3) there exists no satisfactory method of diagnosis, prevention or treatment of such condition authorized for marketing in the European Union, or if such a method exists, the product will be of significant benefit to those affected by the condition. Further guidance on such criteria is provided in European Commission Regulation (EC) No. 847/2000 of 27 April 2000 laying down the provisions for implementation of the criteria for designation of a medicinal product as an orphan medicinal product and definitions of the concepts "similar medicinal product" and "clinical superiority". Orphan medicinal products are eligible for financial incentives such as reduction of fees or fee waivers and following grant of a marketing authorization, the EMA and the European Union Member States' competent authorities are not permitted to accept another application for a marketing authorization, or grant a marketing authorization or accept an application to extend an existing marketing authorization, for the same therapeutic indication of a similar medicinal product for ten years following grant or authorization. The application for orphan drug designation must be submitted before the application for marketing authorization. The applicant may receive a fee reduction for the marketing authorization application if the orphan drug designation has been granted, but not if the designation is still pending at the time the marketing authorization is submitted. Orphan drug designation does not convey any advantage in, or shorten the duration of, the regulatory review and approval process.

Products authorized in the European Union as orphan medicinal products are entitled to 10 years of data exclusivity. The products are, in parallel, entitled to 10 years of market exclusivity. The 10-year market exclusivity may 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 designation, for example, if the product is sufficiently profitable not to justify maintenance of market exclusivity. Additionally, marketing authorization may be granted to a similar product during the 10-year period of market exclusivity for the same therapeutic indication at any time if:

- The second applicant can establish in its application that its product, although similar to the orphan medicinal product already authorized, is safer, more effective or otherwise clinically superior;
- The holder of the marketing authorization for the original orphan medicinal product consents to a second orphan medicinal product application; or
- The holder of the marketing authorization for the original orphan medicinal product cannot supply enough orphan medicinal product.

Similar to obligations imposed in the U.S., medicinal products authorized in the European Union may be subject to post-authorization obligations, including the obligation to conduct Phase IV trials.

Moreover, in the European Union, the sole legal instrument at the European Union level governing the pricing and reimbursement of medicinal products is Council Directive 89/105/EEC (the Price Transparency Directive). The aim of the Price Transparency Directive is to ensure that pricing and reimbursement mechanisms established in European Union Member States are transparent and objective, do not hinder the free movement and trade of medicinal products in the European Union and do not hinder, prevent or distort competition on the market. The Price Transparency Directive does not, however, provide any guidance concerning the specific criteria on the basis of which pricing and reimbursement decisions are to be made in individual European Union Member States. Neither does it have any direct consequence for pricing or levels of reimbursement in individual European Union Member States. The national authorities of the individual European Union Member States are free to restrict the range of medicinal products for which their national health insurance systems provide reimbursement and to control the prices and/or reimbursement of medicinal products for human use. Individual European Union Member States adopt policies according to which a specific price or level of reimbursement is approved for the medicinal product. Other European Union Member States adopt a system of reference pricing, basing the price or reimbursement level in their territory either, on the pricing and reimbursement levels in other countries, or on the pricing and reimbursement levels of medicinal products intended for the same therapeutic indication. Furthermore, some European Union Member States impose direct or indirect controls on the profitability of the company placing the medicinal product on the market.

Health Technology Assessment (HTA) of medicinal products is becoming an increasingly common part of the pricing and reimbursement procedures in some European Union Member States. These countries include the United Kingdom, France, Germany, Ireland, Italy, and Sweden. The HTA process in the European Union Member States is governed by the national laws of these countries. HTA is the procedure according to which the assessment of the public health impact, therapeutic impact and the economic and societal impact of the use of a given medicinal product in the national healthcare systems of the individual country is conducted. HTA generally focuses on the clinical efficacy and effectiveness, safety, cost, and cost-effectiveness of individual medicinal products as well as their potential implications for the national healthcare system. Those elements of medicinal products are compared with other treatment options available on the market.

The outcome of HTA may influence the pricing and reimbursement status for specific medicinal products within individual European Union member states. The extent to which pricing and reimbursement decisions are influenced by the HTA of a specific medicinal product vary between the European Union Member States.

In 2011, Directive 2011/24/EU was adopted at the European Union level. This Directive concerns the application of patients' rights in cross-border healthcare. The Directive is intended to establish rules for facilitating access to safe and high-quality cross-border healthcare in the European Union. It also provides for the establishment of a voluntary network of national authorities or bodies responsible for HTA in the individual European Union Member States. The purpose of the network is to facilitate and support the exchange of scientific information concerning HTAs. This could lead to harmonization of the criteria taken into account in the conduct of HTA between European Union Member States and in pricing and reimbursement decisions and negatively impact price in at least some European Union Member States.

For other countries outside of the European Union, such as countries in Eastern Europe, Latin America or Asia, the requirements governing the conduct of clinical studies, product licensing, pricing and reimbursement vary from country to country. In all cases, again, the clinical studies are conducted in accordance with GCP and the applicable regulatory requirements and the ethical principles that have their origin in the Declaration of Helsinki.

If we fail to comply with applicable foreign regulatory requirements, we may be subject to, among other things, fines, suspension or withdrawal of regulatory approvals, product recalls, seizure of products, operating restrictions and criminal prosecution.

Employees

As of March 1, 2016, we employed 56 full-time employees, including 27 in research and development and 29 in executive, general and administrative functions. We have never had a work stoppage, and none of our employees is represented by a labor organization or under any collective bargaining arrangements. We consider our relationship with our employees to be good.

Corporate Information

We were originally formed on July 16, 2008 as ReGenX, LLC, a Delaware limited liability company, and we were subsequently renamed ReGenX Biosciences, LLC on December 22, 2009. On September 16, 2014, we underwent a corporate reorganization pursuant to which we were converted into a Delaware corporation under the name REGENXBIO Inc. Our principal offices are located at 9712 Medical Center Drive, Suite 100, Rockville, MD 20850, and our telephone number is (240) 552-8181. Our website address is www.regenxbio.com. Our website and the information contained on, or that can be accessed through, the website will not be deemed to be incorporated by reference in, and are not considered part of, this Annual Report on Form 10-K. You should not rely on any such information in making your decision whether to purchase our common stock.

Available Information

We file annual, quarterly, and current reports, proxy statements, and other documents with the Securities and Exchange Commission (SEC) under the Securities Exchange Act of 1934, as amended (the Exchange Act). The public may read and copy any materials that we file with the SEC at the SEC’s Public Reference Room at 100 F Street, NE, Washington, DC 20549. The public may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. Also, the SEC maintains an Internet website that contains reports, proxy and information statements, and other information regarding issuers, including us, that file electronically with the SEC. The public can obtain any documents that we file with the SEC at www.sec.gov.

Copies of each of our filings with the SEC on Form 10-K, Form 10-Q and Form 8-K and all amendments to those reports, can be viewed and downloaded free of charge at our website, www.regenxbio.com after the reports and amendments are electronically filed with or furnished to the SEC.

Our code of ethics, corporate governance guidelines, other corporate policies and procedures, and the charters of our Audit Committee, Compensation Committee and Nominating and Corporate Governance Committee are available through our website at www.regenxbio.com.

ITEM 1A. RISK FACTORS

Investing in our common stock involves risk. You should carefully consider the risks described below as well as all the other information in this Annual Report on Form 10-K, including the financial statements and the related notes appearing at the end of this Annual Report on Form 10-K, before making an investment decision. The risks and uncertainties described below are not the only risks and uncertainties we face. Additional risks and uncertainties not presently known to us or that we currently deem immaterial also may impair our business operations. If any of the following risks actually occur, our business, results of operations and financial condition could suffer. In that event the trading price of our common stock could decline, and you may lose all or part of your investment. The risks discussed below also include forward-looking statements and our actual results may differ substantially from those discussed in these forward-looking statements.

Risks Related to our NAV Technology Platform and the Development of Our Product Candidates

Our gene therapy product candidates are 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 therapy product has been approved in the United States and only one such product has been approved in the European Union.

We have concentrated our research and development efforts on our proprietary adeno-associated virus (AAV) gene delivery platform (our NAV Technology Platform), and our future success depends on our and our licensees' successful development and commercialization of viable gene therapy product candidates. There can be no assurance that we or our licensees will not experience problems or delays in developing current or future product candidates or that such problems or delays will not cause unanticipated costs, or that any such development problems can be solved. We also may experience unanticipated problems or delays in expanding our manufacturing capacity, and this may prevent us from completing our clinical trials, meeting the obligations of our collaborations or commercializing our products on a timely or profitable basis, if at all. For example, we, a partner or another group may uncover one or more previously unknown risks associated with AAV or our NAV Technology Platform, and this may prolong the period of observation required for obtaining regulatory approval, necessitate additional clinical testing or invalidate our NAV Technology.

In addition, the clinical trial requirements of the United States (U.S.) Food and Drug Administration (the FDA), the European Medicines Agency (the EMA) and other regulatory authorities and the criteria these regulators use to determine the quality, safety and efficacy of a product candidate vary substantially according to the type, complexity, novelty and intended use and market of such product candidates. The regulatory approval process for novel product candidates such as ours can be significantly more expensive and take longer than for other, better known or more extensively studied product candidates. No gene therapy product has been approved in the U.S., and only one gene therapy product, uniQure N.V.'s Glybera, has received marketing authorization from the European Commission. It is difficult to determine how long it will take or how much it will cost to obtain regulatory approvals for our product candidates in either the U.S. or the European Union or how long it will take to commercialize our product candidates. Furthermore, approvals by the European Commission may not be indicative of what the FDA may require for approval.

Regulatory requirements governing gene and cell therapy products have changed frequently and may continue to change in the future. The FDA has established the Office of Cellular, Tissue and Gene Therapies within its Center for Biologics Evaluation and Research (CBER), to consolidate the review of gene therapy and related products, and has established the Cellular, Tissue and Gene Therapies Advisory Committee to advise CBER in its review. Gene therapy clinical trials conducted at institutions that receive funding for recombinant DNA research from the U.S. National Institutes of Health (NIH), also are potentially subject to review by the NIH Office of Biotechnology Activities' Recombinant DNA Advisory Committee (the RAC). However, NIH announced in 2014 that the RAC will soon only publicly review clinical trials if the trials cannot be evaluated by standard oversight bodies and pose unusual risks.

Although the FDA decides whether individual gene therapy protocols may proceed, the RAC public review process, if undertaken, can delay the initiation of a clinical trial, even if the FDA has reviewed the trial design and details and approved its initiation. Conversely, the FDA can put an investigational new drug (IND) application on a clinical hold even if the RAC has provided a favorable review or an exemption from in-depth, public review. If we were to engage an NIH-funded institution to conduct a clinical trial, that institution's institutional biosafety committee as well as its institutional review board (IRB) would need to review the proposed clinical trial to assess the safety of the trial. In addition, adverse developments in clinical trials of gene therapy products conducted by others may cause the FDA or other oversight bodies to change the requirements for approval of any of our product candidates. Similarly, in the European Union, the EMA's Committee for Advanced Therapies (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 EMA. In the European Union, the development and evaluation of a gene therapy medicinal product must be considered in the context of the relevant European Union guidelines. This includes the Note for guidance on the quality, preclinical and clinical aspects of gene therapy medicinal products. This guidance document (CPMP/BWP/3088/99) is currently under review in the European Union. A related draft guideline was released by the EMA for consultation on March 23, 2015. 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.

These regulatory review committees and advisory groups and the new guidelines they promulgate may lengthen the regulatory review process, require us to perform additional studies, increase our development costs, lead to changes in regulatory positions and interpretations, delay or prevent approval and commercialization of our product candidates or lead to significant post-approval limitations or restrictions. As we advance our product candidates, we will be required to consult with these regulatory and advisory groups, and comply with applicable guidelines. If we fail to do so, we may be required to delay or discontinue development of certain of our product candidates. These additional processes may result in a review and approval process that is longer than we otherwise would have expected. Delay or failure to obtain, or unexpected costs in obtaining, the regulatory approval necessary to bring a potential product to market could decrease our ability to generate product revenue, and our business, financial condition, results of operations and prospects would be materially harmed.

Our business depends substantially on the success of RGX-111, RGX-121, RGX-314, RGX-321 and RGX-501 (collectively, our Lead Product Candidates), which are all still in preclinical development. If we are unable to obtain regulatory approval for, or successfully commercialize, our Lead Product Candidates or other future product candidates, our business will be materially harmed.

Our Lead Product Candidates are in the early stage of development and will require preclinical studies, substantial clinical development and testing, manufacturing bridging studies and process validation and regulatory approval prior to commercialization. Successful continued development and ultimate regulatory approval of our Lead Product Candidates is critical for our future business success and our ability to generate product revenue. We have invested, and will continue to invest, a significant portion of our financial resources in the development of our Lead Product Candidates. We will need to raise sufficient funds for, and successfully complete, our planned preclinical and future clinical trials of our Lead Product Candidates in appropriate subjects. The future regulatory and commercial success of these product candidates is subject to a number of risks, including the following:

- we may not have sufficient financial and other resources to complete the necessary preclinical studies and clinical trials for our Lead Product Candidates;
- we may not be able to provide evidence of quality, efficacy and safety for our Lead Product Candidates;
- we do not know the degree to which our Lead Product Candidates will be accepted by patients, the medical community and third-party payors as a therapy for the respective diseases to which they relate, even if approved;
- the results of our clinical trials may not meet the level of statistical or clinical significance required by the FDA, EMA or comparable foreign regulatory bodies for marketing approval;
- subjects in our clinical trials, if any, may die or suffer other adverse effects for reasons that may or may not be related to our Lead Product Candidates;
    - subjects in clinical trials, if any, undertaken by licensees under a license we grant of certain intellectual property related to our NAV Technology Platform (our NAV Technology Licensees) may die or suffer adverse effects, that may or may not be related to our NAV Technology Platform;
- certain patients' immune systems might prohibit the successful delivery of certain gene therapy products to the target tissue, thereby limiting the treatment outcomes;
- we may not successfully establish commercial manufacturing capabilities;
- if approved for treatment of Mucopolysaccharidosis Type I (MPS I), Mucopolysaccharidosis Type II (MPS II), wet age-related macular degeneration (wet AMD), X-linked retinitis pigmentosa (XLRP) and homozygous familial hypercholesterolemia (HoFH), our Lead Product Candidates will likely compete with other treatments then available, including the off-label use of products already approved for marketing and other therapies currently available or which may be developed;
- our products and products developed by our NAV Technology Licensees, if any, may not maintain a continued acceptable safety profile following regulatory approval;
    - we may not maintain compliance with post-approval regulation and other requirements; and

- we may not be able to obtain, maintain or enforce our rights under our licensed patents and other intellectual property rights.

Of the large number of biologics and drugs in development in the pharmaceutical industry, only a small percentage result in the submission of a Biologics License Application (BLA) to the FDA or marketing authorization application (MAA) to the EMA and even fewer are approved for commercialization. Furthermore, even if we do receive regulatory approval to market our Lead Product Candidates, any such approval may be subject to limitations on the indicated uses for which we may market the product. Accordingly,

even if we are able to obtain the requisite financing to continue to fund our development programs, we cannot assure you that our Lead Product Candidates will be successfully developed or commercialized. If we or any of our future development partners are unable to develop, or obtain regulatory approval for, or, if approved, successfully commercialize, our Lead Product Candidates, we may not be able to generate sufficient revenue to continue our business.

We may not be successful in our efforts to identify or discover additional product candidates.

The success of our business depends in large part upon our ability to identify, develop and commercialize products based on our NAV Technology Platform. Although our Lead Product Candidates are currently in preclinical development, our research programs may fail to identify other potential product candidates for clinical development for a number of reasons. Our research methodology may be unsuccessful in identifying potential product candidates or our potential product candidates may be shown to have harmful side effects or may have other characteristics that may make the products unmarketable or unlikely to receive marketing approval.

If any of these events occur, we may be forced to abandon our development efforts for a program or programs, which would materially harm our business and could potentially cause us to cease operations. 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.

We have not tested any of our viral vectors, or product candidates internally derived from these viral vectors, in our own clinical trials.

Gene therapy development has inherent risks. None of our internal product candidates have ever been evaluated in clinical studies and our Lead Product Candidates have limited preclinical results, if any, and we may experience unexpected results in the future. We or any of our future development partners will be required to demonstrate through adequate and well-controlled clinical trials that our product candidates containing our proprietary vectors are safe and effective, with a favorable benefit-risk profile, for use in their target indications before we can seek regulatory approvals for their commercial sale. Drug development is a long, expensive and uncertain process, and delay or failure can occur at any stage of development, including after commencement of any of our clinical trials.

The results of preclinical studies and early clinical trials are not always predictive of future results. Any product candidate we or any of our future development partners advance into clinical trials, including our Lead Product Candidates, may not have favorable results in later clinical trials, if any, or receive regulatory approval. There is a high failure rate for drugs and biologic products proceeding through clinical trials. Data obtained from preclinical and clinical activities are subject to varying interpretations that may delay, limit or prevent regulatory approval. In addition, we may experience regulatory delays or rejections as a result of many factors, including due to changes in regulatory policy during the period of our product candidate development. Any such delays could materially harm our business, financial condition, results of operations and prospects.

If our NAV vectors are not shown to be safe and effective, we may not realize the value of our investment in our technology. In addition, success in early clinical trials does not mean that later clinical trials will be successful, because product candidates in later-stage clinical trials may fail to demonstrate sufficient safety or efficacy despite having progressed through initial clinical testing. Furthermore, our future trials will need to demonstrate sufficient safety and efficacy for approval by regulatory authorities in larger patient populations. Companies frequently suffer significant setbacks in advanced clinical trials, even after earlier clinical trials have shown promising results. In addition, only a small percentage of drugs under development result in the submission of a BLA to the FDA or MAA to the EMA and even fewer are approved for commercialization.

We cannot be certain that any of our planned clinical trials will be successful, and any safety concerns observed in any one of our planned clinical trials in our targeted indications could limit the prospects for regulatory approval of our product candidates in those and other indications. In addition, failure of one or more of our viral vectors, whether in our internally developed product candidates or those of our licensees, would impact the licensing of our NAV Technology Platform. Any such failure could materially harm our business, financial condition, results of operations and prospects.

Because we are developing product candidates for the treatment of diseases in which there is little clinical experience using new endpoints or methodologies, there is increased risk that the FDA, EMA or other comparable foreign 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 FDA review process, we will need to identify success criteria and endpoints such that the FDA will be able to determine the clinical efficacy and safety profile of our product candidates. As we are developing novel treatments for diseases in which there is little clinical experience with new endpoints and methodologies, there is heightened risk that the FDA, the EMA or

comparable foreign regulatory bodies may not consider the clinical trial endpoints 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 European Union and other countries, such as the EMA's CAT, may make similar comments with respect to these endpoints and data. As discussed above, our gene therapy product candidates are 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 therapy product has been approved in the U.S. Only one gene therapy product has received marketing authorization from the European Commission.

The results from our preclinical studies or clinical trials for our Lead Product Candidates may not support as broad a marketing approval as we seek, and the FDA and the EMA or other regulatory authorities may require us to conduct additional clinical trials or evaluate subjects for an additional follow-up period.

While we believe our Lead Product Candidates should be applicable for the treatment of patients with MPS I, MPS II, wet AMD, XLRP and HoFH, the results from our preclinical and planned clinical trials may not support as broad of a marketing approval as we seek. Even if we obtain regulatory approval for our Lead Product Candidates, we may be required by the FDA, the EMA or comparable foreign regulatory bodies to conduct additional clinical trials to support approval of our Lead Product Candidates for patients diagnosed with different mutations of MPS I, MPS II, wet AMD, XLRP and HoFH. This could result in our experiencing significant increases in costs and substantial delays in obtaining, or never obtaining, marketing approval for our Lead Product Candidates to treat patients diagnosed with MPS I, MPS II, wet AMD, XLRP and HoFH, respectively. The inability to market our Lead Product Candidates to treat patients with MPS I, MPS II, wet AMD, XLRP and HoFH, would materially harm our business, financial condition, results of operations and prospects.

We may find it difficult to enroll patients in clinical trials, and this could delay or prevent us from proceeding with clinical trials of our product candidates.

Identifying and qualifying patients to participate in clinical trials of our product candidates is critical to our success. The timing of our planned clinical trials depends on our ability to recruit patients to participate as well as completion of required follow-up periods. If patients are unwilling to participate in our gene therapy studies because of negative publicity from adverse events related to the biotechnology or gene therapy fields, competitive clinical trials for similar patient populations, clinical trials in products employing our vectors or our platform or for other reasons, the timeline for recruiting patients, conducting studies and obtaining regulatory approval of our product candidates may be delayed. These delays could result in increased costs, delays in advancing our product candidates, delays in testing the effectiveness of our product candidates or termination of the clinical trials altogether.

We may not be able to identify, recruit and enroll a sufficient number of patients, or those with required or desired characteristics, to complete our planned clinical trials in a timely manner. Patient enrollment and trial completion is affected by factors including:

- size of the patient population and process for identifying subjects;
- design of the trial protocol;
- eligibility and exclusion criteria;
- perceived risks and benefits of the product candidate under study;
- perceived risks and benefits of gene therapy-based approaches to treatment of diseases;

- availability of competing therapies and clinical trials;
- severity of the disease under investigation;
- availability of genetic testing for potential patients;
- proximity and availability of clinical trial sites for prospective subjects;
- ability to obtain and maintain subject consent;
- risk that enrolled subjects will drop out before completion of the trial;

- patient referral practices of physicians; and
- ability to monitor subjects adequately during and after treatment.

Our current product candidates are being developed to treat a variety of conditions, many of which are rare. We plan to seek initial marketing approvals in the U.S. and the European Union. We may not be able to initiate or continue clinical trials if we cannot enroll a sufficient number of eligible patients to participate in the clinical trials required by the FDA, the EMA or other comparable foreign regulatory authorities. Our ability to successfully initiate, enroll and complete a clinical trial in any foreign country is subject to numerous risks unique to conducting business in foreign countries, including:

- difficulty in establishing or managing relationships with contract research organizations (CROs) and physicians;
- different standards for the conduct of clinical trials;
- absence in some countries of established groups with sufficient regulatory expertise for review of gene therapy protocols;
- our inability to locate qualified local consultants, physicians and partners; and
- the potential burden of complying with a variety of foreign laws, medical standards and regulatory requirements, including the regulation of pharmaceutical and biotechnology products and treatments.

If we have difficulty enrolling a sufficient number of patients to conduct our clinical trials as planned, we may need to delay, limit or terminate then ongoing or planned clinical trials, any of which would harm our business, financial condition, results of operations and prospects.

We may encounter substantial delays in our planned clinical trials, or we may fail to demonstrate safety and efficacy to the satisfaction of applicable regulatory authorities.

Before obtaining marketing approval from regulatory authorities for the sale of our product candidates, we must conduct extensive clinical trials to demonstrate the safety and efficacy of the product candidates. Clinical testing is expensive, time-consuming and uncertain as to outcome. We cannot guarantee that any clinical trials will be conducted as planned or completed on schedule, if at all. A failure of one or more clinical trials can occur at any stage of testing. Events that may prevent successful or timely completion of preclinical and clinical development include:

- delays in reaching a consensus with regulatory authorities on trial design;
- delays in reaching agreement on acceptable terms with prospective CROs and clinical trial sites;
- delays in opening clinical trial sites or obtaining required IRB or independent Ethics Committee approval at each clinical trial site;
- delays in recruiting suitable subjects to participate in our clinical trials;
- imposition of a clinical hold by regulatory authorities as a result of a serious adverse event or after an inspection of our clinical trial operations or trial sites;
- failure by us, any CROs we engage or any other third parties to adhere to clinical trial requirements;
- failure to perform in accordance with the FDA good clinical practice (GCP), or applicable regulatory guidelines in the European Union and other countries;
- delays in the testing, validation, manufacturing and delivery of our product candidates to the clinical sites, including delays by third parties with whom we have contracted to perform certain of those functions;
- delays in having subjects complete participation in a trial or return for post-treatment follow-up;
- clinical trial sites or subjects dropping out of a trial;
- selection of clinical endpoints that require prolonged periods of clinical observation or analysis of the resulting data;
- occurrence of serious adverse events associated with the product candidate that are viewed to outweigh its potential benefits;
- occurrence of serious adverse events in trials of the same class of agents conducted by other sponsors; or
- changes in regulatory requirements and guidance that require amending or submitting new clinical protocols.

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Any inability to successfully complete research studies, preclinical and clinical development could result in additional costs to us or impair our ability to generate revenues from product sales, regulatory and commercialization milestones and royalties. In addition, if we make manufacturing or formulation changes to our product candidates, we may need to conduct additional studies to bridge our modified product candidates to earlier versions. 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, which could impair our ability to successfully commercialize our product candidates and may harm our business, financial condition, results of operations and prospects.

Additionally, if the results of our planned clinical trials are inconclusive or if there are safety concerns or serious adverse events associated with our product candidates, we may:

- be delayed in obtaining marketing approval for our product candidates, if at all;
- obtain approval for indications or patient populations that are not as broad as intended or desired;
- obtain approval with labeling that includes significant use or distribution restrictions or safety warnings;
- be subject to changes in the way the product is administered;
- be required to perform additional clinical trials to support approval or be subject to additional post-marketing testing or other requirements;
- have regulatory authorities withdraw, vary or suspend, their approval of the product or impose restrictions on its distribution in the form of a modified risk evaluation and mitigation strategy;
- be subject to the addition of labeling statements, such as warnings or contraindications;
- be sued; or
- experience damage to our reputation.

Our NAV Technology Platform, our Lead Product Candidates and future product candidates, if any, or NAV Technology Licensees' product candidates, and the process for administering such product candidates may cause undesirable side effects or have other properties that could delay or prevent regulatory approval of product candidates, limit the commercial potential or result in significant negative consequences following any potential marketing approval.

There have been several significant adverse side effects in gene therapy treatments in the past, including reported cases of leukemia in trials using lentivirus vectors and death seen in other trials using adenovirus vectors. For example, in 1999, a gene therapy trial of research subjects with ornithine transcarbamylase (OTC) deficiency, a rare disorder in which the liver lacks a functional copy of the OTC gene, resulted in the death of a trial subject due to complications of adenovirus vector administration. James M. Wilson, M.D., Ph.D. was a co-investigator of the 1999 trial while he was Director of the Institute for Human Gene Therapy of the University of Pennsylvania. While new recombinant vectors have been designed to reduce these side effects, gene therapy is still a relatively new approach to disease treatment and additional adverse side effects could develop. There also is the potential risk of delayed adverse events following exposure to gene therapy products due to persistent biologic activity of the genetic material or other components of products used to carry the genetic material. Possible adverse side effects that could occur with treatment with gene therapy products include an immunologic reaction early after administration which could substantially limit the effectiveness of the treatment. In previous clinical trials involving AAV vectors for gene therapy, some subjects experienced the development of a T-cell response, whereby after the vector is within the target cell, the cellular immune response system triggers the removal of transduced cells by activated T-cells. If our vectors demonstrate a similar effect, we may decide or be required to halt or delay preclinical development or clinical development of our product candidates.

In addition to side effects caused by the product candidate, the administration process or related procedures also can cause adverse side effects. If any such adverse events occur in our or third party trials, our clinical trials could be suspended or terminated.

As a result of these concerns, the FDA, the European Commission, the EMA or other comparable foreign regulatory authorities could order us to cease further development of, or deny approval of, our product candidates for any or all targeted indications. 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 of our product candidates, 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 develop other product candidates and may harm our business, financial condition and prospects significantly.

Additionally, if any of our product candidates receives marketing approval, the FDA could require us to adopt a Risk Evaluation and Mitigation Strategy (REMS) to ensure that the benefits outweigh its risks. A REMS may include, among other things, a medication guide outlining the risks of the product for distribution to patients; a communication plan to health care practitioners; and elements to assure safe use, which can severely restrict the distribution of a product by, for example, requiring that health care providers receive particular training and obtain special certification prior to prescribing and dispensing the product, limiting the healthcare settings in which the product may be dispensed, and subjecting patients to monitoring and enrollment in a registry. If FDA requires us to adopt a REMS for our products and we are unable to comply with its requirements, FDA may deem our products to be misbranded and we may be subject to civil money penalties. The European Commission and other comparable foreign regulatory authorities may, following grant of marketing authorization in their territory, impose similar obligations.

Furthermore, if we or others later identify undesirable side effects caused by one of our product candidates, several potentially significant negative consequences could result, including:

- regulatory authorities may suspend, vary or withdraw approvals of such product candidate;
- regulatory authorities may require additional warnings on the label;
- we may be required to change the way a product candidate is administered or conduct additional clinical trials;
- we could be sued and held liable for harm caused to patients; and
- our reputation may suffer.

Any of these events could prevent us from achieving or maintaining market acceptance of our NAV Technology Platform and our product candidates and could materially harm our business, prospects, financial condition and results of operations.

We may be unable to obtain orphan drug designation or exclusivity. If our competitors are able to obtain orphan drug exclusivity for products that constitute the same drug and treat the same indications as our product candidates, we may not be able to have competing products approved by the applicable regulatory authority for a significant period of time.

Regulatory authorities in some jurisdictions, including the U.S. and the European Union, may designate drugs for relatively small patient populations as orphan drugs. Under the Orphan Drug Act of 1983, the FDA may designate a product candidate as an orphan drug if it is intended to treat a rare disease or condition, which is defined under the Food, Drug and Cosmetic Act as having a patient population of fewer than 200,000 individuals in the U.S., or a patient population greater than 200,000 in the U.S. where there is no reasonable expectation that the cost of developing the drug will be recovered from sales in the U.S. In the European Union, following the opinion of the EMA's Committee for Orphan Medicinal Products, the European Commission grants orphan drug designation to promote the development of products that are intended for the diagnosis, prevention or treatment of a life-threatening or chronically debilitating condition affecting not more than five in 10,000 persons in the European Union. Additionally, orphan designation is granted for products intended for the diagnosis, prevention or treatment of a life-threatening, seriously debilitating or serious and chronic condition and when, without incentives, it is unlikely that sales of the drug in the European Union would be sufficient to justify the necessary investment in developing the drug or biologic product.

Generally, if a product candidate with an orphan drug designation 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 European Commission from approving another marketing application for a product that constitutes the same drug treating the same indication for that marketing exclusivity period, except in limited circumstances. If another sponsor receives such approval before we do (regardless of our orphan drug designation), we will be precluded from receiving marketing approval for our product for the applicable exclusivity period. The

applicable period is seven years in the U.S. and 10 years in the European Union. The exclusivity period in the U.S. can be extended by six months if the BLA sponsor submits pediatric data that fairly respond to a written request from the FDA for such data. 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 or if the product is sufficiently profitable so that market exclusivity is no longer justified. Orphan drug exclusivity may be revoked if any regulatory agency 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 patients with the rare disease or condition.

If we request orphan drug designation for any of our product candidates, there can be no assurances that the FDA or the European Commission will grant any of our product candidates such designation. Additionally, the designation of any of our product candidates as an orphan product does not guarantee that any regulatory agency will accelerate regulatory review of, or ultimately approve, that product candidate, nor does it limit the ability of any regulatory agency to grant orphan drug designation to product candidates of other companies that treat the same indications as our product candidates prior to our product candidates receiving exclusive marketing approval.

Even if we obtain orphan drug exclusivity for a product candidate, that exclusivity may not effectively protect the product candidate from competition because different drugs can be approved for the same condition. In the U.S., even after an orphan drug is approved, the FDA may subsequently approve another drug for the same condition if the FDA concludes that the latter drug is not the same drug or is clinically superior in that it is shown to be safer, more effective or makes a major contribution to patient care. In the European Union, marketing authorization may be granted to a similar medicinal product for the same orphan indication if:

- the second applicant can establish in its application that its medicinal product, although similar to the orphan medicinal product already authorized, is safer, more effective or otherwise clinically superior;
- the holder of the marketing authorization for the original orphan medicinal product consents to a second orphan medicinal product application; or
- the holder of the marketing authorization for the original orphan medicinal product cannot supply sufficient quantities of orphan medicinal product.

Even if we complete the necessary preclinical and clinical trials, we cannot predict when, or if, we will obtain regulatory approval to commercialize a product candidate and the approval may be for a more narrow indication than we seek.

We cannot commercialize a product candidate until the appropriate regulatory authorities have reviewed and approved the product candidate. Even if our product candidates meet their safety and efficacy endpoints in clinical trials, the regulatory authorities 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. In addition, we may experience delays or rejections based on additional government regulation from future legislation or administrative action or based on changes in regulatory authority policy during the period of product development, clinical trials and the review process.

Regulatory authorities also may approve a product candidate for more limited indications than requested (such as approving RGX-111 only for patients with Hurler syndrome, a severe subset of MPS I patients) or they may impose significant limitations in the form of narrow indications, warnings or a REMS. These regulatory authorities may require precautions or contra-indications with respect to conditions of use or they may grant approval subject to the performance of costly post-marketing clinical trials. In addition, regulatory authorities may not approve the labeling claims that are necessary or desirable for the successful commercialization of our product candidates. Any of the foregoing scenarios could materially harm the commercial prospects for our product candidates and materially harm our business, financial condition, results of operations and prospects.

Further, the regulatory authorities may require concurrent approval or the CE mark (a mandatory conformity assessment marking for certain products sold within the European Economic Area (EEA)) of a companion diagnostic device, since it may be necessary to use FDA- cleared or FDA-approved, or CE-marked, diagnostic tests or diagnostic tests approved by other comparable foreign regulatory authorities to diagnose patients or to assure the safe and effective use of our product candidates in trial subjects. FDA refers to such tests as in vitro companion diagnostic devices. On July 31, 2014, the FDA announced the publication of a final guidance document describing the agency's current thinking about the development and regulation of in vitro companion diagnostic devices. The final guidance articulates a policy position that, when safe and effective use of a therapeutic product depends on a diagnostic device, the FDA generally will require approval or clearance of the diagnostic device at the same time that FDA approves the therapeutic product. The final guidance allows for two exceptions to the general rule of concurrent drug/device approval, namely, when the therapeutic product is intended to treat serious and life-threatening conditions for which no alternative exists, and when a serious safety issue arises for an approved therapeutic agent, and no FDA-cleared or FDA-approved companion diagnostic test is yet available. It is unclear how the FDA will apply this policy to our current or future gene therapy product candidates. Although we believe diagnoses based on symptoms in conjunction with existing genetic tests developed and administered by laboratories certified under the Clinical Laboratory

Improvement Amendments (CLIA) are sufficient to diagnose patients for our current product candidates, the FDA may disagree. Should the FDA deem genetic tests used for diagnosing patients for our therapies to be in vitro companion diagnostics requiring FDA clearance or approval, we may face significant delays or obstacles in obtaining approval of a BLA for our product candidates. On September 26, 2012 in the European Union, the European Commission released a package of legislative proposals designed to replace the existing regulatory framework for medical devices and in vitro diagnostic medical devices in the EEA. These proposals are intended to strengthen the medical devices rules in the EEA countries. On October 13, 2015, discussions commenced between the European Commission, the European Parliament and the Council of Ministers with the aim of agreeing the final text of the Regulations. Depending on the outcome of the negotiations, the Regulation on in vitro diagnostic medical devices could be definitively adopted in the summer of 2016. If adopted in their current form, these revisions may impose additional obligations on us that may impact the development and authorization of our product candidates in the European Union.

Even if we obtain regulatory approval for a product candidate, our products will remain subject to regulatory oversight.

Even if we obtain any regulatory approval for our product candidates, they will be subject to ongoing regulatory requirements for manufacturing, labeling, packaging, storage, advertising, promotion, sampling, record-keeping and submission of safety and other post-market information. Any regulatory approvals that we receive for our product candidates also may be subject to a REMS, limitations on the approved indicated uses for which the product may be marketed or to the conditions of approval, or contain requirements for potentially costly post-marketing testing, including Phase IV clinical trials, and surveillance to monitor the quality, safety and efficacy of the product. For example, the holder of an approved BLA is obligated to monitor and report adverse events and any failure of a product to meet the specifications in the BLA. The FDA Guidance for Industry on Gene Therapy Clinical Trials—Observing Subjects for Delayed Adverse Events advises that patients treated with some types of gene therapy undergo follow-up observations for potential adverse events for as long as 15 years. The holder of an approved BLA also must submit new or supplemental applications and obtain the FDA approval for certain changes to the approved product, product labeling or manufacturing process. Advertising and promotional materials must comply with the FDA rules and are subject to FDA review, in addition to other potentially applicable federal and state laws. Equivalent rules apply in the European Union and other foreign countries.

In addition, product manufacturers and their facilities are subject to payment of user fees and continual review and periodic inspections by the FDA and other regulatory authorities for compliance with current good manufacturing practice (cGMP) requirements and adherence to commitments made in the BLA or foreign marketing application. If we, or a regulatory authority, discover previously unknown problems with a product, such as adverse events of unanticipated severity or frequency, or problems with the facility where the product is manufactured or disagrees with the promotion, marketing or labeling of that product, a regulatory authority may impose restrictions relative to that product, the manufacturing facility or us, including requiring recall or withdrawal of the product from the market or suspension of manufacturing.

If we fail to comply with applicable regulatory requirements following approval of any of our product candidates, a regulatory authority may take a variety of actions, including:

- issue a warning letter asserting that we are in violation of the law;
- seek an injunction or impose administrative, civil or criminal penalties or monetary fines;
- suspend, vary or withdraw regulatory approval;
- suspend any ongoing clinical trials;
- refuse to approve a pending BLA or comparable foreign marketing application (or any supplements thereto) submitted by us or our strategic partners;
- restrict the marketing or manufacturing of the product;
- seize or detain the product or otherwise require the withdrawal of the product from the market;
- refuse to permit the import or export of products; or
- refuse to allow us to enter into supply contracts, including government contracts.

Any government investigation of alleged violations of law could require us to expend significant time and resources to respond and could generate negative publicity. The occurrence of any event or penalty described above may inhibit our ability to commercialize our product candidates and harm our business, financial condition, results of operations and prospects.

In addition, the FDA’s policies, and those of comparable foreign regulatory authorities, may change and additional government regulations may be enacted that could prevent, limit or delay regulatory approval of our product candidates. We cannot predict the likelihood, nature or extent of government regulation that may arise from future legislation or administrative action, either in the U.S. or abroad. If we are slow or unable to adapt to changes in

existing requirements or the adoption of new requirements or policies, or if we are not able to maintain regulatory compliance, we may lose any marketing approval that we may have obtained and we may not achieve or sustain profitability, which would materially harm our business, financial condition, results of operations and prospects.

We face significant competition in an environment of rapid technological change and there is a possibility that our competitors may achieve regulatory approval before us or develop therapies that are safer or more advanced or effective than ours, which may harm our financial condition and our ability to successfully market or commercialize our product candidates.

The biotechnology and pharmaceutical industries, including the gene therapy field, are characterized by rapidly changing technologies, significant competition and a strong emphasis on intellectual property. We face substantial competition from many different sources, including large and specialty pharmaceutical and biotechnology companies, academic research institutions, government agencies and public and private research institutions.

We are aware of several companies focused on developing gene therapies in various indications, as well as several companies addressing other methods for modifying genes and regulating gene expression. Any advances in gene therapy technology made by a competitor may be used to develop therapies that could compete against any of our product candidates.

Many of our potential competitors, alone or with their strategic partners, have substantially greater financial, technical and other resources, such as larger research and development, clinical, marketing and manufacturing organizations. Mergers and acquisitions in the biotechnology and pharmaceutical industries may result in even more resources being concentrated among a smaller number of competitors. Our commercial opportunity could be reduced or eliminated if 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. Competitors also may obtain FDA or other regulatory approval for their products more rapidly or earlier 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. Additionally, technologies developed by our competitors may render our potential product candidates uneconomical or obsolete, and we may not be successful in marketing our product candidates against those of competitors.

In addition, as a result of the expiration or successful challenge of our patent rights, we could face more litigation with respect to the validity and/or scope of patents relating to our competitors' products. The availability of our competitors' products could limit the demand, and the price we are able to charge, for any products that we may develop and commercialize.

Even if we obtain and maintain approval for our product candidates from the FDA, we may never obtain approval for our product candidates outside of the U.S. which would limit our market opportunities and harm our business.

Approval of a product candidate in the U.S. by the FDA does not ensure approval of such product candidate by regulatory authorities in other countries or jurisdictions, and approval by one foreign regulatory authority does not ensure approval by regulatory authorities in other foreign countries or by the FDA. Sales of our product candidates outside of the U.S. will be subject to foreign regulatory requirements governing clinical trials and marketing approval. Even if the FDA grants marketing approval for a product candidate, comparable regulatory authorities of foreign countries also must approve the manufacturing and marketing of the product candidates in those countries. Approval procedures vary among jurisdictions and can involve requirements and administrative review periods different from, and more onerous than, those in the U.S., including additional preclinical studies or clinical trials. In many countries outside the U.S., a product candidate must be approved for reimbursement before it can be approved for sale in that country. In some cases, the price that we intend to charge for our products, if approved, is also subject to approval. We intend to submit a marketing authorization application to EMA for approval of our product candidates by the European Commission in the European Union. However, obtaining such approval from the European Commission following the opinion of EMA is a lengthy and expensive process. Even if a product candidate is approved, the FDA or the European Commission, as the case may be, may limit the indications for which the product may be marketed, require extensive warnings on the product labeling or require expensive and time-consuming additional clinical trials

or reporting as conditions of approval. Regulatory authorities in countries outside of the U.S. and the European Union also have requirements for approval of product candidates with which we must comply prior to marketing in those countries. Obtaining foreign regulatory approvals and compliance with foreign regulatory requirements could result in significant delays, difficulties and costs for us and could delay or prevent the introduction of our product candidates in certain countries.

Further, clinical trials conducted in one country may not be accepted by regulatory authorities in other countries. Also, regulatory approval for any of our product candidates may be withdrawn. If we fail to comply with the regulatory requirements, our target market will be reduced and our ability to realize the full market potential of our product candidates will be harmed and our business, financial condition, results of operations and prospects will be harmed.

Risks Related to Our Financial Position

We have incurred substantial net losses since inception, and have only had one quarter since inception with profitability. We expect to incur losses for the foreseeable future and may never again achieve or maintain profitability.

Since inception, we have incurred substantial net losses. Our net losses for the years ended December 31, 2015 and 2014 were $22.8 million and $4.0 million, respectively. As of December 31, 2015, we had an accumulated deficit of $51.6 million. We

historically have financed our operations primarily through private placements of our preferred stock and sublicensing rights to our NAV Technology Platform. We have devoted substantially all of our efforts to licensing our NAV Technology Platform and to research and development, including preclinical and planned clinical development of our product candidates, as well as to building out our team. We currently do not have any clinical programs, and we expect that it could be several years, if ever, before we commercialize an internal product candidate. We license certain intellectual property related to our NAV Technology Platform to third parties. Our NAV Technology Licensees have multiple preclinical studies and clinical trials in progress. However, no NAV Technology Licensee has an approved or commercialized gene therapy product based on such licensing program. We expect to generate only limited revenue, if any, from our current NAV Technology Licensees and any future NAV Technology Licensees in the near term. We expect to continue to incur significant expenses and increasing operating losses for the foreseeable future. The net losses we incur may fluctuate significantly from quarter to quarter. We anticipate that our expenses will increase substantially if, and as, we:

- further develop our sublicensing activities and NAV Technology Platform;
- continue our research studies and preclinical development of our internal product candidates, including our Lead Product Candidates;
- initiate additional preclinical studies and clinical trials for our Lead Product Candidates and future product candidates, if any;
- initiate activities relating to manufacturing;
- seek to identify additional product candidates;
- prepare our BLA and MAA for our Lead Product Candidates and seek marketing approvals for any of our other product candidates that successfully complete clinical trials, if any;
- establish a sales, marketing and distribution infrastructure to commercialize any product candidates for which we may obtain marketing approval, if any;
- operate as a public company;
- maintain, expand and protect our intellectual property portfolio; and
- acquire or in-license other product candidates and technologies.

For us to become profitable, we and our NAV Technology Licensees must develop and eventually commercialize product candidates with significant market potential. This will require us and our NAV Technology Licensees to be successful in a range of business challenges, including expansion of the licensing of our NAV Technology Platform, completing preclinical studies of our product candidates, commencing and completing clinical trials of our product candidates, obtaining marketing approval for these product candidates, manufacturing, marketing and selling those products for which we may obtain marketing approval and satisfying any post-marketing requirements. We may never succeed in any or all of these activities and, even if we do, we may never generate revenues that are sufficient to achieve profitability. If we do achieve profitability, we may not be able to sustain or increase profitability on a quarterly or annual basis. Our failure to become and remain profitable would decrease the value of our company and could impair our ability to raise capital, maintain our research and development efforts, expand our business or continue our operations. A decline in the value of our company also could cause you to lose all or part of your investment.

We will need to raise additional funding, which may not be available on acceptable terms, or at all. Failure to obtain this necessary capital when needed may force us to delay, limit or terminate certain of our licensing activities, product development efforts or other operations.

We will require substantial future capital in order to seek to broaden licensing of our NAV Technology Platform, complete the remaining research studies, preclinical and clinical development for our Lead Product Candidates and other future product candidates, if any, and potentially commercialize these product candidates. We expect our spending levels to increase in connection with our preclinical and clinical trials, if any, of our Lead Product Candidates. In addition, if we obtain marketing approval for any of our product candidates, we expect to incur

significant expenses related to product sales, medical affairs, marketing, manufacturing and distribution. Furthermore, 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 when needed or on attractive terms, we would be forced to delay, reduce or eliminate certain of our licensing activities, our research and development programs or other operations.

Our operations have consumed significant amounts of cash since inception. As of December 31, 2015, our cash, cash equivalents and marketable securities were $216.4 million. We expect that our existing cash, cash equivalents and marketable

securities will enable us to initiate Phase I/II clinical trials for RGX-501 and RGX-111 and file an IND in preparation for a Phase I clinical trial for RGX-314, as well as fund our operating expenses and capital expenditure requirements into 2018.

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

- the results of our preclinical studies for our Lead Product Candidates and any subsequent clinical trials;
- our planned expansion of the licensing of our NAV Technology Platform;
- the scope, progress, results and costs of drug discovery, laboratory testing, preclinical development and clinical trials, if any, for our other product candidates;
- the costs, timing and outcome of regulatory review of our product candidates;
- the costs of future activities, including product sales, medical affairs, marketing, manufacturing and distribution, for any of our product candidates for which we receive marketing approval;
- revenue, if any, received from commercial sale of our products, should any of our product candidates receive marketing approval;
- the costs of preparing, filing and prosecuting patent applications, maintaining and enforcing our intellectual property rights and defending any intellectual property-related claims;
- our current licensing agreements remaining in effect;
- our ability to establish and maintain additional licensing agreements or collaborations on favorable terms, if at all;
- the extent to which we acquire or in-license other product candidates and technologies; and
- the costs associated with being a public company.

Many of these factors are outside of our control. 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 regulatory and marketing approval and achieve product sales. In addition, our product candidates, if approved, may not achieve commercial success. Our product revenues, if any, and any commercial milestones or royalty payments under our licensing agreements, will be derived from or based on sales of products that may not be commercially available for many years, if at all. In addition, revenue from our NAV Technology Platform sublicensing is dependent in part on the clinical and commercial success of our licensing partners. Neither we nor any of our NAV Technology Licensees have commercialized any products using our NAV Technology Platform. Accordingly, we will need to continue to rely on additional financing to achieve our business objectives.

To the extent that additional capital is raised through the sale of equity or equity-linked securities, the issuance of those securities could result in substantial dilution for our current stockholders and the terms may include liquidation or other preferences that adversely affect the rights of our current stockholders. Furthermore, the issuance of additional securities, whether equity or debt, by us, or the possibility of such issuance, may cause the market price of our common stock to decline and existing stockholders may not agree with our financing plans or the terms of such financings. Adequate additional financing may not be available to us on acceptable terms, or at all. We also could be required to seek funds through arrangements with partners or otherwise that may require us to relinquish rights to our intellectual property, our product candidates or otherwise agree to terms unfavorable to us.

We have generated limited revenue from our NAV Technology Platform sublicensing and may not successfully expand our licensing activities.

Our ability to generate revenue from our NAV Technology Platform sublicensing depends on the acceptance by third parties of our NAV Technology Platform as their primary gene therapy technology and our ability to market and license our technology platform. We do not anticipate generating revenues from product sales for the next several years, if ever, as described elsewhere in these risk factors and anticipate generating only limited revenue from our NAV Technology Platform sublicensing in the near future. To date, a significant portion of our revenues have been

generated from the sublicensing of rights to our NAV Technology Platform. Our ability to generate future revenues from our NAV Technology Platform sublicensing depends on many factors, including:

- our NAV Technology Licensees successfully developing gene therapy products using our NAV Technology Platform;
- obtaining and maintaining market acceptance of our NAV Technology Platform as a primary gene therapy technology;
- maintaining our licensing relationships with our licensor partners, including GlaxoSmithKline LLC (GSK) and The Trustees of the University of Pennsylvania (together with the University of Pennsylvania, Penn);

- addressing any competing technological and market developments;
- implementing additional internal systems and infrastructure, as needed;
- negotiating favorable terms in any licensing or other arrangements into which we may enter and performing our obligations in such agreements;
- maintaining, protecting and expanding our portfolio of intellectual property rights, including patents, trade secrets and know-how;
- avoiding and defending against third-party interference, infringement and other intellectual property related claims; and
- attracting, hiring and retaining qualified personnel.

We have never generated revenue from product candidate sales and have only generated limited revenue from reagent sales.

Our ability to generate revenue from product candidate sales depends on our ability, alone or with partners, to successfully complete the development of, and obtain the regulatory approvals necessary to commercialize, our product candidates. All of our revenues to date have been from sublicensing our NAV Technology Platform and the sale of licensed reagents to third-parties for use in research and development. We do not consider reagent sales a core aspect of our business model and we do not dedicate significant resources to sales efforts for reagents. Accordingly, future revenue from reagent sales is uncertain and may fluctuate significantly from period to period. We do not anticipate generating revenues from our and our NAV Technology Licensees' product candidate sales for the next several years, if ever. Our ability to generate future revenues from product candidate sales depends heavily on our, or our NAV Technology Licensees', success in:

- completing research studies and preclinical and clinical development of our product candidates and identifying new gene therapy product candidates;
- seeking and obtaining regulatory and marketing approvals for product candidates for which clinical trials are completed;
- launching and commercializing product candidates for which we obtain regulatory and marketing approval by establishing a sales force, marketing and distribution infrastructure or, alternatively, collaborating with a commercialization partner;
- negotiating favorable terms in any collaboration, licensing or other arrangements into which we may enter and performing our obligations in such collaborations;
- qualifying for adequate coverage and reimbursement by government and third-party payors for our product candidates;
- maintaining and enhancing a sustainable, scalable, reproducible and transferable manufacturing process for our vectors and product candidates;
- establishing and maintaining supply and manufacturing relationships with third parties that can provide adequate, in both amount and quality, products and services to support clinical development and the market demand for our product candidates, if approved;
- obtaining market acceptance of our product candidates as a viable treatment option;
- addressing any competing technological and market developments;
- implementing additional internal systems and infrastructure, as needed;
- negotiating favorable terms in any collaboration, licensing or other arrangements into which we may enter and performing our obligations in such collaborations;
- maintaining, protecting and expanding our portfolio of intellectual property rights, including patents, trade secrets and know-how;
- avoiding and defending against third-party interference, infringement and other intellectual property related claims; and

- attracting, hiring and retaining qualified personnel, including research and development, clinical development, regulatory and others.

Even if one or more of the product candidates that we develop is approved for commercial sale, we anticipate incurring significant costs associated with commercializing any approved product candidate. Our expenses could increase beyond expectations if we are required by the FDA, the EMA or other regulatory authorities to perform clinical and other studies in addition to those that we currently anticipate. Even if we are able to generate revenues from the sale of any approved products, we may not become profitable and may need to obtain additional funding to continue operations.

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 an emerging clinical-stage company formed in July 2008. Our operations to date have predominantly focused on organizing and staffing our company, business planning, raising capital, acquiring our technology, administering and expanding our NAV Technology Platform sublicensing, identifying potential product candidates and undertaking research and preclinical studies of our product candidates and establishing licensing arrangements. We have initiated our first clinical trial with our development partners at Penn and intend to initiate a second clinical trial in 2016. We have not yet demonstrated the ability to continue expansion of our NAV Technology Platform sublicensing efforts, complete and report clinical trials of our product candidates, obtain marketing approvals, manufacture a commercial-scale product or conduct sales and marketing activities necessary for successful commercialization. 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.

In addition, as a new business, we may encounter unforeseen expenses, difficulties, complications, delays and other known and unknown factors. We are transitioning from a company with a licensing and research focus to a company that is also capable of supporting clinical development activities and we will need to transition to supporting commercial activities in the future. We may not be successful in these transitions.

The preparation of our financial statements requires significant interpretations, estimates and judgements. Disagreements with respect to these interpretations, estimates and judgements by the SEC, the Financial Accounting Standards Board or various other bodies could result the restatement of our financial statements or other potential adverse effects.

We are subject to complex tax laws, regulations, accounting principles and interpretations thereof. The preparation of our financial statements requires us to interpret accounting principles and guidance and make estimates and judgments that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements, as well as the reported revenue generated and expenses incurred during the reporting periods. Our interpretations, estimates and judgments are based on our historical experience and on various other factors that we believe are reasonable under the circumstances, the results of which form the basis for the preparation of our financial statements. U.S. generally accepted accounting principles are subject to interpretation by the SEC, the Financial Accounting Standards Board and various other bodies formed to interpret and create appropriate accounting principles and guidance. In the event that one of these bodies disagrees with our accounting recognition, measurement or disclosure or any of our accounting interpretations, estimates or assumptions, it may have a significant effect on our reported results and may retroactively affect previously reported results. The need to restate our financial results could, among other potential adverse effects, result in us incurring substantial costs, affect our ability to timely file our periodic reports until such restatement is completed, divert the attention of our management and employees from managing our business, result in material changes to our historical and future financial results, result in investors losing confidence in our operating results, subject us to securities class action litigation, and cause our stock price to decline.

Our management will not be required to evaluate the effectiveness of our internal control over financial reporting until the end of the fiscal year for which our second annual report is due. If we are unable to maintain effective internal control over financial reporting, investors may lose confidence in the accuracy of our financial reports.

As a public company, we are required to maintain internal control over financial reporting and to report any material weaknesses in such internal controls. Section 404 of the Sarbanes-Oxley Act (Section 404) requires that we evaluate and determine the effectiveness of our internal control over financial reporting. Beginning with our second annual report following our initial public offering (completed in September 2015), we will be required to provide a

management report on internal control over financial reporting. When we are no longer an emerging growth company, our management report on internal control over financial reporting will need to be attested to by our independent registered public accounting firm. We do not expect to have our independent registered public accounting firm attest to our management report on internal control over financial reporting while we are an emerging growth company.

If we have a material weakness in our internal control over financial reporting, we may not detect errors on a timely basis and our financial statements may be materially misstated. In addition, our internal control over financial reporting will not prevent or detect all errors and fraud. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that misstatements due to error or fraud will not occur or that all control issues and instances of fraud will be detected.

If there are material weaknesses or failures in our ability to meet any of the requirements related to the maintenance and reporting of our internal controls, investors may lose confidence in the accuracy and completeness of our financial reports and that could cause the price of our common stock to decline. In addition, we could become subject to investigations by NASDAQ, the

Securities and Exchange Commission (SEC) or other regulatory authorities, which could require additional management attention and which could adversely affect our business.

As described below, we currently have two material weaknesses which we are in the process of remediating.

In preparation for our initial public offering, we identified two material weaknesses in our internal control over financial reporting. If we are unable to remedy our material weaknesses, or if we fail to establish and maintain effective internal controls, we may be unable to produce timely and accurate financial statements, and we may conclude that our internal control over financial reporting is not effective, which could adversely impact our investors' confidence and our stock price.

In connection with the audit of our financial statements as of and for the years ended December 31, 2014 and 2013, we identified two material weaknesses in our internal control over financial reporting. A material weakness is defined as a deficiency, or a combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of our financial statements will not be prevented or detected on a timely basis.

First, we determined that we did not have adequate procedures and controls in our contract review process to ensure the completeness of contracts reviewed and to appropriately identify and account for provisions within our contracts. Second, we determined that we did not maintain a sufficient complement of resources to ensure adequate review and segregation of duties within our financial reporting processes.

These control deficiencies resulted in adjustments to our financial statements for 2013 and 2014 to revenues, equity, research and development, general and administrative, other operating income and interest expense. Each of the control deficiencies could result in a misstatement of aforementioned accounts or disclosures that would result in a material misstatement of our annual or interim financial statements that would not be prevented or detected. Accordingly, our management has determined that these control deficiencies constitute material weaknesses.

We are in the process of implementing measures designed to improve internal control over financial reporting to remediate the control deficiencies that led to our material weaknesses. We cannot assure you that the measures we have taken to date, together with any measures we may take in the future, will be sufficient to remediate the control deficiencies that led to our material weaknesses in our internal control over financial reporting or to avoid potential future material weaknesses. In addition, neither our management nor an independent registered public accounting firm has ever performed an evaluation of our internal control over financial reporting in accordance with the provisions of the Sarbanes-Oxley Act because no such evaluation has been required. Had we or our independent registered public accounting firm performed an evaluation of our internal control over financial reporting in accordance with the provisions of the Sarbanes-Oxley Act, additional material weaknesses may have been identified. If we are unable to successfully remediate our existing or any future material weaknesses in our internal control over financial reporting, or identify any additional material weaknesses, the accuracy and timing of our financial reporting may be adversely affected, we may be unable to maintain compliance with securities law requirements regarding timely filing of periodic reports in addition to applicable stock exchange listing requirements, investors may lose confidence in our financial reporting, and our stock price may decline as a result.

Risks Related to Third Parties

We rely primarily on a sponsored research agreement with Penn for our nonclinical research and development activities and a loss of this relationship or of the principal investigator for that nonclinical research, James M. Wilson, M.D., Ph.D., would materially harm our business.

In February 2009, we entered into an exclusive worldwide license agreement with Penn for patent and other intellectual property rights relating to a gene therapy technology platform based on certain novel recombinant AAV vectors discovered at Penn in the laboratory of our Chief Scientific Advisor, James M. Wilson, M.D., Ph.D. This license was most recently amended in September 2014. In February 2009, we also entered into a sponsored research agreement (the 2009 SRA) with Penn pursuant to which we fund the nonclinical research of Dr. Wilson relating to AAV gene therapy and obtain an option to acquire an exclusive worldwide license in certain intellectual property created pursuant to such 2009 SRA. In December 2014, we entered into another sponsored research agreement (the 2014 SRA) with Penn funding related nonclinical research of Dr. Wilson.

Under the 2014 SRA, we fund nonclinical research at Penn and pay certain intellectual property legal and filing expenses and receive the rights to the research results. All patentable inventions conceived, created, or conceived and reduced to practice pursuant to the 2014 SRA, together with patent rights represented by or issuing from the U.S. patents and patent applications (including provisional patent applications) automatically become exclusively licensed to us under our existing licensing agreement with Penn and all research results are automatically licensed to us as know-how in our existing license agreement. The 2014 SRA will expire on

December 31, 2016. We expect to amend the 2014 SRA in order to continue to fund work and receive rights to the results of the nonclinical research we fund at Penn. Also, a loss of our relationship with Penn or Dr. Wilson would materially harm our business.

We have in the past, and in the future plan to, enter into licensing agreements with third parties licensing parts of our NAV Technology Platform for the development of product candidates. If these licensing arrangements are not successful, our business could be harmed.

We have entered into agreements involving the licensing of parts of our NAV Technology Platform and relating to the development and commercialization of certain product candidates and plan to enter into additional licensing agreements or collaborations in the future. We have limited control over the amount and timing of resources that our future collaborators or current and future partners, including our NAV Technology Licensees, dedicate to the development or commercialization of product candidates or of products utilizing licensed components of our NAV Technology Platform. Our ability to generate revenues from these arrangements will depend on our and our partners and collaborators' abilities to successfully perform the functions assigned to each of us in these arrangements. In addition, our partners have the ability to abandon research or development projects and terminate applicable agreements. Moreover, an unsuccessful outcome in any clinical trial for which our collaborator is responsible could be harmful to the public perception and prospects of our gene delivery platform.

Any current or future licensing agreements or future collaborations we enter into may pose risks, including the following:

- licensees or collaborators have significant discretion in determining the efforts and resources that they will apply to these licensing agreements or collaborations;
- licensees or collaborators may not perform their obligations as expected;
- the clinical trials conducted as part of these licensing agreements or collaborations may not be successful;
- subjects in clinical trials undertaken by licensees or future collaborators, including our NAV Technology Licensees, may die or suffer adverse effects;
- licensees or collaborators may not pursue development and commercialization of any product candidates that achieve regulatory approval or may elect not to continue or renew development or commercialization programs based on clinical trial results, changes in the licensees' or collaborators' strategic focus or available funding or external factors, such as an acquisition, that divert resources or create competing priorities;
- licensees or collaborators may delay clinical trials, provide insufficient funding for clinical trials, stop a clinical trial or abandon a product candidate, repeat or conduct new clinical trials or require a new formulation of a product candidate for 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;
- licensees or collaborators could independently develop, or develop with third parties, products that compete directly or indirectly with our product candidates if the licensees or collaborators believe that competitive products are more likely to be successfully developed or can be commercialized under terms that are more economically attractive than ours;
- product candidates developed in collaboration with us may be viewed by our licensees or collaborators as competitive with their own product candidates or products, which may cause licensees or collaborators to cease to devote resources to the commercialization of our product candidates;
- a licensee or 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 any such product candidate;
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disagreements with licensees or future collaborators, including disagreements over intellectual property and other proprietary rights, contract interpretation or the preferred course of development of any product candidates, may cause delays or termination of the research, development or commercialization of such product candidates, may lead to additional responsibilities for us with respect to such product candidates or may result in litigation or arbitration, any of which would be time-consuming and expensive;

- licensees or collaborators may not properly maintain or defend our intellectual property rights or may use our proprietary information in such a way as to invite litigation 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 our other rights to intellectual property developed pursuant to our licensing agreements or collaborations;
- licensees or collaborators may infringe or otherwise violate the intellectual property rights of third parties, which may expose us to litigation and potential liability; and
- licensing agreements or collaborations may be terminated for the convenience of the licensee or collaborator and, if terminated, we could be required to raise additional capital to pursue further development or commercialization of the applicable product candidates.

If our licensing agreements or collaborations do not result in the successful development and commercialization of products, or if one of our licensees or collaborators terminates its agreement with us, we may not receive any future milestone or royalty payments, as applicable, under the collaboration. If we do not receive the payments we expect under these agreements, our development of product candidates could be delayed and we may need additional resources to develop our product candidates. In addition, if one of our collaborators terminates its agreement with us, we may find it more difficult to attract new collaborators and the perception of us in the business and financial communities could be harmed. All of the risks relating to product development, regulatory approval and commercialization described in this Annual Report on Form 10-K apply to the activities of our collaborators, including our license partners.

We may in the future decide to partner or collaborate with pharmaceutical and biotechnology companies for the development and potential commercialization of our product candidates. These relationships, or those like them, 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. In addition, we could face significant competition in seeking appropriate collaborators and the negotiation process is time-consuming and complex. Our ability to reach a definitive licensing agreement or 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 a variety of factors. If we license rights to product candidates, we may not be able to realize the benefit of such transactions if we are unable to successfully integrate the licensed product candidates with our existing operations and company culture.

We may not be successful in finding strategic collaborators for continuing development of certain of our product candidates or successfully commercializing.

We may seek to establish strategic partnerships for developing and/or commercializing certain of our product candidates, due to capital costs required to develop the product candidates or manufacturing constraints. We may not be successful in our efforts to establish such a strategic partnership or other alternative arrangements for our product candidates because our research and development pipeline may be insufficient, our product candidates may be deemed to be at too early of a stage of development for collaborative effort or third parties may not view our product candidates as having the requisite potential to demonstrate safety and efficacy or market opportunity. In addition, we may be restricted under existing collaboration agreements from entering into future agreements with potential collaborators. We cannot be certain that, following a strategic transaction or license, we will achieve an economic benefit that justifies such transaction.

If we are unable to reach agreements with suitable licensees or collaborators on a timely basis, on acceptable terms or at all, we may have to curtail the development of a product candidate, reduce or delay its development program, delay its potential commercialization, 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 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 and our business, financial condition, results of operations and

prospects may be materially harmed.

Our reliance on third parties requires us to share our trade secrets, which increases the possibility that a competitor will discover them or that our trade secrets will be misappropriated or disclosed.

Because we will rely on third parties, including contractors, to research, develop and manufacture our product candidates, we must, at times, share trade secrets with them. We seek to protect our proprietary technology in part by entering into confidentiality agreements and, if applicable, material transfer agreements, consulting agreements or other similar agreements with our advisors, employees, third-party contractors and consultants prior to beginning research or disclosing proprietary information. These agreements typically limit the rights of the third parties to use or disclose our confidential information, including our trade secrets. Despite the contractual provisions employed when working with third parties, these provisions may be breached, and the need to share trade secrets and other confidential information increases the risk that such trade secrets become known by our competitors, are

inadvertently incorporated into the technology of others, or are disclosed or used in violation of these agreements. Given that our proprietary position is based, in part, on our know-how and trade secrets, a competitor's independent discovery of our trade secrets or other unauthorized use or disclosure would impair our competitive position and may materially harm our business.

In addition, these agreements typically restrict the ability of our advisors, employees, third-party contractors and consultants to publish data potentially relating to our trade secrets, although our agreements may contain certain limited publication rights. For example, any academic institution that we may collaborate with in the future will usually expect to be granted rights to publish data arising out of such collaboration, provided that we are notified in advance and given the opportunity to delay publication for a limited time period in order for us to secure patent protection of intellectual property rights arising from the collaboration, in addition to the opportunity to remove confidential or trade secret information from any such publication. In the future we may also conduct joint research and development programs that may require us to share trade secrets under the terms of our research and development or similar agreements. Despite our efforts to protect our trade secrets, our competitors may discover our trade secrets, either through breach of our agreements with third parties, independent development or publication of information by any of our third-party collaborators. A competitor's discovery of our trade secrets would impair our competitive position and harm our business.

Risks Related to Manufacturing

Gene therapies are novel, complex and difficult to manufacture. We could experience production problems that result in delays in our development or commercialization programs, limit the supply of our products or otherwise harm our business.

We currently have a development, manufacturing and testing agreement and cooperation agreement with WuXi AppTec, Inc. (WuXi) to manufacture supplies of our product candidates in the future. Our product candidates require processing steps that are more complex than those required for most chemical pharmaceuticals. Moreover, unlike chemical pharmaceuticals, the physical and chemical properties of biologics such as ours generally cannot be fully characterized. As a result, assays of the finished product may not be sufficient to ensure that the product will perform in the intended manner. Accordingly, we employ multiple steps to control our manufacturing process to assure that the process works and the product candidate is made strictly and consistently in compliance with the process. 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. We may encounter problems achieving adequate quantities and quality of clinical-grade materials that meet FDA, European Union or other comparable applicable foreign standards or specifications with consistent and acceptable production yields and costs. To date, no cGMP gene therapy manufacturing facility in the U.S. has received approval from the FDA for the manufacture of an approved gene therapy product, and, therefore, the timeframe required for us to obtain such approval is uncertain.

In addition, FDA, EMA and other comparable foreign 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 comparable foreign regulatory authorities may require that we not distribute a lot until the competent authority 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 operate our manufacturing process which could result in delays in our production or difficulties in maintaining compliance with applicable regulatory requirements.

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 processes or facilities also could restrict our ability to meet market demand for our products. Additionally, should our agreement with WuXi be terminated for any reason, there are a limited number of manufacturers who would be suitable replacements and it would take a significant amount of time to transition the manufacturing to a replacement.

Delays in obtaining regulatory approval of our manufacturing process or disruptions in our manufacturing process may delay or disrupt our commercialization efforts. To date, no cGMP gene therapy manufacturing facility in the U.S. has received approval from the FDA for the manufacture of an approved gene therapy product.

Before we can begin to commercially manufacture our product candidates in third-party or our own facilities, we must obtain regulatory approval from the FDA for the manufacturing process and facility. A manufacturing authorization must also be obtained from the appropriate regulatory authorities in a European Union Member State. In addition, we must pass a pre-approval inspection of

our manufacturing facility by the FDA before any of our product candidates can obtain marketing approval, if ever. In order to obtain approval, we will need to ensure that all of our processes, methods and equipment are compliant with cGMP, and perform extensive audits of vendors, contract laboratories and suppliers. If any of our vendors, contract laboratories or suppliers is found to be out of compliance with cGMP, we may experience delays or disruptions in manufacturing while we work with these third parties to remedy the violation or while we work to identify suitable replacement vendors. The cGMP requirements govern quality control of the manufacturing process and documentation policies and procedures. In complying with cGMP, we will be obligated to expend time, money and effort in production, record keeping and quality control to assure that the product meets applicable specifications and other requirements. If we fail to comply with these requirements, we would be subject to possible regulatory action and may not be permitted to sell any products that we may develop.

We currently rely and expect to continue to rely on third parties to conduct our product manufacturing, and these third parties may not perform satisfactorily.

We do not currently plan to independently manufacture material for our planned preclinical and clinical programs. We currently rely, and expect to continue to rely, on third parties for the production of our preclinical study and planned clinical trial materials and, therefore, we can control only certain aspects of their activities.

In addition, we rely on additional third parties to manufacture ingredients of our product candidates and to perform quality testing, and reliance on these third parties entails risks to which we would not be subject if we manufactured the product candidates ourselves, including:

- reduced control for certain aspects of manufacturing activities;
- termination or nonrenewal of manufacturing and service agreements with third parties in a manner or at a time that is costly or damaging to us; and
- disruptions to the operations of our third-party manufacturers and service providers caused by conditions unrelated to our business or operations, including the bankruptcy of the manufacturer or service provider.

Any of these events could lead to clinical trial delays or failure to obtain regulatory approval, or impact our ability to successfully commercialize future product candidates. Some of these events could be the basis for FDA or European Union Member State regulatory authority action, including injunction, recall, seizure or total or partial suspension of product manufacture or manufacturing authorization.

Any contamination in our manufacturing process, shortages of raw materials or failure of any of our key suppliers to deliver necessary components could result in delays in our research studies, preclinical, clinical development or marketing schedules.

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 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 our product candidates 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.

Risks Related to the Commercialization of Our Product Candidates

If we are unable to establish sales, medical affairs and marketing capabilities or enter into agreements with third parties to market and sell our product candidates, if approved, we may be unable to generate any product revenue.

We currently have no products to sell and therefore no product sales and marketing organization. To successfully commercialize any products that may result from our development programs, we will need to develop these capabilities, either on our own or with others. The establishment and development of our own commercial team or the establishment of a contract sales force to market any products we may develop will be expensive and time-consuming and could delay any product launch. Moreover, we cannot be certain that we will be able to successfully develop this capability. We may enter into collaborations regarding one or more of our product candidates with other entities to utilize their marketing and distribution capabilities, but we may be unable to enter into such agreements on favorable terms, if at all. If any current licensees or future licensees or collaborators do not commit sufficient resources to commercialize our products, or we are unable to develop the necessary capabilities on our own, we will be unable to generate

sufficient product revenue to sustain our business. We compete with many companies that currently have extensive, experienced and well-funded medical affairs, marketing and sales operations to recruit, hire, train and retain marketing and sales personnel. We also face competition in our search for third parties to assist us with the sales and marketing efforts of our product candidates. Without an internal team or the support of a third party to perform marketing and sales functions, we may be unable to compete successfully against these more established companies.

Our efforts to educate the medical community and third-party payors on the benefits of our product candidates may require significant resources and may never be successful. Such efforts may require more resources than are typically required due to the complexity and uniqueness of our potential products. If any of our product candidates is approved but fails to achieve market acceptance among physicians, patients or third-party payors, we will not be able to generate significant revenues from such product, which could materially harm our business, financial condition, results of operations and prospects.

If we do not achieve our projected development goals in the time frames we announce and expect, the commercialization of our products may be delayed and, as a result, our stock price may decline.

From time to time, we estimate the timing of the accomplishment of various scientific, clinical, regulatory and other product development goals, which we sometimes refer to as milestones. These milestones may include the commencement or completion of scientific studies and clinical trials and the submission of regulatory filings. From time to time, we may publicly announce the expected timing of some of these milestones. All of these milestones are and will be based on numerous assumptions. The actual timing of these milestones can vary dramatically compared to our estimates, in some cases for reasons beyond our control. If we do not meet these milestones as publicly announced, or at all, the commercialization of our products may be delayed or never achieved and, as a result, our stock price may decline.

Even if we obtain marketing approval for our Lead Product Candidates or any future product candidate, they could be subject to restrictions or withdrawal from the market, and we may be subject to penalties if we fail to comply with regulatory requirements or if we experience unanticipated problems with our product candidates, when and if any of them are approved.

Even if U.S. regulatory approval is obtained, the FDA may still impose significant restrictions on a product’s indicated uses or marketing or impose ongoing requirements for potentially costly and time consuming post-approval studies, post-market surveillance or clinical trials. Following approval, if at all, of our Lead Product Candidates or any future product candidates, such candidate will also be subject to ongoing FDA requirements governing the labeling, packaging, storage, distribution, safety surveillance, advertising, promotion, recordkeeping and reporting of safety and other post-market information. In addition, manufacturers of drug products and their facilities are subject to continual review and periodic inspections by the FDA and other regulatory authorities for compliance with cGMP requirements relating to quality control, quality assurance and corresponding maintenance of records and documents. If we or a regulatory agency discovers previously unknown problems with a product, such as adverse events of unanticipated severity or frequency, or problems with the facility where the product is manufactured, a regulatory agency may impose restrictions on that product, the manufacturing facility or us, including requesting recall or withdrawal of the product from the market or suspension of manufacturing.

If regulatory approval is granted by the European Commission, or a comparable foreign regulatory authority, such approval can include restrictions and onerous post-authorization obligations similar to those that the FDA and other U.S. regulatory authorities have power to impose. These can include detailed pharmacovigilance obligations.

If we or the manufacturing facilities for our Lead Product Candidates or any future product candidate that may receive regulatory approval, if any, fail to comply with applicable regulatory requirements, a regulatory agency may:

- issue warning letters or untitled letters;
- seek an injunction or impose civil or criminal penalties or monetary fines;
- suspend, vary or withdraw regulatory approval;
- suspend any ongoing clinical trials;
- refuse to approve pending applications or supplements or applications filed by us;
- suspend or impose restrictions on operations, including costly new manufacturing requirements; or
- seize or detain products, refuse to permit the import or export of product or request us to initiate a product recall.

The occurrence of any event or penalty described above may inhibit our ability to commercialize our product candidates and generate revenue.

The FDA has the authority to require a REMS plan as part of a BLA or after approval, which may impose further requirements or restrictions on the distribution or use of an approved drug, such as limiting prescribing to certain physicians or medical centers that have undergone specialized training, limiting treatment to patients who meet certain safe-use criteria and requiring treated patients to enroll in a registry. The European Commission and comparable foreign regulatory authorities have powers to impose similar obligations.

In addition, if our Lead Product Candidates or any future product candidates are approved, our product labeling, advertising and promotion will be subject to regulatory requirements and continuing regulatory review. The FDA, the competent regulatory authorities in European Union Member States, and comparable foreign regulatory authorities strictly regulate the promotional claims that may be made about prescription products. In particular, a product may not be promoted for uses that are not approved by the FDA, the European Commission, the competent regulatory authorities in European Union Member States, or comparable foreign regulatory authorities as reflected in the product's approved labeling. If we receive marketing approval for a product candidate, physicians may nevertheless prescribe it to their patients in a manner that is inconsistent with the approved label. If we are found to have promoted such off-label uses, we may become subject to significant liability. The FDA, other agencies, the competent regulatory authorities in European Union Member States, and comparable foreign regulatory authorities 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 sanctions. The federal government has levied large civil and criminal fines against companies for alleged improper promotion and has enjoined several companies from engaging in off-label promotion. In the past, the FDA has also requested that companies enter into consent decrees or permanent injunctions under which specified promotional conduct is changed or curtailed.

Our gene therapy approach utilizes vectors derived from viruses which may be perceived as unsafe or may result in unforeseen adverse events. Negative public opinion and increased regulatory scrutiny of gene therapy may damage public perception of the safety of our product candidates and harm our ability to conduct our business or obtain regulatory approvals for our product candidates.

Gene therapy remains a novel technology, with no gene therapy product approved to date in the U.S. and only one gene therapy product approved to date in the European Union. Public perception may be influenced by claims that gene therapy is unsafe, and gene therapy may not gain the acceptance of the public or the medical community. In particular, our success will depend upon physicians who specialize in the treatment of genetic diseases targeted by our product candidates, prescribing treatments that involve the use of our product candidates in lieu of, or in addition to, existing treatments with which they are familiar and for which greater clinical data may be available. More restrictive government regulations or negative public opinion would harm our business, financial condition, results of operations and prospects and may delay or impair the development and commercialization of our product candidates or demand for any products we may develop. For example, earlier gene therapy trials led to several well-publicized adverse events, including cases of leukemia and death seen in other trials using other vectors. Serious adverse events in clinical trials we conduct, or other clinical trials involving our NAV Technology Platform by our NAV Technology Licensees or others, other gene therapy products or our competitors' products, even if not ultimately attributable to the relevant product candidates, and the resulting publicity, could result in increased government 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.

Even if we receive regulatory approval, we still may not be able to successfully commercialize our Lead Product Candidates or any future product candidate, and the revenue that we generate from any approved product's sales, if any, could be limited.

Ethical, social and legal concerns about gene therapy could result in additional regulations restricting or prohibiting our products. From time to time, public sentiment may be more adverse to commercialization of gene therapy as a therapeutic technique. Even with the requisite approvals from the FDA in the U.S., the European Commission in the European Union and other comparable regulatory foreign authorities, the commercial success of our product candidates will depend, in part, on the acceptance of physicians, patients and health care payors of gene therapy products in general, and our product candidates in particular, as medically necessary, cost-effective and safe. Any product that we commercialize may not gain acceptance by physicians, patients, health care payors and others in the medical community. If these products do not achieve an adequate level of acceptance, we may not generate significant product revenue and may not become profitable. The degree of market acceptance of our product candidates will depend on a number of factors, including:

- demonstration of clinical efficacy and safety compared to other more-established products;
- the limitation of our targeted patient population and other limitations or warnings contained in any FDA, European Commission, or other comparable foreign regulatory authority-approved labeling;
- acceptance of a new formulation by health care providers and their patients;
- the prevalence and severity of any adverse effects;

- new procedures or methods of treatment that may be more effective in treating or may reduce the conditions which our products are intended to treat;
- pricing and cost-effectiveness;
- the effectiveness of our or any future collaborators' sales and marketing strategies;
- our ability to obtain and maintain sufficient third-party coverage and reimbursement from government health care programs, including Medicare and Medicaid, private health insurers and other third-party payors;
- unfavorable publicity relating to product candidates or gene therapy generally; and
- the willingness of patients to pay out-of-pocket in the absence of third-party coverage or reimbursement.

If any product candidate is approved but does not achieve an adequate level of acceptance by physicians, hospitals, healthcare payors or patients, we may not generate sufficient revenue from that product candidate and may not become or remain profitable. Our efforts to educate the medical community and third-party payors on the benefits of our Lead Product Candidates or any future product candidates may require significant resources and may never be successful. In addition, our ability to successfully commercialize our product candidates will depend on our ability to manufacture our products, differentiate our products from competing products and defend and enforce our intellectual property rights relating to our products. Additionally, if the market opportunities for our Lead Product Candidates or any future product candidates are smaller than we believe they are, our product revenues may be harmed and our business may suffer.

We focus our research and product development on treatments for severe genetic and orphan diseases. Our understanding of both the number of people who have these diseases, as well as the subset of people with these diseases who have the potential to benefit from treatment with our product candidates, are based on estimates. These estimates may prove to be incorrect and new studies may reduce the estimated incidence or prevalence of these diseases. The number of patients in the U.S., the European Union and elsewhere may turn out to be lower than expected, may not be otherwise amenable to treatment with our products or patients may become increasingly difficult to identify and access, all of which would harm our business, financial condition, results of operations and prospects.

Further, there are several factors that could contribute to making the actual number of patients who receive any products we develop less than the potentially addressable market. These include the lack of widespread availability of, and limited reimbursement for, new therapies in many underdeveloped markets. Further, the severity of the progression of a disease up to the time of treatment, especially in certain degenerative conditions such as MPS I, MPS II, wet AMD and XLRP, will likely diminish the therapeutic benefit conferred by a gene therapy due to irreversible cell death. Lastly, certain patients' immune systems might prohibit the successful delivery of certain gene therapy products to the target tissue, thereby limiting the treatment outcomes.

The insurance coverage and reimbursement status of newly-approved products is uncertain. Failure to obtain or maintain adequate coverage and reimbursement for our products, if approved, could limit our ability to market those products and decrease our ability to generate product revenue.

We expect the cost of a single administration of gene therapy products, such as those we are developing, to be substantial, when and if they achieve regulatory approval. We expect that coverage and reimbursement by government and private payors will be essential for most patients to be able to afford these treatments. Accordingly, sales of our product candidates will depend substantially, both domestically and abroad, on the extent to which the costs of our product candidates will be paid by health maintenance, managed care, pharmacy benefit and similar healthcare management organizations, or will be reimbursed by government authorities, private health coverage insurers and other third-party payors. Coverage and reimbursement by a third-party payor may depend upon several 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.

Obtaining coverage and reimbursement for a product from third-party payors is a time-consuming and costly process that could require us to provide to the payor supporting scientific, clinical and cost-effectiveness data. There is significant uncertainty related to third-party coverage and reimbursement of newly approved products. We may not be able to provide data sufficient to gain acceptance

with respect to coverage and reimbursement. If coverage and reimbursement are not available, or are available only at limited levels, we may not be able to successfully commercialize our product candidates. Even if coverage is provided, the approved reimbursement amount may not be adequate to realize a sufficient return on our investment.

Additionally, our Lead Product Candidates are designed to provide therapeutic benefit after a single administration and, therefore, the pricing and reimbursement of a single administration of our product candidates, if approved, must be adequate to support our commercial infrastructure. The downward pressure on healthcare costs in general, particularly prescription drugs and surgical procedures and other treatments, has become intense. As a result, increasingly high barriers are being erected to the entry of new products such as ours. If we are unable to obtain adequate levels of reimbursement, our ability to successfully market and sell our product candidates will be harmed. The manner and level at which reimbursement is provided for services related to our product candidates (e.g., for administration of our product to patients) is also important. Inadequate reimbursement for such services may lead to physician resistance and limit our ability to market or sell our products.

If we obtain approval to commercialize our product candidates outside of the U.S., in particular in the European Union, a variety of risks associated with international operations could materially harm our business.

We expect that we will be subject to additional risks in commercializing our product candidates outside the U.S., including:

- different regulatory requirements for approval of drugs and biologics in foreign countries;
- reduced protection for intellectual property rights;
- unexpected changes in tariffs, trade barriers and regulatory requirements;
- economic weakness, including inflation, or political instability in particular foreign economies and markets;
- compliance with tax, employment, immigration and labor laws for employees living or traveling abroad;
- foreign currency fluctuations, which could result in increased operating expenses and reduced revenues, and other obligations incident to doing business in another country;
- workforce uncertainty in countries where labor unrest is more common than in the U.S.;
- production shortages resulting from any events affecting raw material supply or manufacturing capabilities abroad; and
- business interruptions resulting from geopolitical actions, including war and terrorism or natural disasters including earthquakes, floods and fires.

Risks Related to our Business Operations

We may not be successful in our efforts to identify or discover additional product candidates and may fail to capitalize on programs or product candidates that may be a greater commercial opportunity or for which there is a greater likelihood of success.

The success of our business depends upon our ability to identify, develop and commercialize product candidates based on our NAV Technology Platform. Research programs to identify new product candidates require substantial technical, financial and human resources. Although certain of our product candidates are currently in research studies or preclinical development, we may fail to identify potential product candidates for clinical development for several reasons. For example, our research may be unsuccessful in identifying potential product candidates or our potential product candidates may be shown to have harmful side effects, may be commercially impracticable to manufacture or may have other characteristics that may make the products unmarketable or unlikely to receive marketing approval.

Additionally, because we have limited resources, we may forego or delay pursuit of opportunities with certain programs or product candidates or for indications that later prove to have greater commercial potential. Our spending on current and future research and development programs may not yield any commercially viable products. If we do

not accurately evaluate the commercial potential for a particular product candidate, we may relinquish valuable rights to that product candidate through strategic collaboration, licensing or other arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to such product candidate. Alternatively, we may allocate internal resources to a product candidate in a therapeutic area in which it would have been more advantageous to enter into a partnering arrangement.

If any of these events occur, we may be forced to abandon our development efforts with respect to a particular product candidate or fail to develop a potentially successful product candidate, which could materially harm our business, financial condition, results of operations and prospects.

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

We are highly dependent on members of our executive team, including, without limitation, Kenneth T. Mills, our Chief Executive Officer; Stephen Yoo, M.D., our Chief Medical Officer; Vittal Vasista, our Chief Financial Officer; and Curran M. Simpson, our Senior Vice President, Technical Operations; and scientific advisors, including, without limitation, James M. Wilson, M.D., Ph.D., our Chief Scientific Advisor; the loss of any of whose services may adversely impact the achievement of our objectives. While we have entered into employment agreements with each of our executive officers, any of them could leave our employment at any time, as all of our employees are "at will" employees. We currently do not have "key person" insurance on any of our employees. The loss of the services of one or more of our current employees, consultants and advisors might impede the achievement of our research, development, licensing and commercialization objectives.

Recruiting and retaining other qualified employees, consultants and advisors for our business, including scientific and technical personnel, also will be critical to our success. There currently is a shortage of skilled individuals with substantial gene therapy experience, which we believe is likely to continue. As a result, competition for skilled personnel, including in gene therapy research and vector manufacturing, is intense and the turnover rate can be high. We may not be able to attract and retain personnel on acceptable terms given the competition among numerous pharmaceutical and biotechnology companies and academic institutions for individuals with similar skill sets. In addition, failure to succeed in preclinical studies or clinical trials or applications for marketing approval may make it more challenging to recruit and retain qualified personnel. The inability to recruit, or loss of services of certain executives, including, without limitation, Kenneth T. Mills, our Chief Executive Officer; Stephen Yoo, M.D., our Chief Medical Officer; Vittal Vasista, our Chief Financial Officer; and Curran M. Simpson, our Senior Vice President, Technical Operations; key employees, consultants or advisors, including, without limitation, James M. Wilson, M.D., Ph.D., our Chief Scientific Advisor; may impede the progress of our research, development, licensing and commercialization objectives and materially harm our business, financial condition, results of operations and prospects. Additionally, our current management team has only been working together for a relatively short period of time and a number of members of our current management team have been employed by us for less than a year. We will also need to expand our current accounting and finance teams with additional qualified personnel to ensure proper internal control over financial reporting.

If we are unable to manage expected growth in the scale and complexity of our operations, our performance may suffer.

If we are successful in executing our business strategy, we will need to expand our managerial, operational, financial and other systems and resources to manage our operations, continue our research and development and licensing activities and, in the longer term, build a sales and marketing infrastructure to support commercialization of any of our product candidates that are approved for sale. Future growth would impose significant added responsibilities on members of management. It is likely that our management, finance, development personnel, systems and facilities currently in place may not be adequate to support this future growth. Our need to effectively manage our operations, growth and product candidates requires that we continue to develop more robust business processes and improve our systems and procedures in each of these areas and to attract and retain sufficient numbers of talented employees. We may be unable to successfully implement these tasks on a larger scale and, accordingly, may not achieve our research, development and growth goals.

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, principal investigators, consultants and commercial partners. 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 U.S. 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.

Healthcare legislative reform measures may materially harm our business and results of operations.

In the U.S., there have been, and continue to be, several legislative initiatives to contain healthcare costs. For example, in March 2010, the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act (PPACA), was passed. PPACA made major changes in how healthcare is delivered and reimbursed, and increased access to health insurance benefits to the uninsured and underinsured population of the U.S.

PPACA, among other things, increased the number of individuals with Medicaid and private insurance coverage, implemented reimbursement policies that tie payment to quality, facilitated the creation of accountable care organizations that may use capitation and other alternative payment methodologies, strengthened enforcement of fraud and abuse laws and encouraged the use of information technology. Many of these changes require implementing regulations which have not yet been drafted or have been released only as proposed rules.

Such changes in the regulatory environment may also result in changes to our payor mix that may affect our operations. While PPACA is expected to increase the number of persons with covered health benefits, we cannot accurately estimate the payment rates for any additional persons that are expected to be covered by health benefits. For example, PPACA's expansion of Medicaid coverage could cause patients who otherwise would have selected private healthcare to participate in government sponsored healthcare programs, and Medicaid and other government programs typically reimburse providers at substantially lower rates than private payors. Our revenue may be adversely impacted if states pursue lower rates or cost-containment strategies as a result of any expansion of their existing Medicaid programs to include additional persons, particularly in states experiencing budget deficits. Exchanges created to facilitate coverage for new persons to be covered by health benefits may also place additional pricing pressure on all providers, regardless of payor. The full impact of many of the provisions under PPACA is unknown at this time. For example, PPACA established an Independent Payment Advisory Board that can recommend changes in payment for physicians under certain circumstances, which the Department of Health and Human Services (HHS) generally would be required to implement unless Congress enacts superseding legislation. PPACA also requires HHS to develop a budget-neutral, value-based payment modifier that provides for differential payment under the Medicare Physician Fee Schedule (the MPFS) for physicians or groups of physicians that is linked to quality of care furnished compared to cost. Physicians in groups of 100 or more eligible professionals who submit claims to Medicare under a single tax identification number are subject to the value modifier based on their performance in previous years. For example, in 2015, this modifier was based on performance during calendar year 2013. In 2016, the modifier will apply to physicians in groups of 10 or more eligible professionals based on 2014 performance. The modifier will apply to all other physicians by 2017.

In November 2012, CMS adopted a rule under the PPACA that generally allowed physicians in certain specialties who provide eligible primary care services to be paid at the Medicare rates in effect in calendar years 2013 and 2014 instead of state-established Medicaid reimbursement rates, referred to as the Medicaid-Medicare Parity. Generally, state Medicaid reimbursement rates are lower than federally established Medicare rates. During 2013, state agencies were required to submit their state plan amendments (SPAs) outlining how they will implement the rule, including frequency and timing of payments to CMS for review and approval. In December 2013, CMS indicated that all SPAs had been approved for enhanced Medicaid-Medicare Parity reimbursement through December 2014. Congress did not act before the end of the year to extend the Medicaid-Medicare Parity and the rule expired. As a result, states must decide whether to revert to previous primary care payment levels or continue at a higher level but without the benefit of the enhanced federal match. It is unclear at this time how these limited state increases or the continued failure to extend the rule at the federal level will impact our business.

Finally, other legislative changes have been proposed and adopted in the U.S. since the PPACA was enacted. On August 2, 2011, the Budget Control Act of 2011 was enacted, which, among other things, created the Joint Select Committee on Deficit Reduction, or the Joint Committee, to recommend proposals in spending reductions to

Congress. The Joint Committee did not achieve a targeted deficit reduction of at least $1.2 trillion for the years 2013 through 2021, triggering the legislation's automatic reduction to several government programs. This included aggregate reductions to Medicare payments to providers of two percent per fiscal year, which went into effect on April 1, 2013 and, due to subsequent legislative amendments to the statute, will remain in effect through 2024 unless additional Congressional action is taken. On January 2, 2013, the American Taxpayer Relief Act was signed into law, which, among other things, further reduced Medicare payments to several providers, including hospitals, imaging centers and cancer treatment centers. 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 and other third-party payors will pay for healthcare products and services, which could adversely affect our business, financial condition and results of operations.

Additionally, in the U.S., the Biologics Price Competition and Innovation Act of 2009 created an abbreviated approval pathway for biologic products that are demonstrated to be "highly similar" or "biosimilar or interchangeable" with an FDA-approved biologic product. This new pathway could allow competitors to reference data from biologic products already approved after 12 years from the

time of approval. This could expose us to potential competition by lower-cost biosimilars even if we commercialize a product candidate faster than our competitors.

We may be subject, directly or indirectly, to federal and state healthcare fraud and abuse laws, false claims laws and health information privacy and security laws. If we are unable to comply, or have not fully complied, with such laws, we could face substantial penalties.

If we obtain FDA, European Commission, or other comparable foreign regulatory authorities' approval for any of our product candidates and begin commercializing those products in the U.S. or outside the U.S., our operations will be directly, or indirectly through our prescribers, customers and purchasers, subject to various federal, state and foreign fraud and abuse laws and regulations, including, without limitation, the federal Health Care Program Anti-Kickback Statute, the federal civil and criminal False Claims Act and Physician Payments Sunshine Act and regulations. These laws will impact, among other things, our proposed sales, marketing and educational programs. In addition, we may be subject to patient privacy laws by both the federal government and the states in which we conduct our business. The laws that will affect our operations include, but are not limited to:

- the federal Health Care Program Anti-Kickback Statute, which prohibits, among other things, persons or entities from knowingly and willfully soliciting, receiving, offering or paying any remuneration (including any kickback, bribe or rebate), directly or indirectly, overtly or covertly, in cash or in kind, in return for the purchase, recommendation, leasing or furnishing of an item or service reimbursable under a federal healthcare program, such as the Medicare and Medicaid programs. This statute has been interpreted to apply to arrangements between pharmaceutical manufacturers on the one hand, and prescribers, purchasers and formulary managers on the other. The PPACA amends the intent requirement of the federal Anti-Kickback Statute. A person or entity no longer needs to have actual knowledge of this statute or specific intent to violate it;
- federal civil and criminal false claims laws and civil monetary penalty laws which prohibit, among other things, individuals or entities from knowingly presenting, or causing to be presented, claims for payment or approval from Medicare, Medicaid or other government payors that are false or fraudulent. The PPACA provides and recent government cases against pharmaceutical and medical device manufacturers support the view that Federal Anti-Kickback Statute violations and certain marketing practices, including off-label promotion, may implicate the False Claims Act;
- the federal Health Insurance Portability and Accountability Act of 1996 (HIPAA), which created new federal criminal statutes that prohibit a person from knowingly and willfully executing a scheme or from making false or fraudulent statements to defraud any healthcare benefit program, regardless of the payor (e.g., public or private);
    - HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act (HITECH), and its implementing regulations, and as amended again by the final HIPAA omnibus rule, Modifications to the HIPAA Privacy, Security, Enforcement, and Breach Notification Rules Under HITECH and the Genetic Information Nondiscrimination Act;
- Other Modifications to HIPAA, published in January 2013, which imposes certain requirements relating to the privacy, security and transmission of individually identifiable health information without appropriate authorization by entities subject to the rule, such as health plans, health care clearinghouses and health care providers;
- federal transparency laws, including the federal Physician Payment Sunshine Act, that require disclosure of payments and other transfers of value provided to physicians and teaching hospitals, and ownership and investment interests held by physicians and other healthcare providers and their immediate family members and applicable group purchasing organizations; and
- state and foreign law equivalents of each of the above federal laws, state laws that require drug manufacturers to report information related to payments and other transfers of value to physicians and other healthcare providers or marketing expenditures and state laws governing the privacy and security of health information in certain circumstances, many of which differ from each other in significant ways and may not have the same effect, thus complicating compliance efforts in certain circumstances, such as specific disease states.

Because of the breadth of these laws and the narrowness of the statutory exceptions and safe harbors available, it is possible that some of our business activities could be subject to challenge under one or more of such laws. If our operations are found to be in violation of any of the laws described above or any other government regulations that apply to us, we may be subject to penalties, including civil and criminal penalties, damages, fines, exclusion from participation in government health care programs, such as Medicare and Medicaid, imprisonment and the curtailment or restructuring of our operations, any of which could harm our ability to operate our business and our results of operations.

The provision of benefits or advantages to physicians to induce or encourage the prescription, recommendation, endorsement, purchase, supply, order or use of medicinal products is prohibited in the European Union. The provision of benefits or advantages to physicians is also governed by the national anti-bribery laws of European Union Member States, such as the UK Bribery Act 2010. Infringement of these laws could result in substantial fines and imprisonment.

Payments made to physicians in certain European Union Member States must be publically disclosed. Moreover, agreements with physicians often must be the subject of prior notification and approval by the physician's employer, his or her competent professional organization and/or the regulatory authorities of the individual European Union Member States. These requirements are provided in the national laws, industry codes or professional codes of conduct, applicable in the European Union Member States. Failure to comply with these requirements could result in reputational risk, public reprimands, administrative penalties, fines or imprisonment.

The collection and use of personal health data in the European Union is governed by the provisions of the Data Protection Directive. This Directive, and the national implementing legislation of the individual European Union Member States, imposes several requirements relating to the consent of the individuals to whom the personal data relates, the information provided to the individuals, notification of data processing obligations to the competent national data protection authorities and the security and confidentiality of the personal data. The European Union Data Protection Directive prohibits the transfer of personal data to countries outside of the European Economic Area, or EEA that are not considered by the European Commission to provide an adequate level of data protection. These countries include the U.S. However, following the decision of the Court of Justice of the European Union in case C-362/14 Maximillian Schrems v. Data Protection Commissioner, which declared the European Union Safe Harbor Framework to be invalid, we can no longer rely on this route as a basis for transfer of personal data from the European Union to the U.S. for processing. We are, therefore, obliged to use alternate procedures for transfer of data between the European Union and the U.S.

On December 15, 2015, a proposal for an European Union Data Protection Regulation, intended to replace the current European Union Data Protection Directive, was agreed between the European Parliament, the Council of the European Union and the European Commission. The European Union Data Protection Regulation, which will be officially adopted in the first quarter of 2016, will introduce new data protection requirements in the European Union as well as substantial fines for breaches of the data protection rules. The European Union Data Protection Regulation, which will be applicable two years after the date of its publication in the Official Journal for the European Union, will increase our responsibility and liability in relation to personal data that we process and we may be required to put in place additional mechanisms ensuring compliance with the new data protection rules. This may be onerous and harm our business, financial condition, results of operations and prospects.

Product liability lawsuits against us could cause us to incur substantial liabilities and could limit licensing of our NAV Technology Platform or commercialization of any product candidates that we may develop.

We face an inherent risk of product liability exposure related to our licensed NAV Technology Platform and the testing of our product candidates in clinical trials and may face an even greater risk if products utilizing our NAV Technology Platform are commercialized. If we cannot successfully defend ourselves against claims that our technology or product candidates caused injuries, we could incur substantial liabilities. Regardless of merit or eventual outcome, liability claims may result in:

- decreased demand for our technology, including any product candidates that we may develop;
- loss of revenue;
- substantial monetary awards to trial participants or patients;
- significant time and costs to defend the related litigation;

- withdrawal of clinical trial participants;
- the inability to license our NAV Technology Platform or commercialize any product candidates that we may develop; and
- injury to our reputation and significant negative media attention.

Although we currently maintain product liability insurance coverage in the amount of $5.0 million per occurrence and $5.0 million in the aggregate, our product liability insurance coverage may not be adequate to cover all liabilities that we may incur. We anticipate that we will need to increase our insurance coverage each time we commence a clinical trial and if we successfully commercialize any product candidates. Insurance coverage is increasingly expensive. We may not be able to maintain insurance coverage at a reasonable cost or in an amount adequate to satisfy any liability that may arise.

If we or our development partners, including our NAV Technology Licensees, fail to comply with environmental, health and safety laws and regulations, we could become subject to fines or penalties or incur costs that could materially harm the success of our business.

We and our development partners, including our NAV Technology Licensees, are subject to numerous environmental, health and safety laws and regulations, including those governing laboratory procedures and the generation, handling, use, storage, treatment, manufacture, transportation and disposal of, and exposure to, hazardous materials and wastes, as well as laws and regulations relating to occupational health and safety. Our operations involve the use of hazardous and flammable materials, including chemicals and biologic and radioactive materials. Our and our development partners', including our NAV Technology Licensees', operations also produce hazardous waste products. We cannot eliminate the risk of contamination or injury from these materials. In the event of contamination or injury resulting from our or our development partners', including our NAV Technology Licensees', 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 workers' compensation insurance in the amount of up to $500,000 per occurrence for certain costs and expenses we may incur due to injuries to our employees resulting from work related injuries, this insurance may not provide adequate coverage against potential liabilities. We do not maintain insurance for toxic tort claims that may be asserted against us in connection with our storage or disposal of biologic, 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, which have tended to become more stringent over time. These current or future laws and regulations may impair us or our development partners', including our NAV Technology Licensees', research, development or production efforts. Failure to comply with these laws and regulations also may result in substantial fines, penalties or other sanctions or liabilities, which could materially harm our business, financial condition, results of operations and prospects.

We and our development partners, third-party manufacturer and suppliers use biological materials and may use hazardous materials, and any claims relating to improper handling, storage or disposal of these materials could be time consuming or costly.

We and our development partners, including our NAV Technology Licensees, third-party manufacturer and suppliers may use hazardous materials, including chemicals and biological agents and compounds that could be dangerous to human health and safety or the environment. Our operations and the operations of our third-party manufacturers and suppliers also produce hazardous waste products. Federal, state and local laws and regulations, and comparable foreign laws, govern the use, generation, manufacture, storage, handling and disposal of these materials and wastes. Compliance with applicable environmental laws and regulations may be expensive, and current or future environmental laws and regulations may impair our product development efforts. In addition, we cannot entirely eliminate the risk of accidental injury or contamination from these materials or wastes. We do not carry specific biological or hazardous waste insurance coverage, and our property, casualty and general liability insurance policies (under which we currently have $12.0 million in coverage) specifically exclude coverage for damages and fines arising from biological or hazardous waste exposure or contamination. Accordingly, in the event of contamination or injury, we could be held liable for damages or be penalized with fines in an amount exceeding our resources, and our clinical trials or regulatory approvals could be suspended.

Unfavorable global economic conditions could harm our business, financial condition or results of operations.

Our results of operations could be harmed by general conditions in the global economy and in the global financial markets. The most recent global financial crisis caused extreme volatility and disruptions in the capital and credit

markets. A severe or prolonged economic downturn, such as the most recent global financial crisis, could result in a variety of risks to our business, including weakened demand for our product candidates and our ability to raise additional capital when needed on acceptable terms, if at all. This is particularly true in the European Union, which is undergoing a continued severe economic crisis. A weak or declining economy could strain our suppliers, possibly resulting in supply disruption, or cause delays in payments for our services by third-party payors or our future collaborators. Any of the foregoing could harm our business and we cannot anticipate all of the ways in which the current economic climate and financial market conditions could harm our business.

We and third parties on which we rely may be harmed by natural disasters and our business continuity and disaster recovery plans may not adequately protect us from a serious disaster.

Natural disasters could severely disrupt our operations or the operations of our third parties' manufacturing facilities and materially harm our business, financial condition, results of operations and prospects. If a natural disaster, power outage or other event occurred that prevented us from using all or a significant portion of our headquarters, that damaged critical infrastructure or that otherwise disrupted operations, it may be difficult or, in certain cases, impossible for us to continue our business for a substantial period of time. The disaster recovery and business continuity plans we have in place currently are limited and may not prove adequate

in the event of a serious disaster or similar event. Our third party manufacturing facilities, as well as substantially all of our current supply of product candidates, are located in Pennsylvania, and we do not have any existing back-up facilities in place or plans for such back-up facilities. We may incur substantial expenses as a result of the limited nature of our disaster recovery and business continuity plans, which could materially harm our business, financial condition, results of operations and prospects.

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

Our internal computer systems and those of our current and any future collaborators and other contractors or consultants are vulnerable to damage from computer viruses, unauthorized access, natural disasters, terrorism, war and telecommunication and electrical failures. While we have not experienced any such material system failure, accident or security breach to date, if such an event were to occur and cause interruptions in our operations, it could result in a material disruption of our licensing and 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 licensing of our NAV Technology Platform and development and commercialization of our product candidates could be delayed.

We are increasingly dependent on information technology systems, infrastructure and data.

We are increasingly dependent upon information technology systems, infrastructure and data. Our computer systems may be vulnerable to service interruption or destruction, malicious intrusion and random attack. Security breaches pose a risk that sensitive data, including intellectual property, trade secrets or personal information may be exposed to unauthorized persons or to the public. 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, denial-of service, social engineering and other means to affect service reliability and threaten data confidentiality, integrity and availability. Our key business partners face similar risks, and a security breach of their systems could adversely affect our security posture. While we continue to invest data protection and information technology, there can be no assurance that our efforts will prevent service interruptions, or identify breaches in our systems, that could adversely affect our business and operations and/or result in the loss of critical or sensitive information, which could result in financial, legal, business or reputational harm.

Our customers are concentrated and therefore the loss of a significant customer may harm our business.

We rely on third parties for aspects of our business. Our revenue for the fiscal year ended December 31, 2015 consisted of license revenue, grant revenue and the sale of licensed reagents to third-parties for use in research and development. Three customers accounted for approximately 79% of our total revenue for the year ended December 31, 2015. No other customer accounted for more than 10% of revenue in 2015. Future license revenue is uncertain due to the contingent nature of our licenses granted to third-parties. We expect grant revenue to decrease in the future as we are not currently seeking any further grant awards. We do not consider reagent sales a core aspect of our business model and we do not dedicate significant resources to sales efforts for reagents. Accordingly, future revenue from sales of reagents is uncertain and may fluctuate significantly from period to period.

Risks Related to Our Intellectual Property

Our rights to license our NAV Technology Platform and to develop and commercialize our product candidates are subject, in part, to the terms and conditions of licenses granted to us by others.

We do not currently own any patents or wholly own any pending patent applications, and we are heavily reliant upon licenses to certain patent rights and proprietary technology from third parties that are important or necessary to the development of our technology and products, including technology related to our manufacturing process and our gene therapy product candidates. 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 license our platform or develop or commercialize our technology and products in the future. As a result, we may not be able to prevent competitors from developing and commercializing competitive products in territories not included in all of our licenses. For example, under our license agreement with GSK, GSK retained certain exclusive and non-exclusive rights under the patent rights that it licensed from Penn.

Licenses to additional third-party technology that may be required for our licensing or development programs may not be available in the future or may not be available on commercially reasonable terms, or at all, which could materially harm our business and financial condition.

In some circumstances, we may not have the right to control the preparation, filing and prosecution of patent applications, or to maintain or enforce the patents, covering technology that we license from third parties. For example, under our license agreement with Penn, Penn is entitled to control the preparation, prosecution and maintenance of the patent rights licensed to us. However, if we determine that we desire a greater degree of control over such patent rights, the Penn license agreement provides that Penn will work in good faith with us to enter into an arrangement for such additional control with reimbursement by us of certain expenses. If our licensors fail to maintain such patents, or lose rights to those patents or patent applications, the rights we have licensed may be reduced or eliminated and our right to develop and commercialize any of our products that are the subject of such licensed rights could be impacted. In addition to the foregoing, the risks associated with patent rights that we license from third parties will also apply to patent rights we may own in the future.

Furthermore, the research resulting in certain of our licensed patent rights and technology was funded by the U.S. government. As a result, the government may have certain rights, or march-in rights, to such patent rights and technology. When new technologies are developed with government funding, the government generally obtains certain rights in any resulting patents, including a non-exclusive license authorizing the government to use the invention for non-commercial purposes. These rights may permit the government to disclose our confidential information to third parties and to exercise march-in rights to use or allow third parties to use our licensed technology. The government can exercise its march-in rights if it determines that action is necessary because we fail to achieve practical application of the 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 inventions may be subject to certain requirements to manufacture products embodying such inventions in the U.S. Any exercise by the government of such rights could harm our competitive position, business, financial condition, results of operations and prospects.

If we are unable to obtain and maintain patent protection for our products and technology, or if the scope of the patent protection obtained is not sufficiently broad, our competitors could develop and commercialize products and technology similar or identical to ours, and our ability to successfully license our NAV Technology Platform and commercialize our products and technology may be harmed.

Our success depends, in large part, on our ability to obtain and maintain patent protection in the U.S. and other countries with respect to our proprietary NAV Technology Platform, our product candidates and our manufacturing technology. Our licensors have sought and we intend to seek to protect our proprietary position by filing patent applications in the U.S. and abroad related to many of our novel technologies and product candidates that are important to our business.

The patent prosecution process is expensive, time-consuming and complex, and we may not be able to file, prosecute, maintain, enforce or license all necessary or desirable patent applications at a reasonable cost or in a timely manner. In addition, certain patents in the field of gene therapy that may have otherwise potentially provided patent protection for certain of our product candidates have expired or will soon expire. In some cases, the work of certain academic researchers in the gene therapy field has entered the public domain, which we believe precludes our ability to obtain patent protection for certain inventions relating to such work. 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.

We are a party to intellectual property license agreements with Penn and GSK, each of which is important to our business, and we expect to enter into additional license agreements in the future. Our existing license agreements impose, and we expect that future license agreements will impose, various diligence, development and commercialization timelines, milestone payments, royalties and other obligations on us. If we fail to comply with our obligations under these agreements, or we are subject to a bankruptcy, the licensor may have the right to terminate the license, in which event we would not be able to market products covered by the license.

The patent position of biotechnology and pharmaceutical companies generally is highly uncertain, involves complex legal and factual questions and has, in recent years, been the subject of much litigation. As a result, the issuance, scope, validity, enforceability and commercial value of our patent rights are highly uncertain. Our pending and future patent applications may not result in patents being issued which protect our technology or product candidates or which effectively prevent others from commercializing competitive technologies and product candidates. Changes in either the patent laws or interpretation of the patent laws in the U.S. and other countries may diminish the value of our patents or narrow the scope of our patent protection.

We may not be aware of all third-party intellectual property rights potentially relating to our technology and product candidates. Publications of discoveries in the scientific literature often lag the actual discoveries, and patent applications in the U.S. and other jurisdictions are typically not published until 18 months after filing or, in some cases, not at all. Therefore, we cannot be certain that we were the first to make the inventions claimed in any owned or any licensed patents or pending patent applications, or that we were the first to file for patent protection of such inventions.

Even if the patent applications we license or may own in the future do issue as patents, they may not issue in a form that will provide us with any meaningful protection, prevent competitors or other third parties from competing with us or otherwise provide us with any competitive advantage. Our competitors or other third parties may avail themselves of safe harbor under the Hatch-Waxman Amendments to conduct research and clinical trials and may be able to circumvent our patents by developing similar or alternative technologies or products in a non-infringing manner.

The issuance of a patent is not conclusive as to its inventorship, scope, validity or enforceability, and our patents may be challenged in the courts or patent offices in the U.S. and abroad. Such challenges may result in loss of exclusivity or in patent claims being narrowed, invalidated or held unenforceable, 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. 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 intellectual property may not provide us with sufficient rights to exclude others from commercializing products similar or identical to ours.

Our intellectual property licenses with third parties may be subject to disagreements over contract interpretation, which could narrow the scope of our rights to the relevant intellectual property or technology or increase our financial or other obligations to our licensors.

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 materially harm our business, financial condition, results of operations and prospects.

If we fail to comply with our obligations in the agreements under which we license intellectual property rights from third parties or otherwise experience disruptions to our business relationships with our licensors, we could lose license rights that are important to our business.

We have entered into license agreements with third parties and may need to obtain additional licenses from others to advance our research, to expand our licensing program or to allow commercialization of our product candidates. It is possible that we may be unable to obtain additional licenses at a reasonable cost or on reasonable terms, if at all. In that event, we may be required to expend significant time and resources to redesign our technology or 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 redesign our platform technology or to develop or commercialize the affected product candidates, which could materially harm our business. We cannot provide any assurances that third-party patents do not exist which might be enforced against our current platform technology, manufacturing methods, product candidates or future methods or products, resulting in either an injunction prohibiting our licensing, manufacture or sales, or, with respect to our sales, an obligation on our part to pay royalties and/or other forms of compensation to third parties.

In each of our existing license agreements, and we expect in our future agreements, patent prosecution of our licensed technology is controlled primarily by the licensor, and we are required to reimburse the licensor for certain costs of patent prosecution and maintenance. If our licensors fail to obtain and maintain patent or other protection for the proprietary intellectual property we license from them, we could lose our rights to the intellectual property or our exclusivity with respect to those rights, and our competitors could market competing products using the intellectual property. Further, in each of our license agreements we could be responsible for bringing actions against any third party for infringing on the patents we have licensed if our licensor elects not to enforce its rights against the infringing

third party. Certain of our license agreements in which we are the licensee also require us to meet development milestones to maintain the license, including establishing a set timeline for developing and commercializing products and minimum diligence obligations in developing and commercializing the product. Disputes may arise regarding intellectual property subject to a licensing agreement, including:

- the scope of rights granted under the license agreement and other interpretation-related issues;
- the extent to which our technology and processes infringe on or otherwise violate intellectual property of the licensor that is not subject to the licensing agreement;
- the sublicensing of patent and other intellectual property rights under our collaborative development relationships;
- our diligence obligations under the license agreement and what activities satisfy those diligence obligations;

- the inventorship or 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.

If disputes over intellectual property that we have licensed prevent or impair our ability to maintain our current licensing arrangements on acceptable terms, we may be unable to successfully develop and commercialize the affected product candidates.

We may not be successful in obtaining necessary rights to our product candidates through acquisitions and in-licenses.

We currently have rights to intellectual property, through licenses from third parties, to license our NAV Technology Platform and develop our product candidates. Because our programs may require the use of intellectual property or other proprietary rights held by third parties, the growth of our business may depend, in part, on our ability to acquire, in-license or use such intellectual property and proprietary rights. We may be unable to acquire or in-license any compositions, methods of use, processes (and patents for such technology) or other intellectual property rights from third parties that we identify as necessary for our technology platform and product candidates. The licensing or acquisition of third-party intellectual property rights is a competitive area, and several more established companies may pursue strategies to license or acquire third-party intellectual property rights that we may consider attractive. 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.

We sometimes collaborate with non-profit and academic institutions to accelerate our preclinical research or development under written agreements with these institutions. Some of these institutions provide us with an option to negotiate a license to any of the institution’s rights in technology resulting from the collaboration, and under our relationship with Penn, any patentable inventions developed under our 2014 SRA automatically accrue to our existing license with Penn. Regardless of such option, we may be unable to negotiate a license 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 other parties, potentially blocking our ability to pursue our program.

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 and our business, financial condition, results of operations and prospects could suffer.

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

Periodic maintenance fees, renewal fees, annuity fees and various other government fees on patents and/or applications will be due to be paid to the U.S. Patent and Trademark Office (USPTO) and various patent agencies outside of the U.S. over the lifetime of our licensed patents and/or applications and any patent rights we may own or license in the future. We rely on our licensing partners to pay these fees due to non-U.S. patent agencies with respect to our licensed patent rights. The USPTO and various non-U.S. government patent agencies require compliance with several procedural, documentary, fee payment and other similar provisions during the patent application process. We employ reputable law firms and other professionals to help us comply and we are also dependent on our licensors to take the necessary action to comply with these requirements with respect to our licensed intellectual property. In many cases, an inadvertent lapse can be cured by payment of a late fee or by other means in accordance with the applicable rules. There are situations, however, in which non-compliance 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. In such an event,

potential competitors might be able to enter the market and this circumstance could materially harm our business.

We may not be able to protect our intellectual property rights throughout the world.

Filing, prosecuting and defending patents on our platform technology or product candidates in all countries throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the U.S. could be less extensive than those in the U.S. Although Penn, GSK and ARIAD Pharmaceuticals, Inc. (ARIAD) license agreements grant us worldwide rights, certain of our in-licensed U.S. patent rights lack corresponding foreign patents or patent applications. For example, under our license agreement with the Regents of the University of Minnesota, the territory is limited to those countries and territories, including the U.S., in which a licensed patent has issued and is unexpired or a licensed patent application is pending. 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 U.S. Consequently, we may not be able to prevent third parties from practicing our inventions in all countries outside the U.S., or from selling or importing

products made using our inventions in and into the U.S. 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, but enforcement is not as strong as that in the U.S. 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 proprietary rights generally. Proceedings to enforce our patent 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 and 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 rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license.

Issued patents covering our NAV Technology Platform or 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 one of our licensing partners or we initiate legal proceedings against a third party to enforce a patent covering our NAV Technology Platform or 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 U.S., 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 subject-matter eligibility, novelty, non-obviousness, written description or enablement. 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 U.S. 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 NAV Technology Platform or 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 materially harm 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 technology, 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 U.S. 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.

Third parties may initiate legal proceedings alleging that we are infringing their intellectual property rights, the outcome of which would be uncertain and could materially harm our business.

Our commercial success depends, in part, upon our ability to license our NAV Technology Platform, and on our NAV Technology Licensees' ability to develop, manufacture, market and sell our product candidates and use our proprietary technologies without infringing or otherwise violating the proprietary rights and intellectual property of third parties. The biotechnology and pharmaceutical industries are characterized by extensive and complex litigation regarding patents and other intellectual property rights. We may in the future become party to, or be threatened with, adversarial proceedings or litigation regarding intellectual property rights with respect to our product candidates and technology, including interference proceedings, post grant review and inter partes review before the USPTO. 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 materially harm our ability to license our technology platform or commercialize our Lead Product Candidates or any future 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. If we are found to infringe a third party's valid and enforceable intellectual property rights, we could be required to obtain a license from such third party to continue licensing, 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 licensing, 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. A finding of infringement could prevent us from licensing our technology platform or manufacturing and commercializing our product candidates or force us to cease some of our business operations, which could materially harm our business. Claims that we have misappropriated the confidential information or trade secrets of third parties could similarly harm our business, financial condition, results of operations and prospects.

Intellectual property litigation could cause us to spend substantial resources and distract our personnel from their normal responsibilities.

Competitors may infringe our patents or the patents of our licensing partners, or we may be required to defend against claims of infringement or that our intellectual property is invalid or unenforceable. To counter infringement or unauthorized use claims or to defend against claims of infringement or other intellectual property related claims can be expensive and time consuming. 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 materially harm 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 adequately conduct such litigation or proceedings. 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 more mature and developed intellectual property portfolios. Uncertainties resulting from the initiation and continuation of patent and other intellectual property litigation or proceedings could materially harm our ability to compete in the marketplace.

We may be subject to claims asserting that our employees, consultants or advisors have wrongfully used or disclosed alleged trade secrets of their current or former employers or claims asserting ownership of what we regard as our own intellectual property.

Many of our employees, consultants or advisors are currently, or were previously, employed at universities or other biotechnology or pharmaceutical companies, including our competitors or potential competitors. Although we try to ensure that our employees, consultants and advisors 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. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management.

In addition, while it is our policy to require our employees and contractors who may be involved in the conception or 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, conceives or develops intellectual property that we regard as our own. The assignment of intellectual property rights may not be self-executing or the assignment agreements may be breached, and we may be forced to bring claims against third parties, or defend claims that they may bring against us, to determine the ownership of what we regard as our intellectual property.

Changes in U.S. patent law could diminish the value of patents in general, thereby impairing our ability to protect our products.

Recent patent reform legislation could increase the uncertainties and costs surrounding the prosecution of patent applications and the enforcement or defense of issued patents. On September 16, 2011, the Leahy-Smith America Invents Act (the Leahy-Smith Act) was signed into law. The Leahy-Smith Act includes several significant changes to U.S. patent law. These include provisions that

affect the way patent applications are prosecuted and also may affect patent litigation. These also include provisions that switched the U.S. from a "first-to-invent" system to a "first-to-file" system, allow third-party submission of prior art to the USPTO during patent prosecution and set forth additional procedures to attack the validity of a patent by the USPTO administered post grant proceedings. Under a first-to-file system, assuming the other requirements for patentability are met, the first inventor to file a patent application generally will be entitled to the patent on an invention regardless of whether another inventor had made the invention earlier. The USPTO recently developed new regulations and procedures to govern administration of the Leahy-Smith Act, and many of the substantive changes to patent law associated with the Leahy-Smith Act, and in particular, the first to file provisions, only became effective on March 16, 2013. Accordingly, it is not clear what, if any, impact the Leahy-Smith Act will have on the operation of our business. However, 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 materially harm our business, financial condition, results of operations and prospects.

The patent positions of companies engaged in the development and commercialization of biologics and pharmaceuticals are particularly uncertain. Two cases involving diagnostic method claims and "gene patents" have recently been decided by the Supreme Court of the U.S. (Supreme Court). On March 20, 2012, the Supreme Court issued a decision in Mayo Collaborative Services v. Prometheus Laboratories, Inc. (Prometheus), a case involving patent claims directed to a process of measuring a metabolic product in a patient to optimize a drug dosage for the patient. According to the Supreme Court, the addition of well-understood, routine or conventional activity such as "administering" or "determining" steps was not enough to transform an otherwise patent-ineligible natural phenomenon into patent-eligible subject matter. On July 3, 2012, the USPTO issued a guidance memo to patent examiners indicating that process claims directed to a law of nature, a natural phenomenon or a naturally occurring relation or correlation that do not include additional elements or steps that integrate the natural principle into the claimed invention such that the natural principle is practically applied and the claim amounts to significantly more than the natural principle itself should be rejected as directed to not patent-eligible subject matter. On June 13, 2013, the Supreme Court issued its decision in Association for Molecular Pathology v. Myriad Genetics, Inc. (Myriad), a case involving patent claims held by Myriad relating to the breast cancer susceptibility genes BRCA1 and BRCA2. Myriad held that an isolated segment of naturally occurring DNA, such as the DNA constituting the BRCA1 and BRCA2 genes, is not patent eligible subject matter, but that complementary DNA, which is an artificial construct that may be created from RNA transcripts of genes, may be patent eligible.

The USPTO issued a number of Interim Guidance memoranda on patent eligibility under 35 U.S.C. §101 in 2014 and 2015 to instruct USPTO examiners on the ramifications of the Prometheus and Myriad rulings and the application of the Myriad ruling to natural products and principles including all naturally occurring nucleic acids. On March 4, 2014, the USPTO issued a guidance memorandum to patent examiners entitled 2014 Procedure for Subject Matter Eligibility Analysis of Claims Reciting or Involving Laws of Nature/Natural Principles, Natural Phenomena, and/or Natural Products. In response to public feedback, these Guidelines were superseded by the Interim Eligibility Guidance in December 2014, and again updated in January 2015. It is expected that the guidance will be further updated in view of developments in the case law and in response to public feedback. Patents for certain of our product candidates contain claims related to specific DNA sequences that are naturally occurring and, therefore, could be the subject of future challenges made by third parties. In addition, the recent USPTO guidance could make it impossible for us to pursue similar patent claims in patent applications we may prosecute in the future.

We cannot assure you that our efforts to seek patent protection for our technology and products will not be negatively impacted by the decisions described above, rulings in other cases or changes in guidance or procedures issued by the USPTO. We cannot fully predict what impact the Supreme Court's decisions in Prometheus and Myriad may have on the ability of life science companies to obtain or enforce patents relating to their products and technologies in the future. These decisions, the guidance issued by the USPTO and rulings in other cases or changes in USPTO guidance or procedures could materially harm our existing patent portfolio and our ability to protect and enforce our intellectual

property in the future.

Moreover, although the Supreme Court has held in Myriad that isolated segments of naturally occurring DNA are not patent-eligible subject matter, certain third parties could allege that activities that we may undertake infringe other gene-related patent claims, and we may deem it necessary to defend ourselves against these claims by asserting non-infringement and/or invalidity positions, or paying to obtain a license to these claims. In any of the foregoing or in other situations involving third-party intellectual property rights, if we are unsuccessful in defending against claims of patent infringement, we could be forced to pay damages or be subjected to an injunction that would prevent us from utilizing the patented subject matter. Such outcomes could harm our business, financial condition, results of operations or prospects.

If we do not obtain patent term extension and data exclusivity for our product candidates, our business may be materially harmed.

Depending upon the timing, duration and specifics of any FDA marketing approval of our product candidates, one or more of our U.S. patents may be eligible for limited patent term extension under the Drug Price Competition and Patent Term Restoration Act of 1984 (Hatch-Waxman Amendments). The Hatch-Waxman Amendments permit a patent extension term of up to five years as

compensation for patent term lost during the FDA regulatory review process. A patent term extension cannot extend the remaining term of a patent beyond a total of 14 years from the date of product approval, only one patent may be extended and only those claims covering the approved drug, a method for using it or a method for manufacturing it may be extended. However, we may not be granted an extension 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 applicable time period or the scope of patent protection afforded could be less than we request. If we are unable to obtain patent term extension or the term of any such extension is less than we request, our competitors may obtain approval of competing products following our patent expiration, and our revenue could be reduced, possibly materially.

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 harmed.

We have pending trademark applications with the USPTO for the mark “REGENXBIO” and the REGENXBIO logo, approval of which is not guaranteed. Once registered, our trademarks or trade names may be challenged, infringed, 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 harmed. 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 harm 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:

- others may be able to make gene therapy products that are similar to our product candidates or utilize similar gene therapy technology but that are not covered by the claims of the patents 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 make the inventions covered by the issued patent or pending patent application 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 licensed intellectual property rights;
- it is possible that our pending licensed patent applications or those that we may own in the future will not lead to issued patents;
- issued patents that we hold rights to may be held invalid or unenforceable, including as a result of legal challenges by our competitors;
- 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 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 for 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 materially harm our business, financial condition, results of operations and prospects.

Risks Related to Our Common Stock

The trading price of the shares of our common stock has been and will likely continue to be highly volatile, and purchasers of our common stock may not be able to resell the shares of our common stock at or above the purchase price and could incur substantial losses.

Our stock price has been and is likely to continue to be volatile. The market price of our common stock could be subject to wide fluctuations in response to various factors, many of which are beyond our control. These factors include those discussed elsewhere in this "Risk Factors" section and others such as:

- the delay or failure in initiating or completing preclinical studies or clinical trials, or unsatisfactory results of these trials;
- announcements about us or about our competitors including clinical trial results, regulatory approvals, or new product candidate introductions;
- developments concerning our current or future development partners, licensors or product candidate manufacturers;
- developments or changing views regarding the use of gene therapy;
- litigation and other developments relating to our patents or other proprietary rights or those of our competitors;
- conditions in the pharmaceutical or biotechnology industries and the economy as a whole;
- governmental regulation and legislation;
- the recruitment or departure of members of our board of directors, management team or other key personnel;
- changes in our operating results;
- any changes in the financial projections we may provide to the public, our failure to meet these projections, or changes in recommendations by any securities analysts that elect to follow our common stock;
- any change in securities analysts' estimates of our performance, or our failure to meet analysts' expectations;
- the expiration of market standoff or contractual lock-up agreements;
- sales or potential sales of substantial amounts of our common stock; or
- price and volume fluctuations in the overall stock market or resulting from inconsistent trading volume levels of our shares.

In recent years, the stock market in general, and the market for pharmaceutical and biotechnology companies in particular, has experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to changes in the operating performance of the companies whose stock is experiencing those price and volume fluctuations. Broad market and industry factors may seriously affect the market price of our common stock, regardless of our actual operating performance.

As a newly public company, our stock price has been and may continue to be volatile, and securities class action litigation has often been instituted against companies following periods of volatility of their stock price. Any such litigation, if instituted against us, could result in substantial costs and a diversion of our management's attention and resources.

In the past, following periods of volatility in the overall market and the market price of a particular company's securities, securities class action litigation has often been instituted against these companies. This litigation, if instituted against us, could result in substantial costs and a diversion of our management's attention and resources.

Our quarterly operating results may fluctuate significantly.

We expect our operating results to be subject to quarterly fluctuations. Our net loss and other operating results will be affected by numerous factors, including:

- variations in the level of expenses related to our NAV Technology Platform and Lead Product Candidates;

·addition or termination of clinical trials;
·regulatory developments affecting our Lead Product Candidates or future product candidates;
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- our execution of any collaborative, licensing or similar arrangements, including our NAV Technology Licensees, and the timing of payments we may make or receive under these arrangements; and
- nature and terms of stock-based compensation grants and any intellectual property infringement lawsuit in which we may become involved.

If our quarterly operating results fall below the expectations of investors or securities analysts, the price of our common stock could decline substantially. Furthermore, any quarterly fluctuations in our operating results may, in turn, cause the price of our stock to fluctuate substantially.

If securities analysts do not publish research or reports about our business or if they publish negative evaluations of our stock, the price of our stock could decline.

The trading market for our common stock relies, in part, on the research and reports that industry or financial analysts publish about us or our business. If few analysts commence coverage of us, the trading price of our stock would likely decrease. Although we have obtained analyst coverage, if one or more of the analysts covering our business downgrade their evaluations of our stock, 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 to decline.

Raising additional funds by issuing securities or through licensing or lending arrangements may cause dilution to our existing stockholders, restrict our operations or require us to relinquish proprietary rights.

We will need to raise additional funding. To the extent that we raise additional capital by issuing equity securities, the share ownership of existing stockholders will be diluted. Any future debt financing may involve covenants that restrict our operations, including limitations on our ability to incur liens or additional debt, pay dividends, redeem our stock, make certain investments, and engage in certain merger, consolidation, or asset sale transactions. In addition, if we seek funds through arrangements with collaborative partners, these arrangements may require us to relinquish rights to some of our technologies or products or otherwise agree to terms unfavorable to us.

We may use our cash and cash equivalents in ways that you and other stockholders may not approve.

Our management has broad discretion in the application of our cash and cash equivalents. Because of the number and variability of factors that will determine our use of our cash and cash equivalents, their ultimate use may vary substantially from their currently intended use. Our management might not apply our cash and cash equivalents in ways that ultimately increase the value of your investment. The failure by our management to apply our cash and cash equivalents effectively could harm our business. Pending their use, we may invest our cash and cash equivalents in a variety of capital preservation investments, including short-term, interest-bearing, investment-grade instruments and U.S. government securities. These investments may not yield a favorable return to our stockholders.

We have never paid and do not intend to pay cash dividends and, consequently, your ability to achieve a return on your investment will depend on appreciation in the price of our common stock.

We have never paid cash dividends on any of our capital stock, and we currently intend to retain future earnings, if any, to fund the development and growth of our business. Therefore, you are not likely to receive any dividends on our common stock for the foreseeable future or at all. Since we do not intend to pay dividends, your ability to receive a return on your investment will depend on any future appreciation in the market value of our common stock. There is no guarantee that our common stock will appreciate or even maintain the price at which you have purchased it.

Our principal stockholders and management own a significant percentage of our stock and will be able to exert significant control over matters subject to stockholder approval.

As of December 31, 2015, our executive officers, directors, holders of more than five percent of our capital stock and their respective affiliates beneficially owned 50.3% of our outstanding capital stock. Therefore, these stockholders may have the ability to influence us through their ownership position. These stockholders may be able to determine all matters requiring stockholder approval. For example, these stockholders may be able to control elections of directors, amendments of our organizational documents, or approval of any merger, sale of assets or other major corporate transaction. This may prevent or discourage unsolicited acquisition proposals or offers for our common stock that you may feel are in your best interest as one of our stockholders.

Substantial future sales of shares by existing stockholders, or the perception that such sales may occur, could cause our stock price to decline.

If our existing stockholders, particularly our directors and executive officers and the venture capital funds affiliated with our current and former directors, sell substantial amounts of our common stock in the public market, or are perceived by the public market as intending to sell substantial amounts of our common stock, the trading price of our common stock could decline below the initial public offering price. We have 26,328,584 outstanding shares of common stock as of March 1, 2016. Of these shares, only the shares of common stock sold in our initial public offering and registered shares issued pursuant to our equity plans will be freely tradable in the public market, subject to any applicable lock-up agreements or Rule 144 transfer restrictions applicable to affiliates.

Our officers, directors and holders of substantially all of our equity securities have entered into contractual lock-up agreements with the underwriters of our initial public offering pursuant to which they have agreed, subject to certain exceptions, not to sell or otherwise transfer any of their common stock or securities convertible into or exchangeable for shares of common stock for a period of 180 days ending March 14, 2016. However, we and the lead underwriters in our initial public offering may permit these holders to sell shares prior to the expiration of the lock-up agreements with the underwriters if certain conditions are satisfied.

Based on 26,328,584 shares outstanding as of March 1, 2016, after the contractual lock-up agreements pertaining to our initial public offering expire on March 14, 2016, up to an additional 19,050,708 shares will be eligible for sale in the public market, up to 8,159,293 of which are held by directors, executive officers and other affiliates and will be subject to volume and other limitations under Rule 144 under the Securities Act.

In addition, shares of common stock that are either subject to outstanding options or reserved for future issuance under our employee benefit plans will become eligible for sale in the public market to the extent permitted by the provisions of various vesting schedules, the lock-up agreements and Rule 144 and Rule 701 under the Securities Act. If these additional shares of common stock are sold, or if it is perceived that they will be sold, in the public market, the trading price of our common stock could decline.

Some of our existing security holders have demand and piggyback rights to require us to register with the SEC up to 16,298,045 shares of our common stock, subject to expiration of the contractual lock-up agreements. If we register these shares of common stock, the stockholders would be able to sell those shares freely in the public market, subject to Rule 144 transfer restrictions applicable to affiliates.

We will continue to 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.

As a public company, and particularly after we are no longer an emerging growth company, we will continue to incur significant legal, accounting and other expenses that we did not incur as a private company. In addition, the Sarbanes-Oxley Act of 2002 and rules subsequently implemented by the SEC and NASDAQ have imposed 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 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.

Pursuant to Section 404, we will be required to furnish a report by our management on our internal control over financial reporting, including an attestation report on internal control over financial reporting issued by our

independent registered public accounting firm. However, while we remain an emerging growth company, 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 incur costs associated with the remediation of the material weaknesses identified in our internal control over financial reporting. We estimate these costs will be between $0.5 million and $1.0 million per year. Additionally, 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, 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 that our internal control over financial reporting is effective as required by Section 404. This could result in an adverse reaction in the financial markets due to a loss of confidence in the reliability of our financial statements.

Provisions in our restated certificate of incorporation and amended and restated bylaws and Delaware law might discourage, delay or prevent a change in control of our company or changes in our management and, therefore, depress the market price of our common stock.

Our restated certificate of incorporation and amended and restated bylaws contain provisions that could depress the market price of our common stock by acting to discourage, delay or prevent a change in control of our company or changes in our management that the stockholders of our company may deem advantageous. These provisions among other things:

- establish a classified board of directors so that not all members of our board are elected at one time;
- permit the board of directors to establish the number of directors;
- provide that directors may only be removed "for cause";
- require super-majority voting to amend some provisions in our restated certificate of incorporation and amended and restated bylaws;
- authorize the issuance of "blank check" preferred stock that our board of directors could use to implement a stockholder rights plan;
- eliminate the ability of our stockholders to call special meetings of stockholders;
- prohibit stockholder action by written consent, which requires all stockholder actions to be taken at a meeting of our stockholders;
- provide that the board of directors is expressly authorized to make, alter or repeal our bylaws; and
- establish advance notice requirements for nominations for election to our board of directors or for proposing matters that can be acted upon by stockholders at annual stockholder meetings.

In addition, Section 203 of the Delaware General Corporation Law may discourage, delay or prevent a change in control of our company. Section 203 imposes certain restrictions on merger, business combinations and other transactions between us and holders of 15% or more of our common stock.

Our restated certificate of incorporation designates the Court of Chancery of the State of Delaware as the exclusive forum for certain litigation that may be initiated by our stockholders, which could limit our stockholders' ability to obtain a favorable judicial forum for disputes with us.

Pursuant to our restated certificate of incorporation, 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 does not have jurisdiction, the federal district court for the District of Delaware), will be the sole and exclusive forum for (1) any derivative action or proceeding brought on our behalf, (2) any action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers or other employees to us or our stockholders, (3) any action asserting a claim arising pursuant to any provision of the Delaware General Corporation Law, our restated certificate of incorporation or our amended and restated bylaws or (4) any action asserting a claim governed by the internal affairs doctrine. Additionally, if the subject matter of any action within the scope of the preceding sentence is filed in a court other than a court located with the State of Delaware (a Foreign Action) in the name of any stockholder, such stockholder shall be deemed to have consented to (i) the personal jurisdiction of the state and federal courts located within the State of Delaware in connection with any action brought in any such court to enforce the preceding sentence and (ii) having service of process made upon such stockholder in any such action by service upon such stockholder's counsel in the Foreign Action as agent for such stockholder. The forum selection clause in our restated certificate of incorporation may limit our stockholders' ability to obtain a favorable judicial forum for disputes with us, our directors, officers or other employees.

We are an emerging growth company and the reduced disclosure and governance requirements applicable to emerging growth companies could make our common stock less attractive to investors.

We are an emerging growth company. Under the Jumpstart Our Business Startups Act, emerging growth companies can delay adopting new or revised accounting standards until such time as those standards apply to private companies. We have irrevocably elected not to avail ourselves of this exemption from new or revised accounting standards and, therefore, we will be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies.

For as long as we continue to be an emerging growth company, we intend to take advantage of certain other exemptions from various reporting requirements that are applicable to other public companies, including reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements, exemptions from the requirements of holding a nonbinding

advisory stockholder vote on executive compensation and any golden parachute payments not previously approved, exemption from the requirement of auditor attestation on our internal control over financial reporting and exemption from 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 (auditor discussion and analysis). If we do, the information that we provide stockholders may be different than what is available with respect to other public companies.

Investors could find our common stock less attractive because we will rely on these exemptions, which may make it more difficult for investors to compare our business with other companies in our industry. 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, it may be difficult for us to raise additional capital as and when we need it. If we are unable to do so, our financial condition and results of operations could be materially harmed.

We will remain an emerging growth company until the earliest of (1) the end of the fiscal year in which the market value of our common stock that is held by non-affiliates exceeds $700.0 million as of the end of the second fiscal quarter, (2) the end of the fiscal year in which we have total annual gross revenue of $1.0 billion or more during such fiscal year, (3) the date on which we issue more than $1.0 billion in non-convertible debt in a three-year period or (4) December 31, 2020, the end of the fiscal year following the fifth anniversary of the completion of our initial public offering.

ITEM 1B. UNRESOLVED STAFF COMMENTS

Not applicable.

ITEM 2. PROPERTIES

Our corporate headquarters are currently located in Rockville, Maryland. We occupy approximately 11,000 square feet of office space in this location under a lease that expires in October 2020, renewable for two additional three-year terms, and which includes a right of first refusal on an additional 19,000 square feet of office, laboratory and manufacturing space adjacent to our current premises which we exercised in September 2015. The lease term for the additional space is five years from the date we occupy the space, which is currently anticipated to take place during the second quarter of 2016. In addition, we occupy 375 square feet of lab space in Philadelphia, Pennsylvania under a lease that expires in June 2016 and lease temporary office space on a month-to-month basis in Bethesda, Maryland. In January 2016, we entered into a new lease agreement for approximately 16,000 square feet of office space elsewhere in Rockville, Maryland that expires in June 2023, renewable for an additional five-year term. We currently anticipate occupying this space in the first half of 2016. We believe that our existing facilities are adequate to meet our current needs, and that suitable additional alternative spaces will be available in the future on commercially reasonable terms.

ITEM 3. LEGAL PROCEEDINGS

From time to time, we may become subject to legal proceedings, claims and litigation arising in the ordinary course of business. We currently are not a party to any threatened or pending litigation and do not have contingency reserves established for any litigation liabilities. However, third parties might allege that we are infringing their patent rights or that we are otherwise violating their intellectual property rights, including trade names and trademarks. Such third parties may resort to litigation. We accrue contingent liabilities when it is probable that future expenditures will be made and such expenditures can be reasonably estimated.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED SHAREHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

Our common stock has been trading on The NASDAQ Global Select Market under the symbol "RGNX" since our initial public offering on September 17, 2015. Prior to that time, there was no established public trading market for our common stock. The following table sets forth, for the periods indicated, the range of high and low sale prices of our common stock as reported by NASDAQ.

	High	Low
Third quarter 2015 (beginning September 17, 2015)	$32.00	$17.51
Fourth quarter 2015	$25.00	$13.77

On March 1, 2016, the last reported sale price for our common stock on The NASDAQ Global Select Market was $12.80 per share.

Stock Performance Graph

The graph set forth below compares the cumulative total stockholder return on our common stock between September 17, 2015 (the date of our initial public offering) and December 31, 2015, with the cumulative total return of (a) the NASDAQ Biotechnology Index (^NBI) and (b) the NASDAQ Composite Index (^IXIC), over the same period. This graph assumes the investment of $100 on September 17, 2015 in our common stock, the NASDAQ Biotechnology Index and the NASDAQ Composite Index and assumes the reinvestment of dividends, if any. The graph assumes our closing sales price on September 17, 2015 of $30.45 per share as the initial value of our common stock and not the initial offering price to the public of $22.00 per share.

The comparisons shown in the graph below are based upon historical data. We caution that the stock price performance shown in the graph below is not necessarily indicative of, nor is it intended to forecast, the potential future performance of our common stock. Information used in the graph was obtained from the NASDAQ Stock Market LLC, a financial data provider and a source believed to be reliable. The NASDAQ Stock Market LLC is not responsible for any errors or omissions in such information.

Holders

As of March 1, 2016 there were 61 holders of record of our common stock. The number of holders of record of our common stock does not reflect the number of beneficial holders whose shares are held by depositors, brokers or other nominees.

Dividends

We have not declared or paid any cash dividends on our common stock since our inception. We do not plan to pay dividends in the foreseeable future.

Securities Authorized for Issuance Under Equity Compensation Plans

The following table provides information as of December 31, 2015 with respect to the shares of our common stock that may be issued under our existing equity compensation plans.

Plan Category	Number of Securities to be Issued upon Exercise of Outstanding Options, Warrants and Rights (a)	Weighted-average Exercise Price of Outstanding Options, Warrants and Rights (b)	Number of Securities Remaining Available for Future Issuance Under Equity Compensation Plans (excluding securities (reflected in column (a)) (c)
Equity compensation plans approved by stockholders	3,683,725[1]	$ 5.52	2,567,812[2]
Equity compensation plans not approved by stockholders	—	—	—
Total	3,683,725	$ 5.52	2,567,812

(1) Includes 3,683,725 shares of common stock issuable upon exercise of outstanding options under all existing equity compensation plans. Of these shares, 3,019,600 were subject to options then outstanding under our 2014 Stock Plan and 664,125 were subject to options then outstanding under our 2015 Equity Incentive Plan (the 2015 Plan).

(2) Represents 2,313,812 shares of common stock available for issuance under the 2015 Plan and 254,000 shares of common stock available for issuance under our 2015 Employee Stock Purchase Plan (the ESPP). On January 1 of each year, (i) the number of shares reserved under the 2015 Plan is automatically increased by the lesser of 4% of the total number of shares of common stock that are outstanding at that time or such lesser number as may be approved by our Board of Directors and (ii) the number of shares reserved under the ESPP is automatically increased by the lesser of 1% of the total number of shares of common stock that are outstanding at that time or such lesser number as may be approved by our Board of Directors. On January 1, 2016, an additional 1,052,538 shares became available for future issuance under the 2015 Stock Plan and no additional shares were added to the ESPP. The additional shares from the annual increase on January 1, 2016 are not included in the table above.

Recent Sales of Unregistered Securities

Conversion from Limited Liability Company to Corporation

In September 2014, we converted from a Delaware limited liability company named ReGenX Biosciences, LLC (the LLC) to a Delaware corporation named REGENXBIO Inc. (the Conversion). Pursuant to the Conversion, we issued (i) 2,642,963 shares of common stock upon the conversion of 132,148,224 Class A units of the LLC, (ii) 1,906,295 shares of Series A Preferred Stock upon the conversion of 119,656,372 Series A Preferred units of the LLC and (iii) 2,393,127 shares of Series B Preferred Stock upon the conversion of 95,314,803 shares of Series B Preferred units of

the LLC.

Series D Preferred Stock Financing

In May 2015, we entered into a stock purchase agreement (the Series D Purchase Agreement) with new and existing investors to raise an aggregate of $70.5 million from the sale of 7,366,849 shares of our Series D convertible preferred stock, $0.0001 par value per share (the Series D Preferred Stock), at a purchase price of $9.5699 per share (the Series D Financing).

Series C Preferred Stock Financing

In January 2015, we entered into a stock purchase agreement (the Series C Purchase Agreement) with new and existing investors to raise an aggregate of $30.0 million, including the conversion of approximately $3.8 million in outstanding convertible notes, from the sale of 4,631,774 shares of our Series C convertible preferred stock, $0.0001 par value per share (the Series C Preferred Stock), at a purchase price of $6.477 per share (the Series C Financing).

The issuances of the securities described above pursuant to the Conversion were deemed to be exempt from registration under the Securities Act of 1933, as amended (the Securities Act), in reliance on Section 4(2) of the Securities Act. The recipients of securities in the Conversion represented their intention to acquire 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 stock certificates issued in such transaction.

The Series C Financing and the Series D Financing were made in reliance on Rule 506 promulgated under the Securities Act and was made without general solicitation or advertising. Each purchaser represented that it was an accredited investor with access to information about us sufficient to evaluate the investment and that the common stock was being acquired without a view to distribution or resale in violation of the Securities Act. A Form D filing was made in accordance with the requirements of Regulation D for both the Series C Financing and the Series D Financing.

No underwriters were involved in the foregoing issuances or sales of securities.

Use of Proceeds from Public Offering of Common Stock

On September 22, 2015, we closed our initial public offering (IPO) whereby 7,245,000 shares of common stock were sold at a public offering price of $22.00 per share for an aggregate offering price of $159.4 million, which included 945,000 shares of common stock sold at the IPO price of $22.00 pursuant to the underwriters' option to purchase additional shares of common stock (Underwriters' Option). The offer and sale of all of the shares in the IPO and pursuant to the Underwriters' Option were registered under the Securities Act pursuant to a Registration Statement on Form S-1 (File No. 333-206430), which was declared effective by the SEC on September 16, 2015. The offering commenced as of September 16, 2015 and did not terminate before all of the securities registered in the registration statement were sold. The syndicate of underwriters was led by Morgan Stanley & Co. LLC, Merrill Lynch, Pierce, Fenner & Smith Incorporated and Piper Jaffray & Co. as joint book-running managers, and Chardan Capital Markets, LLC, as co-manager. We raised approximately $145.2 million in net proceeds after deducting underwriting discounts and commissions and other offering expenses. No payments were made by us to directors, officers or persons owning ten percent or more of our common stock or to their associates, or to our affiliates, other than payments in the ordinary course of business to officers for salaries and to non-employee directors as compensation for board committee service.

There has been no material change in the planned use of proceeds from our IPO as described in our prospectus dated September 16, 2015, filed with the SEC pursuant to Rule 424(b)(4) under the Securities Act.

Purchases of Equity Securities by the Issuer or Affiliated Purchasers

There were no repurchases of shares of common stock made during the year ended December 31, 2015.

ITEM 6. SELECTED FINANCIAL DATA

The following selected financial data should be read in conjunction with "Management's Discussion and Analysis of Financial Condition and Results of Operations," the financial statements and related notes and other financial information included in this Annual Report on Form 10-K.

We derived the financial data for the years ended December 31, 2015, 2014 and 2013 and the balance sheet data as of December 31, 2015 and 2014 from our audited financial statements, which are included elsewhere in this Annual Report on Form 10-K. We derived the balance sheet data as of December 31, 2013 from our audited financial statements that are not included elsewhere in this Annual Report on Form 10-K. Historical results are not necessarily indicative of the results to be expected in future periods.

	Years Ended December 31,		
	2015	2014	2013
	(in thousands, except per share data)		
Statements of Operations and Comprehensive Loss Data:			
Revenues			
License revenue	$5,025	$4,355	$1,055
License revenue from related party	2,000	220	2,700
Reagent sales	257	326	368
Grant revenue	306	1,219	1,964
Total revenues	7,588	6,120	6,087
Expenses			
Costs of revenues			
Licensing costs (including amounts to related parties)	1,405	885	151
Costs of reagent sales (including amounts to related parties)	98	122	173
Research and development (including amounts to related parties)	17,279	4,961	5,051
General and administrative (including amounts to related parties)	11,912	3,851	5,474
Foreign currency transaction losses	57	30	14
Other operating income	(26)	(47)	—
Total operating expenses	30,725	9,802	10,863
Loss from operations	(23,137)	(3,682)	(4,776)
Other Income (Expense)			
Investment income	346	—	—
Interest expense	(20)	(321)	(611)
Total other income (expense)	326	(321)	(611)
Net loss	$(22,811)	$(4,003)	$(5,387)
Basic and diluted net loss per common share	$(2.59)	$(1.82)	$(2.50)
Weighted-average basic and diluted common shares	9,173	2,643	2,320

	As of December 31,		
	2015	2014	2013
	(in thousands)		
Balance Sheet Data:			
Cash and cash equivalents	$54,116	$1,121	$1,119
Marketable securities	162,251	—	—

Working capital (deficit)	113,809	(6,158)	(2,446)
Total assets	221,380	3,491	2,510
Total liabilities	4,572	9,189	4,653
Convertible preferred stock and preferred units	—	12,593	11,778
Common stock, Class A units and additional paid-in capital	269,147	10,518	10,885
Total stockholders' equity (deficit)	216,808	(18,291)	(13,921)

ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

The following discussion and analysis should be read in conjunction with our audited annual financial statements and the related notes that appear elsewhere in this Annual Report on Form 10-K. This discussion contains forward-looking statements reflecting our current expectations that involve risks and uncertainties. Actual results may differ materially from those discussed in these forward-looking statements due to a number of factors, including those set forth in the section entitled "Risk Factors" and elsewhere in this Annual Report on Form 10-K. For further information regarding forward-looking statements, please refer to the "Special Note Regarding Forward-Looking Statements" at the beginning of Part I of this Annual Report on Form 10-K. All amounts are expressed in thousands other than per share amounts.

Overview

We are a leading biotechnology company focused on the development, commercialization and licensing of recombinant adeno-associated virus (AAV) gene therapy. Our proprietary AAV gene delivery platform (our NAV Technology Platform) consists of exclusive rights to over 100 novel AAV vectors, including AAV7, AAV8, AAV9 and AAVrh10 (NAV Vectors). As of December 31, 2015, our NAV Technology Platform was being applied in the development of 28 product candidates for a variety of diseases, including five internally developed product candidates and 23 partnered product candidates developed by our third-party licensees (NAV Technology Licensees).

We currently plan to build internal gene therapy franchises in the metabolic, neurodegenerative and retinal therapeutic areas, and develop multiple product candidates in each area. Our most advanced programs are for the treatment of two severe genetic diseases: homozygous familial hypercholesterolemia (HoFH) and Mucopolysaccharidosis Type I (MPS I). An IND to support a Phase I/II clinical trial to evaluate the effect of RGX-501 for the treatment of HoFH is active. We expect a Phase I/II clinical trial for RGX-501 to be initiated in the first half of 2016. We expect to file an IND with the U.S. Food and Drug Administration (the FDA) for RGX-111, our program for MPS I, in the first half of 2016 to support a Phase I/II clinical trial, which we expect to initiate in mid-2016. We also have a preclinical program for wet age-related macular degeneration (wet AMD) for which we expect to file an IND with the FDA in the second half of 2016 and a preclinical program for Mucopolysaccharidosis Type II (MPS II) for which we expect to file an IND with the FDA in the first half of 2017.

Our partnered development pipeline benefits from the disease-specific expertise of our NAV Technology Licensees. Our partnering strategy provides us the flexibility to sublicense development of treatments designed to address significant unmet medical needs, while remaining focused on our core programs and therapeutic areas internally, which we believe enables us to achieve maximum value. We believe that the broad applicability of our NAV Technology Platform and any clinical successes of the treatments utilizing NAV Vectors will create new internal and partnered pipeline opportunities.

On September 22, 2015, we closed our initial public offering (IPO) whereby we sold 7,245 shares of common stock (inclusive of 945 shares of common stock sold pursuant to the full exercise of an option to purchase additional shares granted to the underwriters in connection with the offering) at a price of $22.00 per share. The shares began trading on The Nasdaq Global Select Market on September 17, 2015. The aggregate net proceeds from the offering were $145,184, net of underwriting discounts and commissions and offering expenses payable by us. Upon the closing of the IPO, all outstanding shares of convertible preferred stock converted into 16,298 shares of common stock.

Financial Overview

Revenue

We classify our revenue into three categories: license revenue, grant revenue and reagent sales. To date, we have generated limited revenue through our licensing agreements with our NAV Technology Licensees for research, development and commercialization of product candidates using our proprietary technology. Additionally, we have generated limited revenue from grant programs and sales of licensed reagents to customers for use in research and development. We have not generated any revenue from sales of approved products or drug therapies. If we fail to complete the development of our product candidates in a timely manner, or fail to obtain their regulatory approval, our ability to generate future revenue will be compromised.

License Revenue

The terms of our license agreements require delivery of a license for use of our intellectual property in either research only, or in research and commercial development of drug therapies for various diseases. License agreements generally have a term equal to the life of the intellectual property, but are terminable at the option of the licensee. Non-refundable payments to us under these arrangements may include: (i) up-front license fees, (ii) option fees to exercise options to obtain commercial licenses, (iii) annual

maintenance fees, (iv) sublicense fees, (v) payments based on the achievement of certain milestones by the licensee and (vi) royalties on product sales. Due to the contingent nature of option fees, sublicense fees, milestone payments and future royalties on product sales under our licensing arrangements, future license revenue is highly dependent on the successful development and commercialization of products by our licensees, which is uncertain and may fluctuate significantly from period to period.

Grant Revenue

Grant revenue is generated through research and development grant programs offered by the United States (U.S.) federal government and the European Union (EU). As of December 31, 2015, all grants from the U.S. federal government have been completed. Grant revenue is expected to decrease in future periods as we expect to incur significantly less costs under the MeuSIX grant funded by the EU. We are not currently seeking any further grant awards.

Reagent Sales

Reagent sales consist of the sales of licensed reagents to third-parties for use in research and development. We do not consider reagent sales a core aspect of our business model and we do not dedicate significant resources to sales efforts for reagents. Accordingly, future revenue from sales of reagents is uncertain and may fluctuate significantly from period to period.

Expenses

We classify our expenses into three categories: costs of revenue, research and development and general and administrative expenses. Personnel costs including salaries, benefits, bonuses and stock-based compensation expense, comprise a significant component of research and development and general and administrative expenses. We allocate expenses associated with our facilities, information technology costs, depreciation and other overhead costs between research and development and general and administrative categories based on employee headcount and the nature of work performed by each employee.

Costs of Revenue

Costs of revenue primarily consist of our expenses related to the generation of revenue from our intellectual property licensing arrangements and sales of reagents. These expenses fall into the following categories: sublicense fees that are included in licensing costs to related parties, and royalties and production costs that are included in costs of reagent sales. Future costs of revenue are uncertain due to the nature of our license agreements and reagent sales, and significant fluctuations in costs of revenue may occur from period to period.

Research and Development Expense

Our research and development expense primarily consists of:

- salaries and personnel-related costs, including benefits, travel and any stock-based compensation, for our scientific personnel performing research and development activities;
- costs related to executing preclinical studies and clinical trials;
- costs related to acquiring, developing and manufacturing materials for preclinical studies and clinical trials;
- fees paid to consultants and other third-parties who support our internal product candidate development;
- other costs in seeking regulatory approval of our internal product candidates; and
- allocated facility-related costs and overhead.

Up-front fees incurred in obtaining technology licenses for research and development activities are expensed as incurred if the technology licensed has no alternative future use.

We typically utilize our employee, consultant and infrastructure resources across our development programs. We do not allocate personnel costs, other internal costs or external consultant costs to specific product candidates or development programs.

Prior to 2015, research and development expense primarily consisted of expenses incurred under our grant programs, as well as externally sourced research and development services and fees incurred under our services agreement with FoxKiser LLP (FoxKiser), a related party. Under the FoxKiser services agreement, we paid a fixed monthly fee plus an additional support fee, as determined by FoxKiser on a monthly basis, as consideration for all personnel and overhead costs including office facilities, equipment, supplies,

general management, accounting, financial management, human resources, legal, secretarial, regulatory compliance and other services provided to us by FoxKiser. We allocated a portion of the service and support fees under the agreement with FoxKiser to research and development. The services agreement with FoxKiser was terminated in January 2015.

We plan to increase our research and development expenses for the foreseeable future as we continue development of our product candidates. Our current and planned research and development activities include the following:

- initiation of Phase I/II clinical trials to evaluate the safety and efficacy of our RGX-501 and RGX-111 product candidates for HoFH and MPS I, respectively;
- clinical trials to evaluate the safety and efficacy of our RGX-314 product candidate for wet AMD;
- research and development for our RGX-121 and RGX-321 programs for Mucopolysaccharidosis Type II (MPS II) and X-linked retinitis pigmentosa (XLRP), respectively;
- research and development for additional product candidates addressing other diseases in the metabolic, neurodegenerative and retinal therapeutic areas;
- continued investment in manufacturing process development activities; and
- continued acquisition and manufacture of clinical trial materials in support of our anticipated clinical trials.

During the years ended December 31, 2015, 2014 and 2013, we incurred the following external research and development expenses:

- $5,658, $2,677 and $3,501, respectively, for external, preclinical research and development as well as grant activities related to our internal product candidates and the advancement of our technology and other potential product candidates;
- $2,435, $344 and $132, respectively, for the development of general manufacturing processes, which we intend to use in the manufacturing of materials for clinical trials for RGX-111, RGX-121 and RGX-314; and
- $2,425, $320 and $14, respectively, for manufacturing of materials to be used in clinical trials for RGX-111, RGX-121 and RGX-314.

The remainder of research and development expenses for the years ended December 31, 2015, 2014 and 2013 were not allocated to our programs and include personnel costs and overhead, and other unallocated research and development costs including consultants and other externally sourced research and development services.

General and Administrative Expense

General and administrative expense consists primarily of salaries and personnel-related costs, including employee travel, benefits and any stock-based compensation, for employees performing functions other than research and development. This includes personnel in executive, finance, legal and administrative support functions. Other general and administrative expenses include facility-related costs not otherwise allocated to research and development expense, professional fees for accounting and legal services, expenses associated with obtaining and maintaining patents, insurance costs, costs of our information systems and other general corporate activities.

Prior to 2015, general and administrative expense included service fees incurred under our services agreement with FoxKiser. Under the FoxKiser services agreement, we paid a fixed monthly fee plus an additional support fee, as determined by FoxKiser on a monthly basis, as consideration for all personnel and overhead costs including office facilities, equipment, supplies, general management, accounting, financial management, human resources, legal, secretarial, regulatory compliance and other services provided to us by FoxKiser. We allocated a portion of the service and support fees under the agreement with FoxKiser to general and administrative expenses. The services agreement with FoxKiser was terminated in January 2015.

We expect that our general and administrative expense will continue to increase as we just began operating as a publicly-traded company and continue to develop, and potentially commercialize, our internal product candidates. We believe that these increases likely will include increased costs for director and officer liability insurance, costs related to the hiring of additional personnel and increased fees for outside consultants, lawyers and accountants. We also expect to incur increased costs to expand our accounting and finance team with knowledgeable personnel to comply with reporting requirements applicable to public companies and maintain adequate internal control over financial reporting.

Other Income (Expense)

Other income (expense) primarily includes investment income and interest expense. Investment income consists of interest income earned on cash equivalents and marketable securities. Cash equivalents are comprised of money market mutual funds and marketable securities are comprised of primarily corporate debt securities. Interest expense is related to previously outstanding borrowings from FoxKiser.

Amounts outstanding under the FoxKiser services agreement in excess of 30 days from their due date accrued interest at 1.5% per month, compounding monthly.

On July 31, 2014, we received $1,800 in exchange for a promissory note issued to FoxKiser. On September 15, 2014, we received $600 in exchange for a second promissory note issued to FoxKiser. Both promissory notes accrued interest at the Short-Term Applicable Federal Rate (0.34% at December 31, 2014), compounding annually, and were payable on demand by FoxKiser at the earlier of December 31, 2014 or the next issuance of preferred equity securities by us. We determined that the promissory notes with FoxKiser bear interest at below-market rates. Accordingly, we imputed interest on the promissory notes and recorded an aggregate discount of $128 on the promissory notes, which was amortized using the effective interest method through December 31, 2014, at which date the notes became payable upon demand by FoxKiser. Amortization of the discount is recorded as interest expense in the statements of operations.

In January 2015, FoxKiser exercised its share settlement options and converted the aggregate principal and interest due under both its promissory notes of $2,403, as well as $1,389 outstanding under the services agreement, into 585 shares of Series C convertible preferred stock (Series C Preferred Stock). The services agreement was terminated in January 2015. We expect interest expense to decrease in future periods as a result of the settlement of these debt instruments, termination of the FoxKiser services agreement and no further debt outstanding as of December 31, 2015.

Critical Accounting Policies and Significant Judgments and Estimates

This Management’s Discussion and Analysis of our Financial Condition and Results of Operations is based on our financial statements, which we have prepared in accordance with accounting principles generally accepted in the U.S. The preparation of our financial statements requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of our financial statements, as well as the reported revenues and expenses during the reported periods. We evaluate these estimates and judgments on an ongoing basis. We base our estimates on historical experience and on various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

While our significant accounting policies are more fully described in Note 2 to our financial statements appearing elsewhere in this Annual Report on Form 10-K, we believe that the following accounting policies are critical to the process of making significant judgments and estimates in the preparation of our financial statements and understanding and evaluating our reported financial results.

Revenue

We generate revenue primarily through license agreements with our NAV Technology Licensees for research, development and commercialization of product candidates using our proprietary technology. Additionally, we have generated revenue from grant programs and sales of licensed reagents to customers for use in research and development.

We recognize revenue when all of the following criteria are met:

- persuasive evidence of an arrangement exists;
- delivery has occurred or services have been rendered;
- our price to the buyer is fixed or determinable; and
- collectability is reasonably assured.

We defer amounts we receive prior to satisfying the revenue recognition criteria until such time as the revenue recognition criteria are met.

License Revenue and License Revenue from Related Party

The terms of our license agreements require delivery of an intellectual property license for use in either research only, or in research and commercial development of product candidates for various diseases. We have determined that none of our license agreements contain multiple deliverables. We recognize nonrefundable up-front license fees when we deliver the license provided there are no undelivered elements in the arrangement and we have met all of the necessary criteria for revenue recognition. When we determine an option to exercise a commercial license is substantive, we recognize the option fee as revenue upon exercise and delivery of the underlying commercial license, provided there are no undelivered elements in the arrangement and we have met all of the necessary criteria for revenue recognition. Annual maintenance fees do not represent a separate deliverable other than the delivery of the license. We recognize annual maintenance fees as revenue under our license agreements when the price is fixed or determinable and collectability is reasonably assured, provided that we have satisfied all other revenue recognition criteria, which is typically upon each anniversary date of the underlying license agreement.

Sublicense fees are payable to us upon the receipt of certain fees by the licensee from any sublicensees. We recognize sublicense fees as revenue when the price is fixed and determinable and collectability is reasonably assured, provided that we have satisfied all other revenue recognition criteria.

We recognize milestone payments as revenue upon achievement of the milestone by the licensee, provided that we have satisfied all other revenue recognition criteria. At the inception of an arrangement that includes milestone payments, we evaluate whether each milestone is substantive and at risk to both parties on the basis of the contingent nature of the milestone. We evaluate factors such as the scientific, clinical, regulatory, commercial and other risks that must be overcome to achieve the respective milestone and the level of effort and investment required to achieve the respective milestone in making this assessment. There is considerable judgment involved in determining whether a milestone satisfies all of the criteria required to conclude that a milestone is substantive. We have evaluated each, and concluded that all of the clinical, regulatory and commercial milestones pursuant to our license agreements are substantive.

We will recognize royalty revenue in the period of sale of the related product(s) based on the underlying contract terms, provided that we can reliably measure the reported sales, we have no remaining performance obligations and we have satisfied all other revenue recognition criteria.

License revenue from a related party consists of license fees from licenses granted to Dimension Therapeutics, Inc. (Dimension) recognized prior to September 30, 2015. Since October 2013, we have granted Dimension a number of commercial licenses to our proprietary technology. In March 2015, we entered into a new option and license agreement with Dimension that grants Dimension options to exclusive commercial licenses for four new disease indications to be elected by Dimension. When elected, each option carries an option fee of $1,000 payable to us upon exercise and annual maintenance fees of $50. Additionally, for each option exercised, Dimension is obligated to pay us up to $9,000 upon their achievement of various substantive milestones, as well as mid to upper-single digit percentage royalties on net sales of licensed products and mid-single digit to low-double digit percentage sublicense fees, if any. In May, August and December 2015, Dimension exercised its first three options, respectively, under the agreement for total aggregate license option fees of $3,000. In accordance with our revenue recognition policy, the license fees were recognized in full upon the delivery of the license, as we have no further performance obligations under the agreements. As of September 30, 2015, we no longer consider Dimension to be a related party. Accordingly, license revenue from licenses granted to Dimension recognized subsequent to September 30, 2015 is no longer included in license revenue from related party in the statements of operations and comprehensive loss.

Grant Revenue

We generate grant revenue through research and development grant programs offered by the U.S. federal government and the EU. We recognize revenue related to government grants in the period during which the related costs are incurred and the related services are rendered, provided that we have met the applicable performance obligations under the grants. If we are the principal and the primary obligor under the arrangements, we record the funds we receive under the grants as revenue. If we are not the principal or primary obligor, we record the grant proceeds as a reduction to research and development expense.

Our grants contain refund provisions in the case of non-compliance with the provisions of the grant, which include, but are not limited to, the eligibility of costs, calculation of personnel rates, selection of subcontractors and other provisions included in the underlying grant agreements. We review those refund provisions to determine the likelihood of repayment. If the likelihood of repayment of the grant is determined to be remote, the grant is recognized as revenue. If the probability of repayment is determined to be more than remote, we record the amount of potential repayment of the grant as a liability, until such time that the grant requirements have been satisfied. Funds received in advance of the performance of the services are recorded as deferred revenue.

Reagent Sales

Our reagent sales consist of the sales of licensed reagents to third-parties for use in research and development. We recognize revenue from reagent sales upon delivery to customers, provided that we have satisfied all other revenue recognition criteria.

Accrued Research and Development Expenses

We estimate our accrued research and development expenses as of each balance sheet date. This process involves reviewing contracts and purchase orders with service providers, identifying services that have been performed on our behalf and estimating the level of service performed, expected remaining period of performance and the associated cost incurred for the service when we have not yet been invoiced or otherwise notified of actual cost. The majority of our service providers invoice us monthly in arrears for services performed. Expenses that are paid in advance of performance are deferred as a prepaid expense and expensed as the services are provided.

Examples of estimated accrued research and development expenses include fees paid to:

- contract research organizations (CROs) in connection with preclinical development and clinical studies;
- vendors related to process development and manufacturing of materials for use in preclinical development and clinical studies; and
- service providers for professional service fees such as consulting and other research and development related services.

Our understanding of the status and timing of services performed relative to the actual status and timing may vary and may result in us reporting changes in estimates in any particular period. To date, there have been no material differences from our estimates to the amount actually incurred.

Stock-Based Compensation

In June 2015, our Board of Directors adopted our 2015 Equity Incentive Plan (the 2015 Plan). The 2015 Plan replaces our 2014 Stock Plan (the 2014 Plan). Any options or awards outstanding under the 2014 Plan at the effective date of the 2015 Plan remained outstanding and effective. Our stock-based compensation expense relates solely to stock options issued to employees, directors and non-employee advisors under the 2014 Plan and 2015 Plan. We did not grant any stock options or record any stock-based compensation expense in any years prior to 2014.

Our stock-based awards are subject to either service or performance-based vesting conditions. We record compensation expense for awards to employees and directors with service-based vesting conditions based on the estimated grant date fair value of the awards. We recognize compensation expense for employee awards on a straight-line basis over the requisite service period, which is generally the vesting term. We record compensation expense for awards to non-employees with service-based vesting conditions based on the then-current fair value at each financial reporting date prior to the measurement date over the associated service period of the award, which is generally the vesting term, on a straight-line basis. We recognize compensation expense for non-employee awards with performance-based vesting conditions based on the then current fair value at each financial reporting date prior to the measurement date over the requisite service period using the accelerated attribution method to the extent achievement of the performance condition is probable. We recognize compensation expense for employee awards with performance-based vesting conditions based on the estimated grant date fair value over the requisite service period using the accelerated attribution method to the extent achievement of the performance condition is probable.

Determination of the Fair Value of Stock-Based Compensation Grants

We calculate the fair value of stock options using the Black-Scholes option-pricing model. The Black-Scholes option-pricing model requires the use of subjective assumptions, including the expected volatility of our common stock, the assumed dividend yield, the expected term of our stock options, the risk-free interest rate for a period that approximates the expected term of our stock options and the fair value of the underlying common stock on the date of grant. In applying these assumptions, we considered the following factors:

- Our common stock has only been publicly traded since September 2015 and, accordingly, we do not have sufficient history to estimate the volatility of our common stock. We calculate expected volatility based on reported data for selected similar publicly traded companies for which the historical information is available. For the purpose of identifying peer companies, we consider characteristics such as enterprise value, risk profiles, position within the industry and length of historical share price information. We focus our peer group company selection on companies that operate within the biotechnology industry, and specifically on companies that use gene therapy, or similar technologies, for treating diseases

and/or are focused on treating diseases in our development pipeline or our licensees' pipelines. We ensure that the companies selected have a sufficient trading history to provide meaningful data to estimate the expected volatility of our common stock over the expected term of stock options we have granted. We plan to continue to use the guideline peer group volatility information until the historical volatility of our common stock is sufficient to measure expected volatility for future option grants;

- The assumed dividend yield of zero is based on our expectation of not paying dividends for the foreseeable future;
- We determine the average expected life of "plain vanilla" stock options based on the simplified method in accordance with Securities and Exchange Commission Staff Accounting Bulletin Nos. 107 and 110, as our common stock has only been publicly traded since September 2015. We expect to use the simplified method until we have sufficient historical exercise data to provide a reasonable basis upon which to estimate expected term;
- We determine the risk-free interest rate by reference to implied yields available from U.S. Treasury securities with a remaining term equal to the expected life assumed at the date of grant; and
- We estimate forfeitures based on our historical analysis of actual stock option forfeitures. To date, we have had minimal forfeitures, and accordingly, we have assumed no forfeiture rate.

The following summarizes the weighted-average assumptions we used to estimate the fair value of stock options that we granted to employees and non-employees for the periods indicated:

	Years Ended December 31,	
Employees	2015	2014
Expected volatility	68 %	64 %
Expected term (in years)	6.1	6.0
Risk-free interest rate	1.7 %	2.0 %
Expected dividend yield	0.0 %	0.0 %

	Years Ended December 31,	
Non-Employees	2015	2014
Expected volatility	75 %	65 %
Expected term (in years)	9.5	9.9
Risk-free interest rate	2.1 %	2.4 %
Expected dividend yield	0.0 %	0.0 %

Fair Value of Common Stock

In setting the exercise price of the stock options at each grant date, our Board of Directors or its compensation committee uses the estimated fair value of our common stock on the date of the grant. Prior to our IPO, there were significant assumptions and estimates required in determining the fair value of our common stock. Valuation estimates were prepared by management in accordance with the framework of the American Institute of Certified Public Accountants Practice Aid, Valuation of Privately-Held-Company Equity Securities Issued as Compensation, as well as through independent third-party valuations and were approved by our Board of Directors. Valuation estimates were based on a variety of factors including our financial position and historical financial performance, our stage of development, the valuations of comparable publicly traded companies, marketplace and macro-economic factors, the illiquid nature of our common stock, arm's-length sales of our preferred equity securities, the rights and preferences of our preferred equity securities and the prospects of a liquidity event such as an IPO, among others. After the completion of our IPO in September 2015, the fair value of our common stock used to determine the exercise price

and fair value of stock options is based on the closing price of our common stock on the date of grant.

Income Taxes and Utilization of Net Operating Loss Carryforward

As of December 31, 2015, we had federal net operating loss (NOL) carryforwards of $21,215 and U.S. state NOL carryforwards of $34,199 which may be available to offset future income tax liabilities and expire at various dates through 2035.

Under the provisions of the Internal Revenue Code, the NOL carryforwards are subject to review and possible adjustment by the Internal Revenue Service and state tax authorities. NOL carryforwards may become subject to an annual limitation in the event of certain cumulative changes in the ownership interest of significant shareholders over a three-year period in excess of 50%, as defined under Sections 382 and 383 of the Internal Revenue Code, respectively, as well as similar state provisions. This could limit the amount of tax attributes that can be utilized annually to offset future taxable income or tax liabilities. The amount of the annual limitation is

determined based on our value immediately prior to the ownership change. Subsequent ownership changes may further affect the limitation in future years. We have completed several financings since our inception, including our IPO, which may have resulted in a change in control as defined by Sections 382 and 383 of the Internal Revenue Code, or could result in a change in control in the future.

We account for income taxes in accordance with Financial Accounting Standards Board (FASB) ASC Topic 740, Income Taxes, which provides for deferred taxes using an asset and liability approach. We recognize deferred tax assets and liabilities for the expected future tax consequences of events that have been included in the financial statements or tax returns. Deferred tax assets and liabilities are determined based on the difference between the financial statement and tax bases of assets and liabilities using enacted tax rates in effect for the year in which the differences are expected to reverse. Valuation allowances are provided if based upon the weight of available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized.

We have evaluated the positive and negative evidence bearing upon the realizability of our deferred tax assets, including our NOLs. Based on our history of operating losses, we believe that it is more likely than not that the benefit of our deferred tax assets will not be realized. Accordingly, we have provided a full valuation allowance for deferred tax assets as of December 31, 2015 and 2014.

Convertible Preferred Stock and Preferred Units

We evaluated our convertible preferred stock and preferred units upon issuance in order to determine classification as to permanent or temporary equity and whether or not the instruments contain an embedded derivative that requires bifurcation. This analysis followed the whole instrument approach which compares an individual feature against the entire convertible preferred stock or preferred unit instrument which includes that feature. This analysis was based on a consideration of the economic characteristics and risk of each series of convertible preferred stock and preferred units.

We evaluated all of the stated and implied substantive terms and features, including: (i) whether the convertible preferred stock and preferred units included redemption features, (ii) how and when any redemption features could be exercised, (iii) whether the holders of convertible preferred stock and preferred units were entitled to dividends and how those dividends were calculated, (iv) the voting rights of the convertible preferred stock and preferred units and (v) the existence and nature of any conversion rights.

As a result of this analysis, we concluded that each series of convertible preferred stock and preferred units represented a debt host and, therefore, the redemption feature of each was considered to be clearly and closely related to the associated debt host instrument and was not considered an embedded derivative that required bifurcation.

We also concluded that the conversion rights under the convertible preferred stock were not clearly and closely related to the debt host instruments, however the conversion features did not meet the net settlement criteria of a derivative and, therefore, were not considered embedded derivatives that required bifurcation.

As a result of this analysis, we concluded that it was appropriate to classify the outstanding shares of convertible preferred stock and preferred units outside of permanent equity and within temporary equity, due to their associated redemption features and liquidation preferences which were considered to be outside of our control. At each reporting date, each series of outstanding convertible preferred stock and preferred units was accreted and stated at the amounts in which each series was currently redeemable, which was also equal to the aggregate liquidation preference at that date.

In connection with the completion of our IPO in September 2015, all outstanding shares of convertible preferred stock were converted into shares of common stock on a one-for-one basis.

Extinguishment of Preferred Stock

In connection with our issuance of Series C Preferred Stock in January 2015, the rights, preferences and privileges of the Series A convertible preferred stock (Series A Preferred Stock) and the Series B convertible preferred stock (Series B Preferred Stock) then outstanding were modified. More specifically, holders of Series C Preferred Stock received preference over Series A Preferred Stock, Series B Preferred Stock and common stock in regards to dividends and liquidation. The dividend rights changed from cumulative dividend rights to noncumulative dividend rights for all series of convertible preferred stock, and all accrued but unpaid cumulative dividends on the Series A Preferred Stock and Series B Preferred Stock as of January 13, 2015 were forfeited. As a result of this modification, the redemption values and liquidation preferences of Series A Preferred Stock and Series B Preferred Stock, which were previously equal to original issue price plus accrued but unpaid cumulative dividends, was reduced to original issue price plus non-cumulative dividends declared. Additionally, the redemption date of Series A Preferred Stock and Series B Preferred Stock was changed from October 30, 2018 to December 31, 2019.

We accounted for the amendment to the rights, preferences and privileges of the Series A Preferred Stock and Series B Preferred Stock as an extinguishment of the old convertible preferred stock and issuance of new convertible preferred stock due to the significance of the modifications to the substantive contractual terms of the convertible preferred stock and the associated fundamental changes to the nature of the convertible preferred stock. Accordingly, we recorded a loss of $1,317 on the Series A Preferred Stock and a gain of $2,076 on the Series B Preferred Stock within stockholders' deficit equal to the difference between the fair value of the new shares of convertible preferred stock issued and the carrying amount of the old shares of preferred stock extinguished. We allocated the entire net gain on extinguishment of convertible preferred stock of $759 to additional paid-in capital. The net gain on extinguishment is reflected in the calculation of net loss available to common stockholders in accordance with FASB ASC Topic 260, Earnings per Share. The fair value of the Series A Preferred Stock and Series B Preferred Stock was determined using the option-pricing back-solve method on the per share price of Series C Preferred Stock to estimate aggregate equity value. We used the option-pricing method to allocate equity value to the Series A Preferred Stock and Series B Preferred Stock using Black-Scholes option-pricing model.

Related Party Transactions

During the years ended December 31, 2015, 2014 and 2013, we transacted with a number of related parties in the course of ordinary business. Our related party transactions are described in detail in Note 13 to our financial statements appearing elsewhere in this Annual Report on Form 10-K.

Recently Announced Accounting Pronouncements

See Note 2 "Recently Announced Accounting Pronouncements" in the notes to the financial statements appearing elsewhere in this Annual Report on Form 10-K for a full description of recent accounting pronouncements and the potential impact on our financial statements.

Results of Operations

Comparison of the Years Ended December 31, 2015 and 2014

	Years Ended December 31,		
	2015	2014	Change
Revenues			
License revenue	$5,025	$4,355	$670
License revenue from related party	2,000	220	1,780
Reagent sales	257	326	(69)
Grant revenue	306	1,219	(913)
Total revenues	7,588	6,120	1,468
Expenses			
Costs of revenues			
Licensing costs (including amounts to related parties)	1,405	885	520
Costs of reagent sales (including amounts to related parties)	98	122	(24)
Research and development (including amounts to related parties)	17,279	4,961	12,318
General and administrative (including amounts to related parties)	11,912	3,851	8,061
Foreign currency transaction losses	57	30	27
Other operating income	(26)	(47)	21
Total operating expenses	30,725	9,802	20,923
Loss from operations	(23,137)	(3,682)	(19,455)
Other Income (Expense)			
Investment income	346	—	346
Interest expense	(20)	(321)	301
Total other income (expense)	326	(321)	647
Net loss	$(22,811)	$(4,003)	$(18,808)

License Revenue and License Revenue from Related Party. License revenue and license revenue from a related party increased by $2,450, from $4,575 for the year ended December 31, 2014 to $7,025 for the year ended December 31, 2015. This increase in license revenue is primarily attributable to an increase in revenue recognized from up-front fees and option fees of $1,900 driven by seven new commercial licenses granted by us in 2015, as well as an increase in milestone fees of $250 and recurring annual maintenance fees of $250 recognized for licenses granted prior to 2015. Commercial licenses granted in 2015 generally carried higher up-front fees than licenses granted in 2014.

Grant Revenue. Grant revenue decreased by $913, from $1,219 for the year ended December 31, 2014 to $306 for the year ended December 31, 2015. This decrease is primarily due to significantly less research and development activities conducted under our grant programs. As of January 2015, all grants awards from agencies of the U.S. federal government were completed. Additionally, we incurred significantly less reimbursable costs under our grant award from the EU. We expect grant revenue to decrease in future periods as we are not currently seeking any further grant awards.

Licensing Costs to Related Parties. Licensing costs to related parties increased by $520, from $885 for the year ended December 31, 2014 to $1,405 for the year ended December 31, 2015. This increase is attributable to an increase in sublicense fees payable to The Trustees of the University of Pennsylvania (Penn) and GlaxoSmithKline LLC (GSK),

as a result of a $2,450 increase in license revenue recognized by us in 2015.

Research and Development Expense. Research and development expenses increased by $12,318, from $4,961 for the year ended December 31, 2014 to $17,279 for the year ended December 31, 2015. This increase is primarily attributable to the following:

- an increase of $7,660 for externally sourced research and development, process development and manufacturing of material for clinical trials related primarily to RGX-111, RGX-121 and RGX-314; and
- an increase of $3,923 for additional personnel costs as a result of increased headcount and stock-based compensation expense, as well as recruiting costs associated with the hiring of key research and development personnel.

General and Administrative Expense. General and administrative expenses increased by $8,061, from $3,851 for the year ended December 31, 2014 to $11,912 for the year ended December 31, 2015. This increase is primarily attributable to the following:

- an increase of $3,410 for additional personnel costs as a result of increased headcount and stock-based compensation expense, as well as recruiting costs associated with the hiring of general corporate personnel;
- an increase of $3,102 for professional fees related to legal, accounting and consulting services;
- an increase of $348 for travel expenses supporting general corporate activities, due largely to increased headcount;
- an increase of $340 for information technology expenses supporting general corporate activities; and
- an increase of $253 for insurance expenses as a result of general growth and operating as a public company.

Investment Income. Investment income increased by $346, from $0 for the year ended December 31, 2014 to $346 for the year ended December 31, 2015. This increase is attributable to significantly higher investments in marketable securities and money market mutual funds during 2015 as a result of net cash proceeds received from the sale and issuance of Series C Preferred Stock and Series D Preferred Stock prior to our IPO and from the sale and issuance of common stock in our IPO.

Interest Expense. Interest expense decreased by $301, from $321 for the year ended December 31, 2014 to $20 for the year ended December 31, 2015. This decrease is attributable to the conversion of debt instruments outstanding with FoxKiser into Series C Preferred Stock in January 2015, and the termination of the services agreement with FoxKiser in January 2015.

Comparison of the Years Ended December 31, 2014 and 2013

	Years Ended December 31,		
	2014	2013	Change
Revenues			
License revenue	$4,355	$1,055	$3,300
License revenue from related party	220	2,700	(2,480)
Reagent sales	326	368	(42)
Grant revenue	1,219	1,964	(745)
Total revenues	6,120	6,087	33
Expenses			
Costs of revenues			
Licensing costs (including amounts to related parties)	885	151	734
Costs of reagent sales (including amounts to related parties)	122	173	(51)
Research and development (including amounts to related parties)	4,961	5,051	(90)
General and administrative (including amounts to related parties)	3,851	5,474	(1,623)
Foreign currency transaction losses	30	14	16
Other operating income	(47)	—	(47)
Total operating expenses	9,802	10,863	(1,061)
Loss from operations	(3,682)	(4,776)	1,094
Other Income (Expense)			
Interest expense	(321)	(611)	290
Total other income (expense)	(321)	(611)	290
Net loss	$(4,003)	$(5,387)	$1,384

License Revenue and License Revenue from Related Party. License revenue and license revenue from a related party increased by $820, from $3,755 for the year ended December 31, 2013 to $4,575 for the year ended December 31, 2014. This increase in license revenue is primarily attributable to an increase in revenue recognized from up-front fees of $750 driven by six new commercial licenses granted by us in 2014, as well as an increase in recurring annual maintenance fees of $185 recognized for licenses granted prior to 2014. License revenue included $2,700 and $220 for the years ended December 31, 2013 and 2014, respectively, recognized from a license granted to Dimension.

Grant Revenue. Grant revenue decreased by $745, from $1,964 for the year ended December 31, 2013 to $1,219 for the year ended December 31, 2014. The decrease is primarily due to significantly less research and development activity conducted under our U.S. federal grant programs, resulting in a corresponding decrease of $916 of grant revenue. The decrease in U.S. federal grant revenue was partially offset by increased costs incurred for research and development under our grant with the EU, which resulted in a $171 increase in grant revenue.

Licensing Costs to Related Parties. Licensing costs to related parties increased by $734, from $151 for the year ended December 31, 2013 to $885 for the year ended December 31, 2014. This increase is due primarily to an increase in sublicense fees payable to Penn and GSK related to up-front fees received by us for six new licenses granted in 2014. Additionally, in 2013, $3,000 of license revenue from up-front license fees was paid to us in the form of non-cash consideration, for which we were not required to pay corresponding sublicense fees to Penn or GSK.

Research and Development Expense. Research and development expense decreased by $90, from $5,051 for the year ended December 31, 2013 to $4,961 for the year ended December 31, 2014. This decrease was primarily attributable to the following:

- a decrease of $924 for externally sourced research and development performed by Penn; and
- a decrease of $575 for costs incurred under our grant programs.

The decrease was partially offset by the following:

- an increase of $1,037 for externally sourced research and development, process development and manufacturing activities;
- an increase of $172 for service fees from FoxKiser allocated for research and development as a result of increased headcount;
- an increase of $116 for consulting services;
- an increase of $60 for stock compensation expense for research and development personnel; and
- an increase of $25 for license fees to access technology for use in research and development.

General and Administrative Expense. General and administrative expense decreased by $1,623, from $5,474 for the year ended December 31, 2013 to $3,851 for the year ended December 31, 2014. This decrease is primarily attributable to a decrease of $2,450 in compensation to related parties for transaction services related to the license with Dimension as well as professional fees for legal, accounting and consulting services. The decrease is partially offset by increases of $259 in stock compensation expense, $227 in services from FoxKiser allocated to general and administrative expenses as a result of higher headcount, $124 in license maintenance fees and $102 in recruiting costs for the hiring of additional personnel.

Interest Expense. Interest expense decreased by $290 from $611 for the year ended December 31, 2013 to $321 for the year ended December 31, 2014. This decrease was due to the conversion of $5,892 of debt to FoxKiser into Series B Preferred Units, which occurred in October 2013 resulting in less debt outstanding during 2014.

Liquidity and Capital Resources

Prior to our IPO, we funded our research and development and operating activities principally from the issuance of convertible preferred stock, preferred units and debt instruments with share settlement options. Additionally, we have supplemented our cash flows with fees received from granting commercial licenses to our proprietary technology to other biotechnology and pharmaceutical companies.

In January 2015, we completed the sale and issuance of 4,632 shares of Series C Preferred Stock, par value $0.0001 per share, at a per share price of $6.477 for aggregate gross proceeds of $30,000. The aggregate purchase price of $30,000 included $26,208 of cash proceeds and the conversion $3,792 of debt by FoxKiser. In May 2015, we

completed the sale and issuance of 7,367 shares of Series D convertible preferred stock (Series D Preferred Stock), par value $0.0001 per share, at a per share price of $9.5699 generating aggregate gross proceeds of $70,500.

In September 2015, we completed our IPO whereby we sold 7,245 shares of common stock (inclusive of 945 shares of common stock sold pursuant to the full exercise of an option to purchase additional shares granted to the underwriters in connection with the offering) at a price of $22.00 per share. The aggregate net proceeds from the offering were $145,184, net of underwriting discounts and commissions and offering expenses payable by us. Upon the closing of the IPO, all outstanding shares of convertible preferred stock converted into 16,298 shares of common stock. As of December 31, 2015, we had cash, cash equivalents and marketable securities of $216,367. We believe that our cash, cash equivalents and marketable securities as of December 31, 2015 will enable us to initiate Phase I/II clinical trials for RGX-501 and RGX-111 and file an IND in preparation for a Phase I clinical trial for RGX-314, as well as fund our operating expenses and capital expenditure requirements into 2018.

We have incurred losses since our inception and, as of December 31, 2015, had an accumulated deficit of $51,620. We anticipate that we will continue to incur losses for at least the next several years. We expect that our research and development and general and administrative expenses will continue to increase for the foreseeable future. As a result, we may need additional capital to fund our operations, which we may obtain through one or more equity offerings, debt financings or other third-party funding, including potential strategic alliances and licensing or collaboration arrangements.

Cash Flows

	Years Ended December 31,		
	2015	2014	2013
Net cash used in operating activities	$(22,515)	$(2,399)	$(3,012)
Net cash used in investing activities	(163,800)	—	—
Net cash provided by financing activities	239,310	2,401	1,965
Net increase (decrease) in cash and cash equivalents	$52,995	$2	$(1,047)

Operating Activities

For the year ended December 31, 2015, our net cash used in operating activities of $22,515 consisted of a net loss of $22,811 and changes in working capital of $3,040, offset by $3,336 in adjustments for non-cash items. The change in working capital is primarily attributable to a decrease in related party payables of $3,761, an increase in trade receivables of $1,342 and an increase of prepaid expenses of $992, and was partially offset by an increase in accounts payable, accrued expenses and other current liabilities of $2,811. Adjustments for non-cash items primarily consisted of stock-based compensation expenses of $2,921 and net amortization of premiums on marketable debt securities of $311.

For the year ended December 31, 2014, our net cash used in operating activities of $2,399 consisted of a net loss of $4,003, primarily attributable to general and administrative and research and development expenses, offset by $494 in adjustments for non-cash items and $1,110 of cash provided by changes in working capital. Adjustments for non-cash items primarily consisted of stock-based compensation expense of $319. The change in working capital was primarily attributable to an increase in accounts payable and accrued expenses of $797, an increase in service fees payable to FoxKiser and other related party payables of $1,026, an increase in advance payments of $153, a decrease in related party receivables of $174, partially offset by an increase in trade receivables of $799 and unbilled receivables of $213 primarily consisting of reimbursements due to us under our grant with the EU.

For the year ended December 31, 2013, our net cash used in operating activities of $3,012 consisted of a net loss of $5,387, primarily attributable to general and administrative and research and development expenses, decreased by $289 in adjustments for non-cash items and partially offset by $2,664 of cash provided by changes in working capital. Adjustments for non-cash items primarily consisted of $303 of non-cash consideration received for licenses granted. The change in working capital was primarily attributable to an increase in service fees payable to FoxKiser of $3,192, an increase in accounts payable and accrued expenses of $364, a decrease in unbilled receivables of $109, partially offset by an increase in related party receivables of $924

Investing Activities

For the year ended December 31, 2015, net cash used in investing activities consisted of $163,278 to purchase marketable securities and $522 to purchase property and equipment.

We had no cash flows from investing activities for the years ended December 31, 2014 and 2013.

Financing Activities

For the year ended December 31, 2015, net cash provided by financing activities primarily consisted of $26,021 in net proceeds from the sale and issuance of Series C Preferred Stock, $67,998 in net proceeds from the sale and issuance of Series D Preferred Stock and $145,184 in net proceeds from the sale and issuance of common stock in our IPO.

For the year ended December 31, 2014, net cash provided by financing activities primarily consisted of $2,400 in proceeds from promissory notes issued to FoxKiser.

For the year ended December 31, 2013, net cash provided by financing activities primarily consisted of $1,965 in net proceeds from the sale and issuance of Series B preferred units.

Future Funding Requirements

To date, we have generated a limited amount of revenue through license agreements with strategic partners for research, development and commercialization of product candidates using our proprietary technology. Additionally, we have generated revenue from grant programs and sales of licensed reagents to customers for use in research and development, for which we do not expect significant future revenue. We do not expect to generate significant recurring revenue unless and until we obtain regulatory approval for and commercialize our product candidates. In addition, we expect our expenses to increase in connection with our ongoing development activities, particularly as we continue to expand the research, development and clinical trials of, and seek regulatory approval for, our internally developed product candidates. As a result of our IPO, we have and expect to continue to incur additional costs associated with operating as a public company. In addition, subject to obtaining regulatory approval for our internally developed product candidates, we expect to incur significant commercialization expenses for product sales, marketing, manufacturing and distribution. We anticipate that we will need substantial additional funding in connection with our continuing operations.

Based upon our current operating plan, we believe that our cash and cash equivalents and marketable securities as of December 31, 2015, will enable us to initiate Phase I/II clinical trials for RGX-501 and RGX-111 and file an IND in preparation for a Phase I clinical trial for RGX-314, as well as fund our operating expenses and capital expenditure requirements into 2018. We intend to devote the majority of our current capital to clinical development and regulatory approval of our internally developed product candidates. We have based our estimates on assumptions that may prove to be wrong, and we may use our available capital resources sooner than we currently expect. Because of the numerous risks and uncertainties associated with the development and commercialization of gene therapy product candidates, we are unable to estimate the amounts of increased capital outlays and operating expenditures necessary to complete the development of product candidates.

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

- the results of our preclinical studies for our internal product candidates and any subsequent clinical trials;
- our planned expansion of the licensing of our NAV Technology Platform;
- the scope, progress, results and costs of drug discovery, laboratory testing, preclinical development and clinical trials, if any, for our other product candidates;
- the costs, timing and outcome of regulatory review of our product candidates;
- the costs of future activities, including product sales, medical affairs, marketing, manufacturing and distribution, for any of our product candidates for which we receive marketing approval;
- revenue, if any, received from commercial sale of our products, should any of our product candidates receive marketing approval;
.

the costs of preparing, filing and prosecuting patent applications, maintaining and enforcing our intellectual property rights and defending any intellectual property-related claims;

- our current licensing agreements remaining in effect;
- our ability to establish and maintain additional licensing agreements or collaborations on favorable terms, if at all;
- the extent to which we acquire or in-license other product candidates and technologies; and
- the costs associated with being a public company.

Many of these factors are outside of our control. 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 regulatory and marketing approval and achieve product sales. In addition, our product candidates, if approved, may not achieve commercial success. Our product revenues, if any, and any commercial milestones or royalty payments under our license agreements, will be derived from or based on sales of products that may not be commercially available for many years, if at all. In addition, revenue from our NAV Technology Platform sublicensing is dependent in part on the clinical and commercial success of our licensing partners. Neither we nor any of our NAV Technology Licensees have commercialized any products using our NAV Technology Platform. Accordingly, we will need to continue to rely on additional financing to achieve our business objectives.

To the extent that additional capital is raised through the sale of equity or equity-linked securities, the issuance of those securities could result in substantial dilution for our existing stockholders and the terms may include liquidation or other preferences that adversely affect the rights of our existing stockholders. Furthermore, the issuance of additional securities, whether equity or debt, by us, or the possibility of such issuance, may cause the market price of our common stock to decline and existing stockholders may not agree with our financing plans or the terms of such financings. Adequate additional financing may not be available to us on acceptable terms, or at all. We also could be required to seek funds through arrangements with collaborative partners or otherwise that may require us the relinquish rights to our intellectual property, our product candidates or otherwise agree to terms unfavorable to us.

Contractual Obligations, Commitments and Contingencies

Our principal commitments consist of obligations under vendor contracts to provide research services and other purchase commitments with our vendors. Additionally, our commitments consist of obligations to our licensors under our in-license agreements, which include sublicense fees, milestones fees, royalties and reimbursement of patent maintenance costs.

The amount and timing of when these payments will actually be made is uncertain and the payments are contingent upon the initiation and completion of future activities, including services to be provided by our vendors. Sublicense fees are due to the licensors when we sublicense licenses to third-parties; the fees are based on a percentage of the sublicense fees received from the sublicensees. Milestone fees are payable by us upon our future achievement of certain development and regulatory milestones. Royalty fees are based on a percentage of net sales of licensed products. Maintenance costs are reimbursements to the licensors for maintaining licensed patents. These amounts are not fixed and determinable and therefore are not included in the table below.

We have entered into a number of short-term and long-term operating leases for office and laboratory space in Bethesda, Maryland, Rockville, Maryland and Philadelphia, Pennsylvania. As of December 31, 2015, future lease payments under operating leases are as follows:

(in thousands)	Total	Less Than 1 Year	1-3 Years	3-5 Years	More Than 5 Years
Future minimum lease payments	$4,299	$777	$1,672	$1,706	$ 144

In January 2016, we entered into a non-cancelable operating lease for additional office space in Rockville, Maryland. The lease is expected to commence in March 2016, and has a term of approximately 7.5 years. Initial monthly rent payments required under the lease are $38 beginning seven months from the commencement date and escalate

annually in accordance with the lease.

Off-Balance Sheet Arrangements

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

ITEM 7A. QUALITATIVE AND QUANTITATIVE DISCLOSURES ABOUT MARKET RISK

Interest Rate Sensitivity

Our primary exposure to interest rate sensitivity results from the cash equivalents and marketable securities in our investment portfolio. Our primary objectives in managing our investment portfolio are to preserve principal, maintain proper liquidity to meet operating needs and maximize yields. The securities we hold in our investment portfolio are subject to interest rate risk. At any time, significant changes in interest rates can affect the fair value of the investment portfolio and its interest earnings. After a review of the investment portfolio, we do not believe a sudden change in the interest rates would have a material impact on our financial condition or results of operations. Currently, we do not hedge these interest rate exposures. We have established policies and procedures to manage exposure to fluctuations in interest rates. We place our investments with high quality issuers and limit the amount of credit exposure to any one issuer and do not use derivative financial instruments in our investment portfolio. We invest in highly liquid, investment-grade securities and money market funds of various issues, types and maturities. Our investments in marketable securities are classified as available-for-sale and are carried at fair value. Unrealized gains and losses, net of any related tax effects, are excluded from earnings and are included in other comprehensive loss and reported as a separate component of stockholders' equity until realized. A decline in the fair value below cost of available-for-sale securities that is deemed other-than-temporary is charged to results of operations, resulting in the establishment of a new cost basis for the security.

We were subject to interest rate risk in connection with our debt instruments outstanding at December 31, 2014 bearing variable interest rates. We had no debt instruments outstanding at December 31, 2015.

Concentrations of Credit Risk

We deposit our cash with financial institutions that we consider to be of high credit quality and purchase marketable securities, which are generally investment grade, liquid, fixed income securities, and money-market instruments denominated in U.S. dollars. Our marketable securities consist primarily of corporate debt securities.

Three customers accounted for approximately 79% of our total revenue for the year ended December 31, 2015. No other customer accounted for more than 10% of revenue in 2015. Future revenue is uncertain and may fluctuate significantly from period to period.

Foreign Currency Risk

Our results of operations and cash flows are subject to fluctuations due to changes in foreign currency exchange rates. A substantial majority of our expenses are denominated in U.S. Dollars. Our results of operations and cash flow are, therefore, subject to fluctuations due to changes in foreign currency exchange rates and may be harmed in the future due to changes in foreign exchange rates. To date, we have not entered into any hedging arrangements with respect to foreign currency risk or other derivative instruments. The effect of a hypothetical 10% change in foreign currency exchange rates applicable to our business would not harm our business, financial condition or results of operations.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

The financial statements and related financial statement schedules required to be filed are listed in the Index to Financial Statements and are incorporated herein.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

Not applicable.

ITEM 9A. CONTROLS AND PROCEDURES

Conclusion Regarding the Effectiveness of Disclosure Controls and Procedures

Our management, with the participation of our Chief Executive Officer and our Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2015. The term "disclosure controls and procedures," as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934 (the Exchange Act), means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC's

rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the company's management, including its principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure.

Based on this evaluation, our Chief Executive Officer and Chief Financial Officer concluded as of December 31, 2015 that our disclosure controls and procedures were not effective at the reasonable assurance level due to material weaknesses in our internal control over financial reporting. We did not maintain (i) effective controls in our contract review process to ensure the completeness of contracts reviewed and to appropriately identify and account for provisions within our contracts; and (ii) a sufficient complement of resources to ensure adequate review and segregation of duties within our financial reporting processes.

Notwithstanding the material weaknesses, our management, including our Chief Executive Officer and Chief Financial Officer, has concluded that the financial statements included in this Form 10-K present fairly, in all material respects, our financial position, results of operations and cash flows for the periods presented in conformity with accounting principles generally accepted in the U.S.

Management's Report on Internal Control over Financial Reporting

This Annual Report on Form 10-K does not include a report of management's assessment regarding internal control over financial reporting or an attestation report of our independent registered public accounting firm due to a transition period established by rules of the SEC for newly public companies and emerging growth companies.

Remediation Activities

Management has been actively engaged in remediating the above described material weaknesses. The following remedial actions have been taken during the year ended December 31, 2015:

- hired additional full-time accounting resources and financial planning and analysis resources with appropriate levels of experience, including a new Accounting Manager and Senior Accountant, and reallocated responsibilities across the accounting organization to ensure that the appropriate level of knowledge and experience is applied based on risk and complexity of transactions and tasks under review;
- strengthened our internal policies, processes and reviews, including substantial completion of the formal documentation thereof;
- implemented a financial close policy and monitoring program, including the formation of a disclosure committee comprised of members of our executive committee, financial management and representatives from our accounting and legal departments to address and coordinate SEC filings and investor communications, the results of which are discussed with the audit committee quarterly;
- implemented new contract management software that will facilitate the documentation and review of contracts by appropriate accounting and other company personnel and analysis of the financial statement impact of all executed agreements; and
- engaged a professional accounting services firm to help us assess and commence documentation of our internal controls for complying with the Sarbanes-Oxley Act. The process of implementing an effective financial reporting system is a continuous effort that requires us to anticipate and react to changes in our business and the economic and regulatory environments and to expend significant resources to maintain a financial reporting system that is adequate to satisfy our reporting obligations.

As we continue to evaluate and take actions to improve our internal control over financial reporting, we may take additional actions to address control deficiencies or modify certain of the remediation measures described above.

While significant progress has been made to enhance our internal control over financial reporting, we are still in the process of implementing, documenting and testing these processes, procedures and controls. Additional time is required to complete implementation and to assess and ensure the sustainability of these procedures. We believe the above actions will be effective in remediating the material weaknesses described above and we will continue to devote significant time and attention to these remedial efforts. However, the material weaknesses cannot be considered remediated until the applicable remedial controls operate for a sufficient period of time and management has concluded, through testing, that these controls are operating effectively.

Changes in Internal Control over Financial Reporting

The items described in “Remediation Activities” above related to the strengthening of internal policies, process and reviews, including formalization of the documentation thereof, as well as the implementation of new contract management software is considered a change in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) of the Exchange Act) during the fourth quarter of 2015 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Limitations on the Effectiveness of Controls

Control systems, no matter how well conceived and operated, are designed to provide a reasonable, but not an absolute, level of assurance that the objectives of the control system are met. Further, the design of a control system must reflect the fact that there are resource constraints, and the benefits of controls must be considered relative to their costs. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, have been detected. Because of the inherent limitations in any control system, misstatements due to error or fraud may occur and not be detected.

ITEM 9B. OTHER INFORMATION

None.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

The information required by this item regarding our directors, including the audit committee and audit committee financial experts, and executive officers corporate governance, our code of conduct and compliance with Section 16(a) of the Exchange Act will be included in our Proxy Statement for the 2016 Annual Meeting of Stockholders to be filed with the Securities and Exchange Commission within 120 days of fiscal year ended December 31, 2015 (2016 Proxy Statement) and is incorporated herein by reference.

ITEM 11. EXECUTIVE COMPENSATION

The information required by this item regarding executive compensation will be included in our 2016 Proxy Statement and is incorporated herein by reference.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

The information required by this item regarding security ownership and certain beneficial owners and management will be included in our 2016 Proxy Statement and is incorporated herein by reference.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

The information required by this item regarding certain relationships and related transactions and director independence will be included in our 2016 Proxy Statement and is incorporated herein by reference.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The information required by this item regarding principal accounting fees and services will be included in our 2016 Proxy Statement and is incorporated herein by reference.

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PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENTS SCHEDULES

(a) The following documents are filed as part of, or incorporated by reference into, this Annual Report on Form 10-K:

1. Financial Statements. See Index to Financial Statements under Item 8 of this Annual Report on Form 10-K.
2. Financial Statement Schedules. All schedules have been omitted because the information required to be presented in them is not applicable or is shown in the financial statements or related notes.
3. Exhibits. We have filed, or incorporated into this Annual Report on Form 10-K by reference, the exhibits listed on the accompanying Exhibit Index immediately following the financial statements in this Annual Report on Form 10-K.

(b) Exhibits. See Item 15(a)(3) above.

(c) Financial Statement Schedules. See Item 15(a)(2) above.

Signatures

Pursuant to the requirements of Section 13 and 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this Annual Report on Form 10-K to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Rockville, State of Maryland, on March 3, 2016.

REGENXBIO INC.

By: /s/ Kenneth T. Mills
Kenneth T. Mills,

President and Chief Executive Officer

Pursuant to the requirements of the Securities Act of 1934, this Annual Report on Form 10-K has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Signature	Title	Date
/s/ Kenneth T. Mills Kenneth T. Mills	Chief Executive Officer, President and Director (Principal Executive Officer)	March 3, 2016
/s/ Vittal Vasista Vittal Vasista	Chief Financial Officer (Principal Financial and Accounting Officer)	March 3, 2016
/s/ Donald J. Hayden, Jr. Donald J. Hayden, Jr.	Chairman of the Board of Directors	March 3, 2016
/s/ Luke M. Beshar Luke M. Beshar	Director	March 3, 2016
/s/ Edgar G. Engleman, M.D. Edgar G. Engleman, M.D.	Director	March 3, 2016
/s/ Allan M. Fox Allan M. Fox	Director	March 3, 2016
/s/ A.N. “Jerry” Karabelas, Ph.D. A.N. “Jerry” Karabelas, Ph.D.	Director	March 3, 2016
/s/ Camille Samuels Camille Samuels	Director	March 3, 2016
/s/ David C. Stump David C. Stump	Director	March 3, 2016

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REGENXBIO INC.

INDEX TO FINANCIAL STATEMENTS

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Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors of

REGENXBIO Inc.:

In our opinion, the accompanying balance sheets and the related statements of operations and comprehensive loss, statements of convertible preferred stock and preferred units, and stockholders' and members' equity (deficit), and statements of cash flows present fairly, in all material respects, the financial position of REGENXBIO Inc. (the Company) at December 31, 2015 and 2014, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2015 in conformity with accounting principles generally accepted in the United States of America. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits of these statements in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements, assessing the accounting principles used and significant estimates made by management, and evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

/s/ PricewaterhouseCoopers LLP

McLean, Virginia

March 3, 2016

REGENXBIO INC.

BALANCE SHEETS

(in thousands, except per share data)

	As of December 31,	
	2015	2014
Assets		
Current assets		
Cash and cash equivalents	$54,116	$1,121
Marketable securities	60,025	—
Accounts receivable		
Trade receivables	2,136	805
Related party receivables	—	750
Unbilled receivables	—	327
Prepaid expenses	1,020	28
Other current assets	851	—
Total current assets	118,148	3,031
Marketable securities	102,226	—
Property and equipment, net	538	—
Cost method investments	300	303
Deferred issuance costs	—	157
Other assets	168	—
Total assets	$221,380	$3,491
Liabilities, Convertible Preferred Stock and Stockholders' Equity (Deficit)		
Current liabilities		
Accounts payable	$1,014	$334
Accrued expenses and other current liabilities	3,198	1,115
Due to related party under services agreement	—	1,423
Related party promissory notes	—	2,403
Other related party payables	—	3,761
Advance payments	127	153
Total current liabilities	4,339	9,189
Deferred rent, net of current portion	233	—
Total liabilities	4,572	9,189
Commitments and contingencies (Note 7)		
Convertible preferred stock		
Series A convertible preferred stock; $0.0001 par value; no shares authorized, issued and outstanding at December 31, 2015; 2,393 shares authorized, issued and outstanding at December 31, 2014	—	3,963
Series B convertible preferred stock; $0.0001 par value; no shares authorized, issued and outstanding at December 31, 2015; 1,906 shares authorized, issued and outstanding at	—	8,630

December 31, 2014		
Total convertible preferred stock	—	12,593
Stockholders' equity (deficit)		
Preferred stock; $0.0001 par value; 10,000 shares authorized, and no shares issued and outstanding at December 31, 2015; no shares authorized, issued and outstanding at December 31, 2014	—	—
Common stock; $0.0001 par value; 100,000 and 9,500 shares authorized at December 31, 2015 and December 31, 2014, respectively; 26,313 and 2,645 shares issued and outstanding at December 31, 2015 and December 31, 2014, respectively	3	—
Additional paid-in capital	269,144	10,518
Accumulated other comprehensive loss	(719)	—
Accumulated deficit	(51,620)	(28,809)
Total stockholders' equity (deficit)	216,808	(18,291)
Total liabilities, convertible preferred stock and stockholders' equity (deficit)	$221,380	$3,491

The accompanying notes are an integral part of these financial statements.

REGENXBIO INC.

STATEMENTS OF OPERATIONS AND COMPREHENSIVE LOSS

(in thousands, except per share data)

	Years Ended December 31,		
	2015	2014	2013
Revenues			
License revenue	$5,025	$4,355	$1,055
License revenue from related party	2,000	220	2,700
Reagent sales	257	326	368
Grant revenue	306	1,219	1,964
Total revenues	7,588	6,120	6,087
Expenses			
Costs of revenues			
Licensing costs (including amounts to related parties)	1,405	885	151
Costs of reagent sales (including amounts to related parties)	98	122	173
Research and development (including amounts to related parties)	17,279	4,961	5,051
General and administrative (including amounts to related parties)	11,912	3,851	5,474
Foreign currency transaction losses	57	30	14
Other operating income	(26)	(47)	—
Total operating expenses	30,725	9,802	10,863
Loss from operations	(23,137)	(3,682)	(4,776)
Other Income (Expense)			
Investment income	346	—	—
Interest expense	(20)	(321)	(611)
Total other income (expense)	326	(321)	(611)
Net loss	$(22,811)	$(4,003)	$(5,387)
Other Comprehensive Loss			
Unrealized loss on available-for-sale securities	(719)	—	—
Total other comprehensive loss	(719)	—	—
Comprehensive loss	$(23,530)	$(4,003)	$(5,387)
Reconciliation of net loss to net loss applicable to common stockholders			
Net loss	$(22,811)	$(4,003)	$(5,387)
Accretion and dividends on convertible preferred stock	(1,747)	(815)	(422)
Net gain on extinguishment of convertible preferred stock	759	—	—
Net loss applicable to common stockholders	$(23,799)	$(4,818)	$(5,809)
Basic and diluted net loss per common share	$(2.59)	$(1.82)	$(2.50)
Weighted-average basic and diluted common shares	9,173	2,643	2,320

The accompanying notes are an integral part of these financial statements.

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REGENXBIO INC.

STATEMENTS OF CONVERTIBLE PREFERRED STOCK AND PREFERRED UNITS,

AND STOCKHOLDERS' AND MEMBERS' EQUITY (DEFICIT)

(in thousands)

	Series A Preferred Units		Series B Preferred Units		Series A Convertible Preferred Stock		Series B Convertible Preferred Stock		Series C Convertible Preferred Stock		Series D Convertible Preferred Stock		To Co Pre Sto Pre Un
	Units	Amount	Units	Amount	Shares	Amount	Shares	Amount	Shares	Amount	Shares	Amount	
at er 31,	119,656	$3,499	—	$—	—	$—	—	$—	—	$—	—	$—	$3
of Series ed units,													
saction 35	—	—	24,155	1,965	—	—	—	—	—	—	—	—	1
of Series ed units													
version nding													
ebt	—	—	71,160	5,892	—	—	—	—	—	—	—	—	5
n of units	—	280	—	142	—	—	—	—	—	—	—	—	4
	—	—	—	—	—	—	—	—	—	—	—	—	–
at er 31,	119,656	3,779	95,315	7,999	—	—	—	—	—	—	—	—	1
on from on	(119,656)	(3,779)	(95,315)	(7,999)	2,393	3,779	1,906	7,999	—	—	—	—	–
n of ble stock	—	—	—	—	—	184	—	631	—	—	—	—	8
on arty	—	—	—	—	—	—	—	—	—	—	—	—	–

ry													
of stock	—	—	—	—	—	—	—	—	—	—	—	—	—
sed ation	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—
at r 31,	—	—	—	—	2,393	3,963	1,906	8,630	—	—	—	—	1
of Series tible net of on costs	—	—	—	—	—	—	—	—	4,047	26,021	—	—	2
of Series tible or the on of ng party	—	—	—	—	—	—	—	—	585	3,792	—	—	3
of Series tible net of on costs 2	—	—	—	—	—	—	—	—	—	—	7,367	67,998	6
n) on hment of tible stock	—	—	—	—	—	1,317	—	(2,076)	—	—	—	—	(
n n) of ble ed stock	—	—	—	—	—	(2,280)	—	1,338	—	187	—	2,502	1
on of ble stock	—	—	—	—	(2,393)	(3,000)	(1,906)	(7,892)	(4,632)	(30,000)	(7,367)	(70,500)	(

mmon on initial g													
of stock ial offering, nsaction													
206	—	—	—	—	—	—	—	—	—	—	—	—	—
on arty ry													
	—	—	—	—	—	—	—	—	—	—	—	—	—
of stock	—	—	—	—	—	—	—	—	—	—	—	—	—
sed ation	—	—	—	—	—	—	—	—	—	—	—	—	—
ed loss -for-sale es	—	—	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	—	—	—	—	—
at er 31,	—	$—	—	$—	—	$—	—	$—	—	$—	—	$—	$—

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	Class A Units		Common Stock		Additional Paid-in	Accumulated Other Comprehensive		Total Stockholders' and Members' Equity
	Units	Amount	Shares	Amount	Capital	Loss	Deficit	(Deficit)
Balances at December 31, 2012	112,672	$10,597	—	$ —	$—	$ —	$ (18,709)	$ (8,112)
Issuance of Series B preferred units, net of transaction costs of $35	19,476	288	—	—	—	—	(288)	—
Issuance of Series B preferred units for the conversion of outstanding related party debt	—	—	—	—	—	—	—	—
Accretion of preferred units	—	—	—	—	—	—	(422)	(422)
Net loss	—	—	—	—	—	—	(5,387)	(5,387)
Balances at December 31, 2013	132,148	10,885	—	—	—	—	(24,806)	(13,921)
Conversion from LLC to C corporation	(132,148)	(10,885)	2,643	—	10,885	—	—	—
Accretion of convertible preferred stock	—	—	—	—	(815)	—	—	(815)
Discount on related party promissory notes	—	—	—	—	128	—	—	128
Exercise of stock options	—	—	2	—	1	—	—	1
Stock-based compensation expense	—	—	—	—	319	—	—	319
Net loss	—	—	—	—	—	—	(4,003)	(4,003)
Balances at December 31, 2014	—	—	2,645	—	10,518	—	(28,809)	(18,291)
Issuance of Series C convertible preferred stock, net of transaction costs of $187	—	—	—	—	—	—	—	—
Issuance of Series C convertible preferred	—	—	—	—	—	—	—	—

stock for the conversion of outstanding related party debt								
Issuance of Series D convertible preferred stock, net of transaction costs of $2,502	—	—	—	—	—	—	—	—
Loss (gain) on extinguishment of convertible preferred stock	—	—	—	—	759	—	—	759
Accretion (decretion) of convertible preferred stock	—	—	—	—	(1,747)	—	—	(1,747)
Conversion of convertible preferred stock into common stock upon initial public offering	—	—	16,298	2	111,390	—	—	111,392
Issuance of common stock upon initial public offering, net of transaction costs of $14,206	—	—	7,245	1	145,183	—	—	145,184
Discount on related party promissory notes	—	—	—	—	13	—	—	13
Exercise of stock options	—	—	125	—	107	—	—	107
Stock-based compensation expense	—	—	—	—	2,921	—	—	2,921
Unrealized loss on available-for-sale securities	—	—	—	—	—	(719)	—	(719)
Net loss	—	—	—	—	—	—	(22,811)	(22,811)
Balances at December 31, 2015	—	$—	26,313	$ 3	$269,144	$ (719)	$ (51,620)	$216,808

The accompanying notes are an integral part of these financial statements.

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REGENXBIO INC.

STATEMENTS OF CASH FLOWS

(in thousands)

	Years Ended December 31,		
	2015	2014	2013
Cash flows from operating activities			
Net loss	$(22,811)	$(4,003)	$(5,387)
Adjustments to reconcile net loss to net cash used in operating activities			
Stock-based compensation expense	2,921	319	—
Imputed interest on related party promissory notes	13	128	—
Unrealized foreign currency transaction losses	11	44	14
Net amortization of premiums and accretion of discounts on marketable debt securities	311	—	—
Depreciation and amortization	80	—	—
Non-cash consideration received for licenses granted	—	—	(303)
Other non-cash adjustments	—	3	—
Changes in operating assets and liabilities			
Trade receivables	(1,342)	(799)	(36)
Related party receivables	750	174	(924)
Unbilled receivables	327	(213)	109
Prepaid expenses	(992)	(28)	—
Other current assets	(851)	—	—
Other assets	(168)	—	—
Accounts payable	590	33	257
Accrued expenses and other current liabilities	2,221	764	107
Due to related party under services agreement	(34)	768	3,192
Other related party payables	(3,761)	258	(41)
Advance payments	(26)	153	—
Deferred rent	246	—	—
Net cash used in operating activities	(22,515)	(2,399)	(3,012)
Cash flows from investing activities			
Purchases of marketable securities	(163,278)	—	—
Purchases of property and equipment	(522)	—	—
Net cash used in investing activities	(163,800)	—	—
Cash flows from financing activities			
Proceeds from issuance of Series B preferred units, net of transaction costs	—	—	1,965
Proceeds from related party promissory notes	—	2,400	—
Proceeds from exercise of stock options	107	1	—
Proceeds from issuance of Series C convertible preferred stock, net of transaction costs	26,021	—	—
Proceeds from issuance of Series D convertible preferred stock, net of transaction costs	67,998	—	—
Proceeds from initial public offering of common stock, net of transaction costs	145,184	—	—
Net cash provided by financing activities	239,310	2,401	1,965

Net increase (decrease) in cash and cash equivalents	52,995	2	(1,047)
Cash and cash equivalents			
Beginning of period	1,121	1,119	2,166
End of period	$54,116	$1,121	$1,119
Supplemental cash flow information			
Cash paid for interest	$7	$164	$—
Supplemental disclosures of non-cash investing and financing activities			
Conversion of accrued service fees to related party into Series C convertible preferred stock	$2,403	$—	$—
Conversion of related party promissory notes into Series C convertible preferred stock	$1,389	$—	$—
Conversion of convertible preferred stock into common stock upon initial public offering	$111,392	$—	$—
Purchases of property and equipment in accounts payable and accrued expenses	$96	$—	$—
Deferred issuance costs for Series C convertible preferred stock in accrued expenses	$—	$157	$—
Conversion of accrued service fees to related party into Series B preferred units	$—	$—	$5,892
Non-cash consideration received for licenses granted	$—	$—	$303

The accompanying notes are an integral part of these financial statements.

REGENXBIO INC.

NOTES TO FINANCIAL STATEMENTS

(in thousands, except per share data)

1. Nature of Business

REGENXBIO Inc. (the Company) was formed on July 16, 2008 in the state of Delaware as ReGenX, LLC, and on December 22, 2009, changed its name to ReGenX Biosciences, LLC. On September 16, 2014, the Company converted from a limited liability company (LLC) to a C-corporation, and changed its name to REGENXBIO Inc. The Company uses its proprietary NAV® Technology platform and collaborates with clinical advisors to advance the development of gene therapy treatments for a range of severe diseases with unmet needs.

Initial Public Offering

On September 22, 2015, the Company completed its initial public offering (IPO) whereby the Company sold 7,245 shares of common stock (inclusive of 945 shares of common stock sold by the Company pursuant to the full exercise of an option to purchase additional shares granted to the underwriters in connection with the offering) at a price of $22.00 per share. The shares began trading on The Nasdaq Global Select Market on September 17, 2015. The aggregate net proceeds received by the Company from the offering were $145,184, net of underwriting discounts and commissions and offering expenses payable by the Company. Upon the closing of the IPO, all outstanding shares of convertible preferred stock converted into 16,298 shares of common stock.

Liquidity and Risks

As of December 31, 2015, the Company had generated an accumulated deficit of $51,620 since inception. As the Company continues to incur losses, transition to profitability is dependent upon the successful development, approval and commercialization of its product candidates and achieving a level of revenues adequate to support the Company’s cost structure. The Company may never achieve profitability, and unless and until it does, the Company will continue to need to raise additional capital. As of December 31, 2015, the Company had cash, cash equivalents and marketable securities of $216,367, which management believes is sufficient to fund operations for at least the next twelve months.

The Company is subject to risks common to companies in the biotechnology industry, including, but not limited to, development by the Company or its competitors of technological innovations, risks of failure of clinical trials, dependence on key personnel, protection of proprietary technology, compliance with government regulations and ability to transition from preclinical manufacturing to commercial production of products.

2. Summary of Significant Accounting Policies

Basis of Presentation

The accompanying financial statements have been prepared in conformity with accounting principles generally accepted in the United States of America (GAAP). Any reference in these notes to applicable guidance is meant to refer to the authoritative United States (U.S.) generally accepted accounting principles as found in the Accounting Standards Codification (ASC) and Accounting Standards Update (ASU) of the Financial Accounting Standards Board (FASB).

Foreign Currency Transactions

Transaction gains (losses) that arise from exchange rate fluctuations on transactions denominated in a currency other than the U.S. dollar are included in the statements of operations and comprehensive loss as incurred.

Use of Estimates

The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts in the financial statements and accompanying notes. Actual results could materially differ from those estimates. Management considers many factors in selecting appropriate financial accounting policies and controls, and in developing the estimates and assumptions that are used in the preparation of these financial statements. Management must apply significant judgment in this process. In addition, other factors may affect estimates, including: expected business and operational changes, sensitivity and volatility associated with the assumptions used in developing estimates and whether historical trends are expected to be representative of future trends. The estimation process often may yield a range of potentially reasonable estimates of the ultimate future outcomes and management must select an amount that falls within that range of reasonable estimates. This process may result in actual results differing materially from those estimated amounts used in the preparation of the financial statements. Estimates are used in the following areas, among others: stock-based compensation expense, accrued research and development expenses and the fair value of financial instruments.

Segment and Geographical Information

Operating segments are identified as components of an enterprise about which separate discrete financial information is available for evaluation by the chief operating decision maker (CODM), or decision making group, in making decisions on how to allocate resources and assess performance. The Company’s CODM, the Chief Executive Officer, views its operations and manages its business as one operating segment.

For the year ended December 31, 2015, 78 percent and 21 percent of the Company’s revenue was generated from customers located in the U.S. and Europe, respectively. For the year ended December 31, 2014, 60 percent and 40 percent of the Company’s revenue was generated from customers located in the U.S. and Europe, respectively. For the year ended December 31, 2013, 86 percent and 13 percent of the Company’s revenue was generated from customers located in the U.S. and Europe, respectively. Country of origin for revenue is determined by the Company based on the country of domicile of licensees for license revenue, the country in which reagent sales are delivered to for reagent sales and the location of grantors for government grant revenue. All of the Company’s assets currently reside in the U.S.

Cash and Cash Equivalents

The Company considers all highly liquid investments purchased with original maturities of 90 days or less at acquisition to be cash equivalents. Cash and cash equivalents include cash held in banks and money market mutual funds.

Marketable Securities

The Company’s marketable securities are classified as available-for-sale and are carried at fair value. Marketable securities with remaining maturity dates exceeding twelve months which are not intended to be sold prior to maturity for use in current operations are classified as non-current. Unrealized gains and losses, net of any related tax effects, are excluded from earnings and are included in other comprehensive loss and reported as a separate component of stockholders’ equity until realized. A decline in the fair value below cost of available-for-sale securities that is deemed other-than-temporary is charged to results of operations, resulting in the establishment of a new cost basis for the security. Premiums and discounts are amortized or accreted into the cost basis over the life of the related security as adjustments to the yield using the effective-interest method. Interest income is recognized when earned. Realized gains and losses from the sale of marketable securities are based on the specific identification method and are included in results of operations.

The Company regularly evaluates whether declines in the fair value of its investments below their cost are other-than-temporary. The evaluation includes consideration of the cause of the impairment, including the creditworthiness of the security issuers, the number of securities in an unrealized loss position, the severity and duration of the unrealized losses, whether the Company has the intent to sell the securities and whether it is more likely than not that the Company will be required to sell the securities before the recovery of their amortized cost basis. If the Company determines that the decline in fair value of an investment is below its accounting basis and this decline is other-than-temporary, the Company would reduce the carrying value of the security it holds and record a loss for the amount of such decline. The Company has not recorded any declines in value judged to be other-than-temporary on its investments.

Concentrations of Credit Risk and Off-balance Sheet Risk

Cash and cash equivalents, marketable securities and accounts receivable are financial instruments that are potentially subject to concentrations of credit risk. The Company’s cash and cash equivalents are deposited in accounts at multiple financial institutions, and

amounts may exceed federally insured limits. The Company believes it is not exposed to significant credit risk due to the financial strength of the depository institutions in which the cash and cash equivalents are held. The Company's marketable securities consist of fixed income corporate debt securities and may subject the Company to concentrations of credit risk. The Company has adopted an investment policy which limits potential concentrations of investments and establishes minimum acceptable credit ratings, thereby reducing credit risk exposure. Management believes that it is not exposed to significant credit risk related to accounts receivable due to the credit quality and history of collections from its significant customers. The Company has no financial instruments with off-balance sheet risk of loss.

The following table summarizes those customers who represented at least 10 percent of revenue or accounts receivable for the periods presented:

	Revenue Years Ended December 31,			Accounts Receivable December 31,	
	2015	2014	2013	2015	2014
Customer A	*	33 %	*	*	*
Customer B	*	14 %	11 %	25 %	46 %
Customer C[(1)]	41%	*	44 %	*	40 %
Customer D	*	*	*	*	11 %
Customer E	*	*	21 %	*	*
Customer F	16%	*	*	42 %	*
Customer G	22%	*	*	19 %	*

*Represented less than 10%
(1)Represents a related party prior to September 30, 2015

Accounts Receivable

Trade accounts receivable consist of amounts due to the Company resulting from the Company's licensing arrangements, reagent sales and grant programs. Related party accounts receivable consists of amounts due from related parties (Note 13). Unbilled receivables consist of estimated costs incurred under the Company's grant programs which have not yet been submitted to the grantor for reimbursement. Receivables are stated net of an allowance for doubtful accounts, if deemed necessary based on the Company's evaluation of collectability using specific identification of account balances and historical information regarding write-offs. Account balances are charged off against the allowance when the potential for recovery is considered remote. The Company has not recorded an allowance for doubtful accounts as of December 31, 2015 or 2014.

Deferred Issuance Costs

Deferred issuance costs, which consist of direct and incremental fees relating to the issuance of equity securities are capitalized. As of December 31, 2014, the Company capitalized $157 of deferred issuance costs related to Series C convertible preferred stock (Series C Preferred Stock) (Note 8), which were offset against the proceeds from the issuance of the Series C Preferred Stock in January 2015. As of December 31, 2015, no amounts were deferred.

Property and Equipment

Property and equipment is stated at cost. Maintenance and repairs that do not improve or extend the lives of the respective assets are expensed to operations as incurred. Upon disposal, the related cost and accumulated depreciation is removed from the accounts and any resulting gain or loss is included in the results of operations. Upon retirement or sale, the cost of the disposed asset and the related accumulated depreciation are removed from the accounts and any resulting gain or loss is recognized. Depreciation and amortization is calculated using the straight-line method over the estimated useful lives of the assets, which are as follows:

Computer equipment and software	3 years
Lab equipment	5 years
Furniture and fixtures	5 years
Leasehold improvements	Shorter of lease term or estimated useful life

Impairment of Long-lived Assets

The Company reviews long-lived assets when events or changes in circumstances indicate the carrying value of the assets may not be recoverable. Recoverability is measured by comparison of the book values of the assets to estimated future net undiscounted

cash flows that the assets are expected to generate. If such assets are considered to be impaired, the impairment to be recognized is measured by the amount by which the book value of the assets exceed their fair value, which is measured based on the projected discounted future net cash flows arising from the assets. No impairment losses have been recorded during the years ended December 31, 2015, 2014 and 2013.

Cost Method Investments

Cost method investments consist of non-marketable holdings in certain corporations and are stated at cost. The Company accounts for its investments in other entities using the cost method if its ownership interest is below 20 percent and the Company does not have significant influence over the operations of the entity. As of December 31, 2015, the Company's cost method investment in Audentes Therapeutics, Inc. (Audentes) (Note 9) had a carrying value of $300. As of December 31, 2014, cost method investments in Audentes and Dimension Therapeutics, Inc. (Dimension) (Note 13) had a carrying value of $303.

Declines in the fair value of cost method investments below their carrying value that are deemed to be other-than-temporary are reflected in the statements of operations and comprehensive loss as realized losses. In estimating other-than-temporary impairment losses, management considers, among other things, the length of time and the extent to which the fair value has been less than cost, the financial condition and near-term prospects of the issuer and the intent and ability of the Company to retain its investments in the issuer for a period of time sufficient to allow for the anticipated recovery in fair value. The Company has not identified any events or changes in circumstances that would have an adverse effect on the fair value of its cost method investments. Accordingly, no other-than-temporary impairment losses were recorded for the years ended December 31, 2015, 2014 and 2013.

The Company applies the variable interest model under FASB ASC Topic 810, Consolidation (ASC 810), to any entity in which the Company holds an equity investment or to which the Company has granted a commercial license. If the entity is within the scope of the model, and meets the definition of a variable interest entity (VIE), the Company considers whether it must consolidate the VIE or if further disclosures regarding the Company's involvement with the VIE are necessary. If the Company is determined to be the primary beneficiary of the VIE, the Company will consolidate the VIE. This analysis is performed at the initial investment in the entity or the inception of the commercial license agreement, or upon any reconsideration event.

The Company considers a legal entity a VIE if (i) its investors do not have sufficient equity at risk for the legal entity to finance its activities without additional subordinated financial support or (ii) as a group, the holders of the equity investment at risk do not have both the power to direct the activities of the legal entity that most significantly impact the entity's economic performance and the obligation to absorb the expected losses or the right to receive expected residual returns of the legal entity. The Company considers itself to be the primary beneficiary of a VIE if the Company has both the power to direct the activities that most significantly affect the VIE's economic performance and the obligation to absorb the losses of, or right to receive benefits from, the VIE that could be potentially significant to the VIE. If the Company, or any of the Company's related parties which have a variable interest in the VIE, individually lack the necessary power and benefits criteria, but the related party group as a whole has the necessary power and benefits, the Company determines which of the related party group members is most closely associated with the VIE and considers that party to be the primary beneficiary. As of December 31, 2015 and 2014, the Company has not consolidated any VIE's. See Note 13 for further information regarding the Company's involvement and variable interests in related parties and entities controlled by related parties.

Related Party Debt Instruments

The Company evaluates each of its related party debt instruments (Note 6) with embedded features under FASB ASC Topic 815, Derivatives and Hedging (ASC 815). More specifically, the Company evaluates all of the stated and

implied substantive terms and features of the debt, including: (i) whether the debt included redemption features, (ii) how and when any redemption features could be exercised and settled and (iii) the existence and nature of any conversion rights.

Fair Value of Financial Instruments

The Company is required to disclose information on all assets and liabilities reported at fair value that enables an assessment of the inputs used in determining the reported fair values. FASB ASC Topic 820, Fair Value Measurements and Disclosures (ASC 820), establishes a hierarchy of inputs used in measuring fair value that maximizes the use of observable inputs and minimizes the use of unobservable inputs by requiring that the observable inputs be used when available. 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 asset or liability, and are developed based on the best information available in the circumstances. The fair value hierarchy applies only to the valuation inputs used in determining the reported fair value of the investments and is not a measure of the investment credit quality. The three levels of the fair value hierarchy are described below:

- Level 1—Valuations based on unadjusted quoted prices in active markets for identical assets or liabilities that the Company has the ability to access at the measurement date.
- Level 2—Valuations based on quoted prices for similar assets or liabilities in markets that are not active or for which all significant inputs are observable, either directly or indirectly.
- Level 3—Valuations that require inputs that reflect the Company's own assumptions that are both significant to the fair value measurement and unobservable.

To the extent that valuation is based on models or inputs that are less observable or unobservable in the market, the determination of fair value requires more judgment. Accordingly, the degree of judgment exercised by the Company in determining fair value is greatest for instruments categorized in 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. Please refer to Note 4 for further information on the fair value measurement of the Company's financial instruments.

Convertible Preferred Stock and Preferred Units

In accordance with the guidance in FASB ASC Topic 480, Distinguishing Liabilities from Equity, outstanding shares of convertible preferred stock and preferred units (Note 8) were classified outside of permanent equity and within temporary equity as of December 31, 2014 due to their associated redemption features and liquidation preferences. At each reporting date, each series of convertible preferred stock and preferred units is accreted and stated at the amounts in which each series is currently redeemable, which is also equal to the aggregate liquidation preference at that date.

The Company evaluated each series of its convertible preferred stock and preferred units and determined that each individual series is considered a debt host under ASC 815. In making this determination, the Company's analysis followed the whole instrument approach which compares an individual feature against the entire convertible preferred stock or preferred unit instrument which includes that feature. The Company's analysis was based on a consideration of the economic characteristics and risks of each series of convertible preferred stock and preferred units. More specifically, the Company evaluated all of the stated and implied substantive terms and features, including: (i) whether the convertible preferred stock and preferred units included redemption features, (ii) how and when any redemption features could be exercised, (iii) whether the holders of convertible preferred stock and preferred units were entitled to dividends and how those dividends were calculated, (iv) the voting rights of the convertible preferred stock and preferred units and (v) the existence and nature of any conversion rights. As a result of the Company's conclusion that the convertible preferred stock and preferred units represent a debt host, the redemption features of all series of convertible preferred stock and preferred units were considered to be clearly and closely related to the associated debt host instruments. Accordingly, the redemption features of all series of convertible preferred stock were not considered embedded derivatives that required bifurcation. The Company also concluded that the conversion rights under the convertible preferred stock were not clearly and closely related to the debt host instruments. However, the Company concluded that the conversion rights did not meet the net settlement criteria of a derivative and, therefore, were not

considered embedded derivatives that required bifurcation.

The Company accounts for potential beneficial conversion features of convertible preferred stock under FASB ASC 470-20, Debt with Conversion and Other Options. At the time of each of the issuances of convertible preferred stock, the Company's common stock into which each series of the Company's convertible preferred stock was convertible had an estimated fair value less than the effective conversion prices of the convertible preferred stock. Therefore, there was no intrinsic value on the respective issuance dates.

Revenue Recognition

The Company primarily generates revenue through license agreements with third parties which may grant rights to the research, development, and commercialization of product candidates using the Company's NAV® Technology. Additionally, the Company has generated revenue from grant programs and sales of licensed reagents to customers for use in research and development.

The Company recognizes revenue in accordance with FASB ASC Topic 605, Revenue Recognition (ASC 605). Accordingly, revenue is recognized for each unit of accounting when all of the following criteria are met:

- Persuasive evidence of an arrangement exists;
- Delivery has occurred or services have been rendered;
- The seller's price to the buyer is fixed or determinable; and
- Collectability is reasonably assured.

Amounts received prior to satisfying the revenue recognition criteria are recorded as deferred revenue in the Company's balance sheets.

The Company analyzes its revenue arrangements based on the guidance in FASB ASC Topic 605-25, Revenue Recognition-Multiple-Element Arrangements (ASC 605-25). Pursuant to the guidance in ASC 605-25, the Company evaluates multiple-element arrangements to determine (i) the deliverables included in the arrangement and (ii) whether the individual deliverables represent separate units of accounting or whether they must be accounted for as a combined unit of accounting. This evaluation involves subjective determinations and requires management to make judgments about the individual deliverables and whether such deliverables are separable from the other aspects of the contractual relationship. Deliverables are considered separate units of accounting provided that: (i) the delivered item(s) has value to the customer on a standalone basis and (ii) if the arrangement includes a general right of return relative to the delivered item(s), delivery or performance of the undelivered item(s) is considered probable and substantially in the control of the Company. The Company does not have any material revenue arrangements that contain multiple deliverables.

License Revenue and License Revenue From Related Party. The terms of the Company's license agreements require delivery of an intellectual property license for use of the Company's intellectual property in research and/or commercial development of product candidates for various diseases. License agreements generally have a term equal to the life of the intellectual property, but are terminable at the option of the licensee. Non-refundable payments to the Company under these arrangements may include: (i) up-front license fees, (ii) option fees to exercise options to obtain commercial licenses, (iii) annual maintenance fees, (iv) sublicense fees, (v) payments based on the achievement of certain milestones based solely on the efforts of the licensees and (vi) royalties on product sales.

Nonrefundable up-front license fees are recognized as revenue upon delivery of the license provided there are no undelivered elements in the arrangement and the necessary criteria under ASC 605 for revenue recognition have been met.

Options to exercise commercial licenses are considered substantive if, at the inception of the arrangement, the Company is at risk as to whether the licensee will choose to exercise the option. Factors that the Company considers in evaluating whether an option is substantive include the overall objective of the arrangement, the benefit the licensee might obtain from the arrangement without exercising the option, the cost to exercise the option and the likelihood that the option will be exercised. For arrangements under which an option is considered substantive, the Company does not consider the item underlying the option to be a deliverable at the inception of the arrangement and the associated option fees are not included in allocable arrangement consideration, provided the option is not priced at a significant and incremental discount. Conversely, for arrangements under which an option is not considered

substantive or if an option is priced at a significant and incremental discount, the Company would consider the item underlying the option to be a deliverable at the inception of the arrangement and a corresponding amount would be included in allocable arrangement consideration. As of December 31, 2015 and 2014, all of the options included in the Company's license agreements have been determined to be substantive, and none of the options are priced at a significant and incremental discount. Option fees are recognized as revenue upon exercise and delivery of the underlying commercial license, provided there are no undelivered elements in the arrangement and the necessary criteria under ASC 605 for revenue recognition have been met.

Annual maintenance fees under the Company's license agreements do not represent a separate deliverable aside from the delivery of the license since the Company has no further obligations under the agreements. Accordingly, annual maintenance fees are recognized as revenue when billable under the agreement, provided the price is fixed or determinable and collectability is deemed reasonably assured.

Sublicense fees are payable to the Company upon the receipt of certain fees by the licensee from any sublicensees. Sublicense fees received by the Company are recognized as revenue when the price is fixed or determinable and collectability is deemed reasonably assured.

At the inception of an arrangement that includes milestone payments, the Company evaluates whether each milestone is substantive and at risk to both parties on the basis of the contingent nature of the milestone. The Company evaluates factors such as the scientific, clinical, regulatory, commercial and other risks that must be overcome to achieve the respective milestone and the level of effort and investment required to achieve the respective milestone in making this assessment. There is considerable judgment involved in determining whether a milestone satisfies all of the criteria required to conclude that a milestone is substantive. The Company has concluded that all of the clinical, regulatory and commercial milestones pursuant to its license agreements are substantive. Milestone payments are recognized as revenue upon achievement of the milestone by the licensee, provided that all other revenue recognition criteria are satisfied.

The Company recognizes royalty revenue, if any, in the period of sale of the related product(s) based on the underlying contract terms, provided that the reported sales are reliably measurable and the Company has no remaining performance obligations, and provided that all other revenue recognition criteria under ASC 605 are satisfied. To date, the Company has not generated any royalty revenues.

Please refer to Note 13 for information regarding license revenue from related party.

Grant Revenue. Grant revenue is generated through research and development grant programs offered by the U.S. federal government and the European Union. Government grants provide funds for certain types of expenditures in connection with research and development activities over a contractually defined period. Revenue related to government grants is recognized in the period during which the related costs are incurred and the related services are rendered, provided that the applicable performance obligations under the grants have been met. Funds received under grants are recorded as revenue if the Company is deemed to be the principal participant and primary obligor in the contract arrangements because the activities under the contracts are part of the Company’s development programs. If the Company is not the principal participant or primary obligor, the grant proceeds are recorded as a reduction to research and development expense.

The Company’s grants contain refund provisions. The Company reviews those refund provisions to determine the likelihood of repayment. If the likelihood of repayment of the grant is determined to be remote, the grant is recognized as revenue. If the probability of repayment is determined to be more than remote, the Company records the amount of potential repayment of the grant as a liability, until such time that the grant requirements have been satisfied. Funds received in advance of the performance of the services are recorded as deferred revenue. Please refer to Note 9 for further information regarding the Company’s grant agreements.

Reagent Sales. Reagent sales consist of sales of licensed reagents to third parties for use in research and development. Revenue from reagent sales is recognized upon delivery to customers, provided that all other revenue recognition criteria under ASC 605 are satisfied.

Research and Development Expenses

Research and development costs are charged to expense as costs are incurred. Research and development costs include salaries and benefits, other personnel costs, facilities costs, overhead costs, preclinical and clinical contract services, regulatory, manufacturing and other related costs. Up-front fees incurred in obtaining technology licenses are charged to research and development expense as incurred if the technology licensed has no alternative future use. Advance payments for goods or services for future research and development activities are deferred and expensed as the goods

are delivered or the related services are performed.

The Company estimates research and development expenses for manufacturing activities, process development, preclinical studies and clinical trials based on the services performed pursuant to contracts with research institutions and clinical research organizations that conduct and manage the activities on the Company's behalf. In accruing these research and development expenses, the Company estimates the time period over which services will be performed and the level of effort to be expended in each period. These estimates are based on communications with the third party service providers and other information available to the Company at each balance sheet date. If the actual timing of the performance of services or the level of effort varies from the estimate, the Company will adjust the accrual accordingly. There have been no significant changes from the Company's original estimates in any of the periods presented.

Stock-based Compensation

The Company accounts for its stock-based compensation awards in accordance with FASB ASC Topic 718, Compensation—Stock Compensation (ASC 718). ASC 718 requires all stock-based payments to employees, including grants of employee stock options, to be recognized in the statement of operations and comprehensive loss based on their fair values.

The Company's stock-based awards are subject to either service or performance-based vesting conditions. Compensation expense related to awards to employees with service-based vesting conditions is recognized on a straight-line basis based on the estimated grant date fair value over the associated service period of the award, which is generally the vesting term. Compensation expense related to awards to non-employees with service-based vesting conditions is recognized based on the then-current fair value at each financial reporting date prior to the measurement date over the associated service period of the award, which is generally the vesting term, on a straight-line basis. Compensation expense related to awards to employees with performance-based vesting conditions is recognized based on the estimated grant date fair value over the requisite service period using the accelerated attribution method to the extent achievement of the performance condition is probable. Compensation expense related to awards to non-employees with performance-based vesting conditions is recognized based on the then-current fair value at each financial reporting date prior to the measurement date over the requisite service period using the accelerated attribution method to the extent achievement of the performance condition is probable.

The Company estimates the fair value of its option awards to employees and directors using the Black-Scholes option-pricing model, which requires the input of and subjective assumptions, including (i) the fair value of the underlying common stock, (ii) the expected stock price volatility, (iii) the calculation of expected term of the award, (iv) the risk-free interest rate and (v) expected dividends. Due to the lack of company specific historical and implied volatility data of its common stock, the Company has based its estimate of expected volatility on the historical volatility of a group of similar companies that are publicly traded. When selecting these public companies on which it has based its expected stock price volatility, the Company selected companies with comparable characteristics to it, including enterprise value, risk profiles, position within the industry and with historical share price information sufficient to meet the expected term of the stock-based awards. The Company will continue to apply this method of estimating expected volatility until a sufficient amount of historical information regarding the volatility of its own common stock price becomes available. The Company computes historical volatility data using the daily closing prices for the selected companies' shares during the equivalent period of the calculated expected term of the stock-based awards. The Company has estimated the expected term of its employee stock options using the "simplified" method, whereby, the expected term equals the arithmetic average of the vesting term and the original contractual term of the option due to its lack of sufficient historical data. The risk-free interest rates for periods within the expected term of the option are based on the U.S. Treasury securities with a maturity date commensurate with the expected term of the associated award. The Company has never paid, and does not expect to pay dividends in the foreseeable future.

The Company is also required to estimate forfeitures at the time of grant and revise those estimates in subsequent periods if actual forfeitures differ from its estimates. To date, a forfeiture rate of zero has been used to calculate stock-based compensation expense. To the extent that actual forfeitures differ from the Company's estimates, the differences are recorded as a cumulative adjustment in the period the estimates were revised. Stock-based compensation expense recognized in the financial statements is based on awards that are ultimately expected to vest.

The Company has granted stock options to non-employees as compensation for advisory services provided to the Company. Consistent with the guidance in FASB ASC Topic 505-50, Equity-Based Payments to Non-Employees, the fair value of each non-employee stock option is estimated at the date of grant using the Black-Scholes option-pricing model with assumptions generally consistent with those used for employee stock options, with the exception of

expected term, which is based on the contractual life.

Income Taxes

Income taxes are recorded in accordance with FASB ASC Topic 740, Income Taxes (ASC 740), which provides for deferred taxes using an asset and liability approach. The Company recognizes deferred tax assets and liabilities for the expected future tax consequences of events that have been included in the financial statements or tax returns. Deferred tax assets and liabilities are determined based on the difference between the financial statement and tax bases of assets and liabilities using enacted tax rates in effect for the year in which the differences are expected to reverse. Valuation allowances are provided, if based upon the weight of available evidence, it is more likely than not that some or all of the deferred tax assets will not be realized.

The Company accounts for uncertain tax positions in accordance with the provisions of ASC 740. When uncertain tax positions exist, the Company recognizes the tax benefit of tax positions to the extent that the benefit will more likely than not be realized. The determination as to whether the tax benefit will more likely than not be realized is based upon the technical merits of the tax position as well as consideration of the available facts and circumstances. As of December 31, 2015 and 2014, the Company did not have any significant uncertain tax positions.

The Company will recognize interest and penalties related to uncertain tax positions in income tax expense. As of December 31, 2015 and 2014, the Company had no accrued interest or penalties related to uncertain tax positions and no amounts have been recognized in the Company's statements of operations and comprehensive loss.

Net Loss Per Share

On September 16, 2014, the Company converted from an LLC to a C-corporation. Upon the conversion, every 50 Class A Units, Series A Preferred Units and Series B Preferred Units (Note 8) held were converted into 1 share of common stock, Series A convertible preferred stock (Series A Preferred Stock) and Series B convertible preferred stock (Series B Preferred Stock), respectively. Class A Units of the LLC had similar rights and characteristics of common stock issued upon the conversion. In calculating net loss per share, the Company retrospectively applied the effects of the conversion to the number of Class A Units, Series A Preferred Units and Series B Preferred Units outstanding prior to the conversion. Net loss per share for periods prior to the conversion to a C-corporation refers to net loss per Class A Unit.

The Company computes net loss per share in conformity with the two-class method required for participating securities. The Company considers all series of convertible preferred stock outstanding prior to the IPO, and all series of preferred units outstanding prior to the conversion to a C-corporation, to be participating securities. The holders of convertible preferred stock outstanding prior to the IPO were entitled to receive preferential dividends in the event that a dividend was to be paid to the holders of common stock, and the holders of preferred units outstanding prior to the conversion to a C-corporation were entitled to a preferred return in the event that operating distributions were to be paid to the Class A Unit holders of the LLC. The holders of convertible preferred stock and preferred units did not have a contractual obligation to share in the losses of the Company. As such, the Company's net losses for the years ended December 31, 2015, 2014 and 2013 were not allocated to these participating securities. In connection with the IPO, all outstanding shares of convertible preferred stock were automatically converted into shares of common stock.

Basic net loss per share is calculated by dividing net loss applicable to holders of common stock by the weighted-average shares outstanding during the period, without consideration for common stock equivalents. Diluted net loss per share is calculated by adjusting weighted-average shares outstanding for the dilutive effect of common stock equivalents outstanding for the period, determined using the treasury-stock method. For purposes of the diluted net loss per share calculation, convertible preferred stock and preferred units, stock options and debt instruments containing share settlement options are considered to be common stock equivalents but have been excluded from the calculation of diluted net loss per share, as their effect would be anti-dilutive. Contingently convertible shares in which conversion is based on non-market-priced contingencies are excluded from the calculations of both basic and diluted net loss per share until the contingency has been fully met. Accordingly, basic and diluted net loss per share and unit were the same for all periods presented.

Comprehensive Loss

The Company's comprehensive loss includes its net loss as well as net unrealized losses on available-for-sale securities.

Recently Announced Accounting Pronouncements

In February 2016, the FASB issued ASU 2016-02, Leases (Topic 842) which supersedes FASB ASC Topic 840, Leases (Topic 840) and provides principles for the recognition, measurement, presentation and disclosure of leases for both lessees and lessors. The new standard requires lessees to apply a dual approach, classifying leases as either finance or operating leases based on the principle of whether or not the lease is effectively a financed purchase by the lessee. This classification will determine whether lease expense is recognized based on an effective interest

method or on a straight-line basis over the term of the lease, respectively. A lessee is also required to record a right-of-use asset and a lease liability for all leases with a term of greater than twelve months regardless of classification. Leases with a term of twelve months or less will be accounted for similar to existing guidance for operating leases. The standard is effective for annual and interim periods beginning after December 15, 2018, with early adoption permitted upon issuance. The Company is evaluating the application of this ASU, but has not yet determined the potential effects it may have on the Company's financial statements.

In January 2016, the FASB issued ASU 2016-01, Financial Instruments—Overall (Topic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities, which supersedes the current guidance to classify equity securities with readily determinable fair values into different categories and requires equity securities to be measured at fair value with changes in the fair value recognized through net income (loss). This guidance is effective for annual and interim periods beginning after December 15, 2017. The Company is evaluating the application of this ASU, but has not yet determined the potential effects it may have on the Company's financial statements.

In February 2015, the FASB issued ASU 2015-2, Consolidation (Topic 810): Amendments to the Consolidation Analysis, which provides clarification regarding the guidance surrounding consolidation of certain legal entities. This guidance is effective for annual and interim periods beginning after December 15, 2015. The Company has evaluated the application of this ASU, and determined that it does not have a material effect on the Company's financial statements.

In August 2014, the FASB issued ASU 2014-15, Presentation of Financial Statements—Going Concern (Subtopic 205-40): Disclosure of Uncertainties about an Entity's Ability to Continue as a Going Concern, requiring management to evaluate whether events or conditions could impact an entity's ability to continue as a going concern and to provide disclosures if necessary. Management will be required to perform the evaluation within one year after the date that the financial statements are issued. Disclosures will be required if conditions give rise to substantial doubt and the type of disclosure will be determined based on whether management's plans will be able to alleviate the substantial doubt. The ASU will be effective for the first annual period ending after December 15, 2016, and for annual periods and interim periods thereafter with early application permitted. The Company is evaluating the application of this ASU, but has not yet determined the potential effects it may have on the Company's financial statement disclosures.

In June 2014, the FASB issued ASU No. 2014-12, Compensation—Stock Compensation (Topic 718): Accounting for Share-Based Payments When the Terms of an Award Provide That a Performance Target Could be Achieved after the Requisite Service Period, which requires the Company to assess share-based awards with performance targets that could be achieved after the requisite service period for potential treatment as performance conditions. Under the ASU, compensation expense is to be recognized when the performance target is deemed probable and should represent the compensation expense attributable to the periods for which service has already been rendered. If the performance target is reached prior to achievement of the service period, the remaining unrecognized compensation cost should be recognized over the remaining service period. The ASU is effective for annual and interim periods beginning after December 15, 2015 with early adoption permitted. The Company has evaluated the application of this ASU, and determined that it does not have a material effect on the Company's financial statements.

In May 2014, the FASB issued ASU No. 2014-09, Revenue from Contracts with Customers (Topic 606), which supersedes the revenue recognition requirements in ASC 605, Revenue Recognition. This ASU is based on the principle that revenue is recognized to depict the transfer of goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. The ASU also requires additional disclosure about the nature, amount, timing and uncertainty of revenue and cash flows arising from customer contracts, including significant judgments and changes in judgments and assets recognized from costs incurred to obtain or fulfill a contract. In August 2015, the FASB issued ASU No. 2015-14, Revenue from Contracts with Customers (Topic 606), which deferred the effective date of the guidance under ASU No. 2014-09 for entities by one year. The ASU is now effective for annual and interim reporting periods beginning after December 15, 2017. Earlier application is permitted only as of annual reporting periods beginning after December 15, 2016, including interim reporting periods within that reporting period. The Company is evaluating the application of this ASU, but has not yet determined the potential effects it may have on the Company's financial statements.

3. Marketable Securities

The following table presents a summary of the Company's marketable securities, which consist solely of available-for-sale securities:

	Amortized Cost	Unrealized Gains	Unrealized Losses	Fair Value
December 31, 2015				
Corporate bonds	$ 157,977	$ 4	$ (759)	$ 157,222
Commercial paper	4,990	—	—	4,990
Common equity securities	3	36	—	39
	$ 162,970	$ 40	$ (759)	$ 162,251

The Company's common equity securities consist of shares of common stock of Dimension, which became a publicly traded company in October 2015. The Company obtained these shares in connection with a license granted to Dimension in October 2013 (Note 13). The Company is restricted from trading these securities until April 2016 pursuant to a lock-up agreement entered into in connection with Dimension's IPO. The Company has classified these shares as available-for-sale securities and recognized an unrealized gain of $36 which is included in other comprehensive loss for the year ended December 31, 2015. Prior to Dimension's IPO, the shares were not marketable and were accounted for as a cost method investment on the Company's balance sheets.

As of December 31, 2015, no available-for-sale securities had remaining maturities greater than three years. The Company did not hold any available-for-sale securities as of December 31, 2014.

The amortized cost of available-for-sale securities is adjusted for amortization of premiums and accretion of discounts to maturity. As of December 31, 2015, the balance in the Company's accumulated other comprehensive loss consisted solely of net unrealized gains and losses on available-for-sale securities. For the year ended December 31, 2015, the Company recognized net unrealized losses on available-for-sale securities of $719, which is included in other comprehensive loss. There were no realized gains or losses recognized on the sale or maturity of available-for-sale securities during the year ended December 31, 2015, and as a result, the Company did not reclassify any amounts out of accumulated other comprehensive loss for the period.

As of December 31, 2015, the Company did not hold any available-for-sale securities in an unrealized loss position for more than twelve months. The aggregate fair value of securities held by the Company in an unrealized loss position for less than twelve months as of December 31, 2015 was $155,486, which consisted of corporate debt securities with credit ratings of A-2/A or higher. The Company has the intent and ability to hold such securities until recovery. The Company determined that there have been no material changes in the credit risk of these investments since their initial purchases. As a result, the Company determined that none of these investments are other-than-temporarily impaired as of December 31, 2015.

4. Fair Value of Financial Instruments

Financial instruments reported at fair value on a recurring basis include cash equivalents and marketable securities. Cash equivalents consist solely of money market mutual funds. Marketable securities consist of corporate debt securities, including corporate bonds and commercial paper, as well as common equity securities as disclosed in Note 3. The following tables present the fair value of cash equivalents and marketable securities in accordance with the hierarchy discussed in Note 2:

	Quoted prices in active markets (Level 1)	Significant other observable inputs (Level 2)	Significant unobservable inputs (Level 3)	Total
December 31, 2015				
Money market mutual funds (cash equivalents)	$ —	$ 54,104	$ —	$ 54,104
Corporate bonds (marketable securities)	—	157,222	—	157,222
Commercial paper (marketable securities)	—	4,990	—	4,990
Common equity securities (marketable securities)	39	—	—	39
	$ 39	$ 216,316	$ —	$ 216,355

	Quoted	Significant

	prices in active markets (Level 1)	other observable inputs (Level 2)	Significant unobservable inputs (Level 3)	Total
December 31, 2014				
Money market mutual funds (cash equivalents)	$ —	$ 844	$ —	$844
	$ —	$ 844	$ —	$844

Management estimates that the carrying amounts of its accounts receivable, accounts payable, accrued expenses and other current liabilities and related party payables approximate fair value due to the short-term nature of those instruments.

Certain debt instruments (Note 6) outstanding at December 31, 2014 accrued interest at below market rates. The Company has recorded a discount to the face value of the instrument to account for the difference between the present value of the debt at an estimated market rate versus face value. Accordingly, management believes that the carrying values of all debt instruments approximate fair value.

The Company has determined that it is not practicable to estimate the fair value of cost method investments. The Company has not identified any events or changes in circumstances that would have an adverse effect on the fair value of its cost method investments.

5. Property and Equipment, Net

Property and equipment, net consists of the following:

	December 31, 2015
Computer equipment and software	$ 458
Furniture and fixtures	105
Leasehold improvements	55
Total property and equipment	618
Accumulated depreciation and amortization	(80)
Property and equipment, net	$ 538

As of December 31, 2014, the Company had no property and equipment because the Company's resources used in operations were provided by a related party (Note 13). Accordingly, no depreciation or amortization expense was recorded for the years ended December 31, 2014 and 2013. The Company recorded $80 of depreciation and amortization expense for the year ended December 31, 2015.

6. Related Party Debt Instruments

Due to Related Party Under Services Agreement

Until terminated in January 2015, the Company was party to a services agreement with FoxKiser LLP (FoxKiser), a related party (Note 13). Under the services agreement, the Company paid a fixed monthly fee and a support fee to FoxKiser. Amounts outstanding under the services agreement in excess of 30 days from their due date accrued interest at 1.5 percent per month, compounding monthly.

The Company entered into an agreement (the Initial Conversion Agreement) with FoxKiser in which all principal and interest owed under the services agreement as of September 30, 2013, which was $5,892, may be settled at the option of FoxKiser, in whole or in part, (i) upon the next issuance of preferred equity securities by the Company, in shares of such preferred equity securities issued at a price per share equal to the issuance price of such shares, or (ii) if an issuance of preferred equity securities has not taken place by December 31, 2013, in shares of common equity securities of the Company at a price per share equal to the fair value of such common equity securities as determined by the Board of Directors. The debt is deemed fully settled upon conversion into equity securities of the Company.

On October 30, 2013, in conjunction with the Company's issuance of Series B Preferred Units (Note 8), FoxKiser converted the entire $5,892 outstanding under the Initial Conversion Agreement into 71,160 Series B Preferred Units at a price per unit of $0.082798.

On July 31, 2014, the Company entered into another agreement (the Second Conversion Agreement) with FoxKiser. Under the Second Conversion Agreement, all principal and interest owed under the services agreement between the Company and FoxKiser on or after July 31, 2014, with a maximum amount of $2,000, may be settled at the option of

FoxKiser, in whole or in part, (i) upon the next issuance of preferred equity securities by the Company, in shares of such preferred equity securities issued at a price per share equal to the issuance price of such shares, or (ii) if an issuance of preferred equity securities has not taken place by December 31, 2014, in shares of common equity securities of the Company at a price per share equal to the fair value of such common equity securities as determined by the Board of Directors. The debt is deemed fully settled upon conversion into equity securities of the Company.

As of December 31, 2014, the Company had accrued $1,423 payable to FoxKiser under the services agreement, which contained an option to be settled in preferred or common shares in accordance with the Second Conversion Agreement.

Related Party Promissory Notes

On July 31, 2014, the Company received $1,800 in exchange for a promissory note issued to FoxKiser. On September 15, 2014, the Company received $600 in exchange for a second promissory note issued to FoxKiser. Both promissory notes accrued interest at the Short-Term Applicable Federal Rate (0.34% at December 31, 2014), compounding annually, and were payable on demand by FoxKiser at the earlier of December 31, 2014 or the next issuance of preferred equity securities by the Company.

Both promissory notes may be settled at the option of FoxKiser, in whole or in part, (i) upon the next issuance of preferred equity securities by the Company, in shares of such preferred equity securities issued at a price per share equal to the issuance price of such shares, or (ii) if an issuance of preferred equity securities has not taken place by December 31, 2014, in shares of common equity securities of the Company at a price per share equal to the fair value of such common equity securities as determined by the Board of Directors. The debt is fully settled upon conversion into equity securities of the Company.

The promissory notes with FoxKiser bear interest at below-market rates. Accordingly, the Company imputed interest on the promissory notes and recorded a discount equal to the difference between the face value of the promissory notes and the present value of the notes at an estimated market rate of 15 percent. The aggregate discount of $128 on the promissory notes was amortized using the effective interest method through December 31, 2014, at which date the notes became payable upon demand by FoxKiser. The discount was recorded as additional paid-in capital from FoxKiser due to the related party nature of the borrowing arrangements. Amortization of the discount is recorded as interest expense in the statements of operations and comprehensive loss. As of December 31, 2014, the promissory notes had an outstanding principal of $2,400, and accrued interest of $3.

The Company evaluated the embedded features of each of its debt instruments under ASC 815. The Company has concluded that the redemption features, including all put and call features, with the exception of settlement upon a liquidation or change in control as discussed further below, are clearly and closely related to the debt host instruments and, therefore, are not considered embedded derivatives that require bifurcation. Additionally, the Company concluded that the share settlement rights of the debt instruments do not require bifurcation as embedded derivatives because in the event of a settlement in shares, the debt is settled in a variable number of equity securities with an aggregate fair value equaling the debt principal outstanding on the debt host instruments.

Pursuant to the terms of the Initial Conversion Agreement, Second Conversion Agreement and each of the promissory notes with FoxKiser, in the event of a liquidation or change in control, as defined in the agreements, the Company shall pay two times (2x) the principal and accrued interest then outstanding in order to settle the debt. The Company evaluated this redemption feature in accordance with ASC 815 and determined that it is an embedded derivative that should be bifurcated from each of the debt host instruments. However, due to the low probability of a liquidation or change in control event, the Company has determined that the liability associated with this derivative instrument is de minimis as of December 31, 2014. As discussed below, upon the conversion of the debt instruments into Series C Convertible Preferred Stock in January 2015, this redemption feature is no longer outstanding.

On January 13, 2015, in conjunction with the Company’s issuance of Series C Preferred Stock (Note 8), FoxKiser elected its share settlement options and converted $1,389 of the amount due under the services agreement and $2,403 of principal and interest due under the promissory notes, for a total of $3,792, into 585 shares of Series C Preferred Stock at a per share price of $6.477. The promissory notes were settled in full upon the conversion, and the Company terminated the services agreement with FoxKiser and paid the remainder of the outstanding service fees in full. As of December 31, 2015, no amounts were outstanding under the services agreement or promissory notes with FoxKiser.

Interest expense to FoxKiser under the services agreement and promissory notes, inclusive of imputed interest, for the years ended December 31, 2015, 2014 and 2013 was $20, $321 and $611, respectively.

7. Commitments and Contingencies

Lease Agreements

The Company recognizes rent expense on a straight-line basis over the term of its operating leases commencing on the date the Company takes possession of the leased property. Tenant improvement allowances which are considered to be lease incentives from the lessor are recorded as deferred rent and amortized as a reduction of rent expense over the term of the lease from the possession date.

In January 2015, the services agreement with FoxKiser (Note 13) was terminated and the Company entered into an operating lease with FoxKiser for office space in Washington, D.C. The lease agreement, which had a month-to-month term, required monthly payments of $20. The lease was terminated in April 2015.

In March 2015, the Company entered into a 5.5-year, non-cancelable operating lease for office space in Rockville, Maryland. The lease commenced in April 2015, and expires in September 2020. The Company has options to extend the lease for up to 6 years. Initial monthly payments required under the lease were $24 beginning in October 2015 and escalate annually in accordance with the lease.

In September 2015, and again in October 2015, the Company amended its operating lease in Rockville, Maryland to include additional office and laboratory space and extend the term of the lease for its existing space to October 2020. The lease for the

additional space is expected to commence in April 2016, and has a 5-year term. The Company has options to extend the lease for the additional space to be coterminous with the Company's existing lease at that facility. Initial monthly payments required under the lease for the additional space are $41 and escalate annually in accordance with the lease. The Company received a $286 tenant improvement allowance from the landlord which will be deferred and amortized on a straight-line basis as a reduction of rent expense over the term of lease.

The Company has entered into various short-term operating leases for office and laboratory space in Bethesda, Maryland and Philadelphia, Pennsylvania, which expire at various dates through June 2016.

As of December 31, 2015, future minimum lease payments under non-cancelable operating leases are as follows:

	Operating Leases
2016	$ 777
2017	824
2018	848
2019	874
2020	832
Thereafter	144
Total minimum lease payments	$ 4,299

Rent expense under all operating leases, including additional rent charges for utilities, parking, property management, operating expenses and real estate taxes for the years ended December 31, 2015, 2014 and 2013 was $396, $45 and $45, respectively.

In January 2016, the Company entered into a non-cancelable operating lease for additional office space in Rockville, Maryland. The lease is expected to commence by March 2016, and has term of approximately 7.5 years. Initial monthly payments required under the lease are $38 beginning seven months from the commencement date and escalate annually in accordance with the lease. The Company received a $725 tenant improvement allowance from the landlord which, if used by the Company, will be deferred and amortized on a straight-line basis as a reduction of rent expense over the term of lease.

Licenses Granted to the Company

Licenses granted to the Company may require the Company to make future payments relating to sublicense fees, milestone fees for milestones not met as of December 31, 2015 and royalties on future sales of licensed products. Additionally, the Company may be responsible for the cost of the maintenance of the intellectual property as incurred by its licensors. Up-front fees to obtain licensed technology are included in research and development expenses and patent maintenance costs are included in general and administrative expenses in the statements of operations and comprehensive loss. Sublicense fees are based on a specified percentage of license fees earned by the Company and are included in licensing costs in the statements of operations and comprehensive loss. Royalties on sales of licensed reagents for use in research and development are included in costs of reagent sales in the statements of operations and comprehensive loss. The Company has not commercialized any product candidates or paid any royalties under these agreements other than for the sales of licensed reagents.

The Trustees of the University of Pennsylvania. On February 20, 2009, the Company entered into a license agreement, as amended, with The Trustees of the University of Pennsylvania (Penn) for exclusive, worldwide rights to certain patents owned by Penn underlying the Company's NAV® Technology platform. Under the terms of the agreement, in consideration for the license, the Company issued to Penn 24.5 percent of the then outstanding membership interest in the LLC on a fully diluted basis after issuance. The Company is obligated to pay Penn royalties on net sales and sublicense fees, if any. Additionally, the Company is obligated to reimburse Penn for certain costs incurred related to the maintenance of the licensed patents.

Expenses incurred by the Company related to its license from Penn were as follows:

	Years Ended December 31,		
	2015	2014	2013
Sublicense fees	$703	$443	$76
Royalties on sales of reagents	9	17	18
Maintenance of licensed patents	154	256	120
	$866	$716	$214

As of December 31, 2015 and 2014, the Company had accrued $440 and $305, respectively, in expenses payable to Penn under the license agreement. As of December 31, 2015, these amounts are included in accounts payable and accrued expenses and as of December 31, 2014, these amounts are included in other related party payables on the Company's balance sheets. Until September 30, 2015, the Company considered Penn to be a related party. For the nine months ended September 30, 2015, the Company incurred $264, $8 and $118 in expenses for sublicense fees, royalties on reagent sales and reimbursement of patent maintenance costs, respectively, under its license from Penn. See Note 13 for further information on related party transactions with Penn.

GlaxoSmithKline LLC. On March 6, 2009, the Company entered into a license agreement, as amended, with GlaxoSmithKline LLC (GSK) for exclusive, worldwide rights to certain patents underlying the Company's NAV® Technology platform which are owned by Penn and exclusively licensed to GSK. Under the terms of the agreement, in consideration for the license the Company issued to GSK 19.9 percent of then outstanding membership interest in the LLC on a fully diluted basis after issuance. The Company is obligated to pay GSK royalties on net sales and sublicense fees, if any. Additionally, the Company is obligated to reimburse GSK for certain costs incurred and invoiced to the Company related to the maintenance of the licensed patents. The Company is obligated to pay GSK up to $1,500 upon the achievement of various milestones. As of December 31, 2015, no milestones have been achieved and accordingly no milestone payments were payable to GSK.

Expenses incurred by the Company related to its license from GSK were as follows:

	Years Ended December 31,		
	2015	2014	2013
Sublicense fees	$703	$443	$76
Royalties on sales of reagents	5	10	11
Maintenance of licensed patents	573	432	455
	$1,281	$885	$542

As of December 31, 2015 and 2014, the Company had accrued $526 and $2,028, respectively, in expenses payable to GSK under the license agreement. As of December 31, 2015, these amounts are included in accounts payable and accrued expenses and as of December 31, 2014, these amounts are included in other related party payables on the Company's balance sheets. Until September 30, 2015, the Company considered GSK to be a related party. For the nine months ended September 30, 2015, the Company incurred $264, $5 and $474 in expenses for sublicense fees, royalties on reagent sales and reimbursement of patent maintenance costs, respectively, under its license from GSK. See Note 13 for further information on related party transactions with GSK.

ARIAD Pharmaceuticals, Inc. On November 19, 2010, the Company entered into a license agreement with ARIAD Pharmaceuticals, Inc. (ARIAD), for exclusive, worldwide rights to certain patents owned and exclusively licensed by ARIAD. In consideration for the license, the Company issued Class A Units to ARIAD with a fair value of $726. Under the terms of the agreement, the Company is obligated to pay ARIAD royalties on net sales, and sublicense fees, if any. Additionally, the Company is obligated to pay ARIAD up to $2,300 and annual maintenance fees of $50 upon the achievement of various milestones. As of December 31, 2015, no milestones have been achieved and accordingly no milestone payments or maintenance fees were payable to ARIAD. Additionally, the Company has not incurred any royalties or sublicense fees payable to ARIAD since the inception of the agreement. The Company had no amounts due to ARIAD under the agreement as of December 31, 2015 and 2014.

Regents of the University of Minnesota. On November 10, 2014, the Company entered into a license agreement with Regents of the University of Minnesota (Minnesota), for an exclusive license under certain patent rights to commercialize products covered by the licensed patent rights in any country or territory in which a licensed patent has been issued and is unexpired, or a licensed patent application is pending. In consideration for the license, the Company paid an up-front fee of $25 and reimbursed Minnesota for patent maintenance expenses of $9. Under the terms of the agreement, the Company is obligated to pay Minnesota annual maintenance fees between $5 and $15 per year on each anniversary date of the agreement. Additionally, the Company is obligated to pay royalties on net sales and sublicense fees, if any, and up to $125 per licensed product upon the achievement of various milestones. As of December 31, 2015 and 2014, no milestones have been achieved and accordingly no milestone payments were payable to Minnesota. Additionally, the Company has not incurred any royalties or sublicense fees payable to Minnesota since the inception of the agreement. The Company had no amounts due to Minnesota under the agreement as of December 31, 2015 and 2014.

Guarantees and Indemnifications

In the normal course of business, the Company enters into agreements that contain a variety of representations and provide for general indemnification. The Company’s exposure under these agreements is unknown because it involves claims that may be made against the Company in the future. To date, the Company has not paid any claims or been required to defend any action related to its

indemnification obligations. As of December 31, 2015 and 2014, the Company did not have any material indemnification claims that were probable or reasonably possible and consequently has not recorded any related liabilities.

8. Capitalization

In connection with the IPO, which closed on September 22, 2015, all of the outstanding shares of the Company's convertible preferred stock were converted into 16,298 shares of its common stock. As of December 31, 2015, the authorized capital stock of the Company included 100,000 shares of common stock, par value $0.0001 per share, and 10,000 shares of preferred stock, par value $0.0001 per share. The Company's restated certificate of incorporation and bylaws, which were adopted in connection with the IPO, contain the rights, preferences and privileges of the Company's stockholders and their respective shares.

As of December 31, 2014, the authorized capital stock of the Company included 9,500 shares of common stock, par value $0.0001 per share, and 4,299 shares of preferred stock, par value $0.0001 per share. The Company's authorized preferred stock included 2,393 shares designated as Series A Preferred Stock and 1,906 shares designated as Series B Preferred Stock.

Preferred Units

On December 31, 2010, the Company issued 119,656 Series A Preferred Units at a per unit price of $0.0251 for aggregate proceeds of $3,000. On October 30, 2013, the Company issued 95,315 Series B Preferred Units at a per unit price of $0.082798 for an aggregate amount of $7,857, net of issuance costs of $35. The aggregate purchase price of $7,857 included $1,965 of net cash proceeds from new investors and the conversion $5,892 of debt under the Initial Conversion Agreement (Note 6) with FoxKiser. The Series A Preferred Units and Series B Preferred Units are herein collectively referred to as "Preferred Units."

Holders of the Preferred Units were entitled to a pre-tax cumulative internal rate of return of 8 percent per annum, compounding annually (the Preferred Return). Subsequent to the issuance of the Series B Preferred Units, Preferred Units were redeemable by the holder upon the majority vote of all Preferred Unit holders on a per unit basis on or after October 30, 2018. The redemption price of the Preferred Units was equal to the original issue price of each unit held plus any amounts due under the Preferred Return on the redemption date.

Conversion to C-corporation

On September 16, 2014, the Company converted from an LLC to a C-corporation. Upon the conversion, Preferred Units were subject to a 50-to-1 reverse unit split, and converted into Series A Preferred Stock and Series B Preferred Stock of the Company. Specifically, the 119,656 Series A Preferred Units issued and outstanding on the conversion date were converted into 2,393 shares of Series A Preferred Stock, and the 95,315 Series B Preferred Units issued and outstanding on the conversion date were converted into 1,906 shares of Series B Preferred Stock.

Upon the conversion to a C-corporation and filing of the Company's certificate of incorporation on September 16, 2014, and as of December 31, 2014, rights, preferences and privileges of Series A Preferred Stock and Series B Preferred Stock consisted of the following:

Dividends. The holders of Series A Preferred Stock and Series B Preferred Stock were entitled to receive dividends, in preference to common stock, on a pro rata basis, at a dividend rate equal to $0.1003 and $0.331192 per annum for each share of Series A Preferred Stock and Series B Preferred stock, respectively. Dividends were cumulative and accrued on each share of Series A Preferred Stock and Series B Preferred Stock from the respective original date of issuance of each share. After payment dividends to holders of Series A Preferred Stock and Series B Preferred Stock, any additional dividends were to be made to the holders of Series A Preferred Stock, Series B Preferred Stock and common stock in proportion to the number of shares of common stock that would be held by each holder if all shares of Series A Preferred Stock and Series B Preferred Stock were converted to common stock at the then effective conversion rate. As of December 31, 2015 the Company has not declared or paid any dividends or operating distributions since its inception.

Liquidation Preference. In the event of a liquidation event, as defined below, either voluntary or involuntary, the holders of Series A Preferred Stock and Series B Preferred Stock had preference over common stock to any proceeds from liquidation at an amount equal to the original issuance price per share of Series A Preferred Stock and Series B Preferred Stock plus any accrued but unpaid dividends, whether declared or not, and any other declared but unpaid dividends. A liquidation event includes (i) the sale or disposition of substantially all of the Company’s assets or the exclusive license of substantially all of the Company’s intellectual property, (ii) a merger or consolidation in which the stockholders of the Company prior to the transaction no longer hold at least 50 percent of the voting power of the merged or consolidated entity, (iii) a transaction, or series of transactions, which results in a single

party, or group of affiliated entities representing a single party, owning 50 percent of more the Company's equity securities or (iv) a liquidation, dissolution, or winding up of the Company. For purposes of the liquidation preference, the original issuance price of Series A Preferred Stock and Series B Preferred Stock was $1.255 and $4.1399 per share, respectively. If proceeds from the liquidation event were insufficient to pay the entire liquidation preference to holders of Series A Preferred Stock and Series B Preferred Stock, then the proceeds were to be distributed ratably among the holders of Series A Preferred Stock and Series B Preferred Stock in proportion to the total preferential amount each holder was entitled to under the liquidation preference. Upon full payment of the liquidation preference, any remaining proceeds were to be distributed among the holders of Series A Preferred Stock and Series B Preferred Stock and common stock pro rata based on the number of shares of common stock, assuming full conversion of all Series A Preferred Stock and Series B Preferred Stock into common stock, held by each holder. For purposes of determining the amount each holder of Preferred Stock was entitled to receive with respect to a liquidation event, holders of Series A Preferred Stock and Series B Preferred Stock were deemed to have their shares converted into shares of common stock immediately prior to the liquidation event if, as a result of an actual conversion, the holder would receive an aggregate amount greater than the amount that would be distributed if the holder's preferred shares had not been converted into common stock. If the holder was deemed to have converted shares of Series A Preferred Stock and Series B Preferred Stock into shares of common stock for purposes of the liquidation preference, then the holder was not entitled to receive any distribution that would be made to holders of preferred shares that were not converted.

Redemption. Series A Preferred Stock and Series B Preferred Stock was redeemable upon the majority vote of all Series A Preferred Stock and Series B Preferred Stock holders on a per share basis, after October 30, 2018. The redemption price of the Series A Preferred Stock and Series B Preferred Stock was equal to the original issue price of each share held plus all accrued but unpaid dividends, whether or not declared, and was to be paid in three annual installments beginning on the first redemption date. For purposes of the redemption price, the original issuance price of Series A Preferred Stock and Series B Preferred Stock was $1.255 and $4.1399 per share, respectively.

Conversion. Each share of Series A Preferred Stock and Series B Preferred Stock was convertible at the option of the holder at any point in time into fully paid and non-assessable shares of common stock. Upon conversion, the Series A Preferred Stock and Series B Preferred Stock would be fully settled. Each share of Series A Preferred Stock and Series B Preferred Stock was convertible into that number of shares of common stock as determined by dividing the original issuance price of such share by the applicable conversion price. For purposes of determining the conversion rate, the original issuance price of Series A Preferred Stock and Series B Preferred Stock was $1.255 and $4.1399 per share, respectively. As of December 31, 2014, the conversion rate was 1:1, but was subject to future adjustments to the conversion price upon the occurrence of certain events including (i) certain future issuances of common stock at a price less than the conversion price in effect on the date of such issuance, and (ii) future stock splits, subdivisions or combinations of outstanding common stock.

Each share of Series A Preferred Stock and Series B Preferred Stock would automatically convert into shares of common stock at the applicable conversion rate upon (i) a qualified public offering, as defined in the Certificate of Incorporation, at a per share price no less than $20.6995 per share (as adjusted for any stock splits, stock dividends, combinations, subdivisions, recapitalizations or the like) and $50,000 in aggregate gross proceeds, prior to deduction of underwriting discounts and commissions, or (ii) the majority vote of the holders of Series A Preferred Stock and Series B Preferred Stock on a per share and as-converted to common stock basis.

Voting. The holders of each share of Series A Preferred Stock and Series B Preferred Stock had the right to one vote for each share of common stock into which the shares could then be converted. Holders of Series A Preferred Stock and Series B Preferred Stock had full voting rights and powers equal to those of common stock holders. As long as shares of Series A Preferred Stock remained outstanding, the holders of Series A Preferred Stock, voting as a separate class, were entitled to elect three directors to the Board of Directors. As long as shares of Series B Preferred Stock

remained outstanding, the holders of Series B Preferred Stock, voting as a separate class, were entitled to elect one director to the Board of Directors. The holders of outstanding common stock, voting as a separate class, were entitled to elect one director to the Board of Directors. The holders of Preferred Stock and common stock, voting together as a single class on an as-converted basis for Preferred Stock, were entitled to elect any remaining directors of the Company.

The Company evaluated the conversion of Series A Preferred Units and Series B Preferred Units into Series A Preferred Stock and Series B Preferred Stock, respectively, giving consideration to all changes in the rights, preferences and privileges of each class of securities. As a result of the conversion, holders of previously issued preferred units were given a conversion option to convert their newly issued preferred stock into common stock. Additionally, dividends on the newly issued preferred shares were no longer compounded annually as they were under the Preferred Return, which decreased the liquidation and redemption values of the securities. Management determined that the changes to these rights, privileges and preferences should be accounted for as a modification of the securities.

Issuance of Series C Preferred Stock

On January 13, 2015, the Company completed the issuance and sale of 4,632 shares of Series C Preferred Stock, par value $0.0001 per share, at a per share price of $6.477 for aggregate gross proceeds of $30,000. The aggregate purchase price of $30,000 included $26,021 of cash proceeds, net of issuance costs of $187, and the conversion of $3,792 of debt as discussed in Note 6.

Extinguishment of Preferred Stock

In connection with the issuance of the Series C Preferred Stock in January 2015, the rights, preferences and privileges of Series A Preferred Stock and Series B Preferred Stock then outstanding were modified. More specifically, Series C Preferred Stock received preference in dividends and liquidation proceeds over Series A Preferred Stock and Series B Preferred Stock. Additionally, the dividend rights changed from cumulative dividend rights to non-cumulative dividend rights, and all accrued but unpaid cumulative dividends on the Series A Preferred Stock and Series B Preferred Stock as of January 13, 2015 were forfeited. As a result of this modification, the redemption value and liquidation preferences of Series A Preferred Stock and Series B Preferred Stock, which were previously equal to original issue price plus accrued but unpaid cumulative dividends, were reduced to original issue price plus non-cumulative dividends declared. Additionally, the redemption date of Series A Preferred Stock and Series B Preferred Stock was changed from October 30, 2018 to December 31, 2019.

The Company has accounted for the amendment to the rights, preferences and privileges of the Series A Preferred Stock and Series B Preferred Stock as an extinguishment of the original convertible preferred stock and issuance of new convertible preferred stock due to the significance of the modifications to the substantive contractual terms of the convertible preferred stock and the associated fundamental changes to the nature of the convertible preferred stock. Accordingly, upon extinguishment the Company recorded a loss of $1,317 on the Series A Preferred Stock and a gain of $2,076 on the Series B Preferred Stock within stockholders' equity (deficit) equal to the difference between the fair value of the new shares of preferred stock issued and the carrying amount of the old shares of preferred stock extinguished. The Company allocated the entire net gain on extinguishment of convertible preferred stock of $759 to additional paid-in capital. The net gain on extinguishment is reflected in the calculation of net loss available to common stockholders in accordance with FASB ASC Topic 260, Earnings per Share. The fair value of the Series A Preferred Stock and Series B Preferred Stock was determined using the option-pricing method (OPM) back-solve method on the per share price of Series C Preferred Stock to estimate aggregate equity value. The OPM was used to allocate equity value to the Series A Preferred Stock and Series B Preferred stock using the Black-Scholes option-pricing model.

Issuance of Series D Preferred Stock

On May 15, 2015, the Company completed the sale and issuance of 7,367 shares of Series D Preferred Stock, par value $0.0001 per share, at a per share price of $9.5699 for proceeds of $67,998, net of issuance costs of $2,502.

In connection with the issuance of the Series D Preferred Stock, the Company amended and restated its certificate of incorporation. Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock and Series D Preferred Stock are herein collectively referred to as Preferred Stock. Under the amended and restated certificate of incorporation in effect prior to the IPO, the rights, preferences and privileges of Preferred Stock consisted of the following:

Dividends. The holders of Series D Preferred Stock were entitled to receive dividends, in preference to Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock and common stock when and if declared by the Company's Board of Directors. After payment of dividends to holders of Series D Preferred Stock, holders of Series C

Preferred Stock were entitled to receive dividends in preference to Series A Preferred Stock, Series B Preferred Stock and common stock. After payment of dividends to holders of Series C Preferred Stock, holders of Series A Preferred Stock and Series B Preferred Stock were entitled to receive dividends in preference to common stock. Dividends to holders of Preferred Stock were non-cumulative and had a dividend rate equal to $0.1003, $0.331192, $0.51816 and $0.765592 per annum for each share of Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock and Series D Preferred Stock, respectively. After payment of dividends to holders of Preferred Stock, any additional dividends were to be made to the holders of Preferred Stock and common stock in proportion to the number of shares of common stock that would be held by each holder if all shares of Preferred Stock were converted to common stock at the then effective conversion rate.

Liquidation Preference. In the event of a liquidation event, as defined below, either voluntary or involuntary, the holders of Series D Preferred Stock had preference over Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock and common stock to any proceeds from liquidation. Upon payment of the liquidation preference to holders of Series D Preferred Stock, holders of Series C Preferred Stock had preference in liquidation proceeds over holders of Series A Preferred Stock, Series B Preferred Stock and common stock. Upon payment of the liquidation preference to holders of Series C Preferred Stock, holders of Series A Preferred Stock and Series B Preferred Stock had preference in liquidation proceeds over holders of common stock.

Liquidation preferences of Preferred Stock were at an amount equal to the original issuance price per share of Preferred Stock plus any accrued but unpaid dividends, whether declared or not, and any other declared but unpaid dividends. A liquidation event included (i) the sale or disposition of substantially all of the Company's assets or the exclusive license of substantially all of the Company's intellectual property, (ii) a merger or consolidation in which the stockholders of the Company prior to the transaction no longer hold at least 50 percent of the voting power of the merged or consolidated entity, (iii) a transaction, or series of transactions, which results in a single party, or group of affiliated entities representing a single party, owning 50 percent or more of the Company's equity securities, or (iv) a liquidation, dissolution, or winding up of the Company. For purposes of the liquidation preference, the original issuance price of Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock and Series D Preferred Stock was $1.255, $4.1399, $6.477 and $9.5699 per share, respectively. If proceeds from the liquidation event were insufficient to pay the entire liquidation preference to holders of any series of Preferred Stock, then the proceeds were to be distributed ratably among the holders of that series of Preferred Stock in proportion to the total preferential amount each holder is entitled to under the liquidation preference. Upon full payment of the liquidation preference, any remaining proceeds were to be distributed among the holders of Preferred Stock and common stock pro rata based on the number of shares of common stock, assuming full conversion of all Preferred Stock into common stock, held by each holder. For purposes of determining the amount each holder of Preferred Stock was entitled to receive with respect to a liquidation event, holders of Preferred Stock were deemed to have their shares of Preferred Stock converted into shares of common stock immediately prior to the liquidation event if, as a result of an actual conversion, the holder would receive an aggregate amount greater than the amount that would be distributed if the holder's Preferred Shares had not been converted into common stock. If the holder was deemed to have converted shares of Preferred Stock into shares of common stock for purposes of the liquidation preference, then the holder was not entitled to receive any distribution that would be made to holders of Preferred Stock that were not converted.

Redemption. All series of Preferred Stock were redeemable upon the majority vote of all Preferred Stock holders on a per share basis, after December 31, 2019. The redemption price of the Preferred Stock was equal to the original issue price of each share held plus all accrued but unpaid dividends, whether or not declared, and was to be paid in three annual installments beginning on the first redemption date. For purposes of the redemption price, the original issuance price of Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock and Series D Preferred Stock was $1.255, $4.1399, $6.477 and $9.5699 per share, respectively.

Conversion. Each share of Preferred Stock was convertible at the option of the holder at any point in time into fully paid and non-assessable shares of common stock. Upon conversion, the Preferred Stock would be fully settled. Each share of Preferred Stock was convertible into that number of shares of common stock as determined by dividing the original issuance price of such share by the applicable conversion price. For purposes of determining the conversion rate, the original issuance price of Series A Preferred Stock, Series B Preferred Stock, Series C Preferred Stock and Series D Preferred Stock was $1.255, $4.1399, $6.477 and $9.5699 per share, respectively. Initially, the conversion rate was 1:1 for each series of Preferred Stock, but was subject to future adjustments to the conversion price upon the occurrence of certain events including (i) certain future issuances of common stock at a price less than the conversion price in effect on the date of such issuance and (ii) future stock splits, subdivisions, or combinations of outstanding common stock.

Each share of Preferred Stock was to automatically convert into shares of common stock at the applicable conversion rate upon (i) a qualified public offering, as defined in the Company's amended and restated certificate of incorporation, of at least $40,000 in aggregate gross proceeds, prior to deduction of underwriting discounts and commissions, or (ii) the majority vote of the holders of Preferred Stock on a per share and as-converted to common stock basis.

Voting. The holders of each share of Preferred Stock had the right to one vote for each share of common stock into which the Preferred Stock could then be converted. Holders of Preferred Stock had full voting rights and powers equal to those of common stockholders.

As long as shares of Series A Preferred Stock remained outstanding, the holders of Series A Preferred Stock, voting as a separate class, were entitled to elect three directors to the Board of Directors. As long as shares of Series B Preferred Stock remained outstanding, the holders of Series B Preferred Stock, voting as a separate class, were entitled to elect one director to the Board of Directors. As long as shares of Series C Preferred Stock remained outstanding, the holders of Series C Preferred Stock, voting as a separate class, were entitled to elect one director to the Board of Directors. As long as shares of Series D Preferred Stock remained outstanding, the holders of Series D Preferred Stock, voting as a separate class, were entitled to elect one director to the Board of Directors. The holders of outstanding common stock, voting as a separate class, were entitled to elect one director to the Board of Directors. The holders of Preferred Stock and common stock, voting together as a single class on an as-converted basis for Preferred Stock, were entitled to elect any remaining directors of the Company.

Prior to the closing of the IPO on September 22, 2015, all of the outstanding shares of the Company's Preferred Stock were converted into 16,298 shares of its common stock. As of December 31, 2015, the Company did not have any preferred equity securities (including Preferred Stock) issued or outstanding.

Common Stock, Class A Units and Class B Units

Class A Units. The Company's authorized Class A Units were initially issued for the contributions of the various members, which included capital, services and intellectual property. Additionally, certain members received Class A Units in accordance with anti-dilution provisions in the Company's LLC agreement. In conjunction with the October 30, 2013 issuance of Series B Preferred Units, certain holders of Class A Units received an aggregate of 19,476 additional Class A Units as a result of the anti-dilution provisions. Upon the completion of the Series B Preferred Units issuance, all anti-dilution provisions had been fully utilized and were no longer outstanding.

Upon the Company's conversion from an LLC to a C-corporation on September 16, 2014, the 132,148 of then issued and outstanding Class A Units were subject to a 50-to-1 reverse unit split, and converted into 2,643 shares of common stock.

Class B Units. In December 2009, the Company entered into the 2009 Equity Incentive Plan. Under the 2009 Equity Incentive Plan, which was administered by the Board of Managers, the Company was authorized to grant Class B Units. Class B Units were designed to provide equity incentive compensation to managers, employees, advisory board members and consultants of the Company, with such terms and conditions including vesting and forfeiture determined by the Board of Managers in its sole discretion. The Class B Units represented a profits interest in the Company as that term is defined in the Internal Revenue Code. The holders of Class B Units had no voting power and were only eligible for distributions resulting from a qualified liquidity event of the Company, as defined by the LLC agreement, and if the proceeds from such event exceed a fixed distribution threshold per unit. Distribution thresholds were determined by the Board of Managers for each Class B Unit awarded. In the case of a qualified public offering, as defined in the 2009 Equity Incentive Plan, the Class B Units would convert into shares of restricted common stock and continue to vest in accordance with each award agreement. The Class B Units were non-transferable and upon termination of service, the Company had the option to purchase all vested units from the award holder. The Company did not repurchase any Class B Units.

As of December 31, 2013, the Company had authorized up to 24,500 Class B Units for issuance, 22,828 of which were issued and subject to vesting conditions set forth in each Class B Unit award. Upon the Company's conversion from an LLC to a C-corporation on September 16, 2014, all outstanding Class B Units were terminated along with the 2009 Equity Incentive Plan, and the Company executed the 2014 Stock Plan and granted stock options. Please refer to Note 10 for further information regarding the 2014 Stock Plan.

Management evaluated the Class B Unit awards and determined that they should be accounted for as a share-based payments in accordance with ASC 718. However, since no distribution is to be made to Class B Unit holders unless a qualified liquidity event occurs, management has determined that the awards are subject to both a service condition (vesting period) and a performance condition (qualified liquidity event). Additionally, the awards only convert into restricted common stock upon the event of a qualified public offering. Management did not consider a qualified liquidity event or public offering to be probable at any point during the outstanding terms of the Class B Units, and accordingly, no compensation expense was recorded in connection with the awards.

The Company accounted for the termination of the Class B Units and simultaneous grant of stock options under the 2014 Stock Plan as a modification to share-based payments under ASC 718. Since the performance conditions under the Class B Unit awards were deemed improbable of achievement, no incremental compensation cost from the modification was recognized. Please refer to Note 10 for information on stock-based compensation expense regarding stock options issued by the Company.

Common stock. As of December 31, 2014 and prior to the closing of the Company's IPO on September 22, 2015, the dividend, liquidation and voting rights of the Company's common stockholders were subject to, and qualified by, the

rights, preferences and privileges of the holders of the outstanding Preferred Stock.

The Company's reserved shares of common stock for future issuance are as follows:

	December 31,	
	2015	2014
Series A convertible preferred stock	—	2,393
Series B convertible preferred stock	—	1,906
Reserved for issuance under equity incentive plans	5,998	2,500
Reserved for issuance under employee stock purchase plan	254	—
Debt with share settlement option (Note 6)	—	3,715
	6,252	10,514

9. Significant Agreements

Please refer to Note 13 for significant agreements with related parties and Note 7 for licenses granted to the Company.

Licenses Granted by the Company

The Company has granted a number of intellectual property licenses to other biotechnology and pharmaceutical companies. The terms of the licenses vary, however licenses may be exclusive or non-exclusive and may be sublicensable by the licensee. Licenses may grant intellectual property rights for purposes of internal and preclinical research and development only, or may include the rights, or options to obtain future rights, to commercialize drug therapies for specific diseases using the Company's NAV® Technology. License agreements generally have a term equal to the life of the underlying patents and are terminable only at the option of the licensee. License agreements may require licensees to pay non-refundable up-front fees, option fees and annual maintenance fees. Additional contingent consideration under the licenses may include sublicense fees, milestone fees and royalties on net sales of commercialized products. Sublicense fees vary by license and range from a mid-single digit percentage to a low-double digit percentage of license fees received by licensees as a result of sublicenses. Royalties on net sales of commercialized products vary by license and range from a mid-single digit percentage to a low-teen percentage of net sales by licensees.

In July 2013, the Company granted an exclusive commercial license to Audentes. The license required an up-front fee of $600, $300 of which was payable in cash and the remainder in common stock of Audentes. As discussed in Note 2, the investment in Audentes is accounted for under the cost method. The carrying value of the equity investment in Audentes was $300 at December 31, 2015 and 2014, and is included in cost method investments on the balance sheets.

Milestone fees are payable to the Company upon the achievement of specific clinical and regulatory developments by licensees. As of December 31, 2015, the Company's license agreements, excluding additional licenses that could be granted upon the exercise of options by licensees, could result in aggregate milestone fees payable to the Company of up to $500 upon the submission of preclinical regulatory filings, $16,650 upon the commencement of various stages of clinical trials, $28,000 upon the submission of regulatory approval filings, $73,500 upon the approval of commercial products by regulatory agencies and $47,000 upon the achievement of specified sales targets for licensed products.

License revenue, including amounts from related parties, consists of the following:

	Years Ended December 31,		
	2015	2014	2013
Up-front fees and option fees for commercial licenses	$5,900	$4,000	$3,400
Milestone fees for commercial licenses	250	—	—
Maintenance fees for commercial licenses	635	385	200
Research and other license revenue	240	190	155
	$7,025	$4,575	$3,755

Grant Programs

MeuSIX. In December 2012, as part of a consortium of research and development entities called MeuSIX, the Company was awarded a long-term grant by the European Commission's Seventh Framework Program, to perform preclinical and clinical research and development services for the treatment of MPS VI, a severe lysosomal storage disorder. Under the grant agreement, the Company is reimbursed by the grantor for 75 percent of qualified research and development costs, up to approximately €2,273 (approximately $2,859 based on the average conversion rate for the grant period to date through December 31, 2015) of such costs over the five year grant period. Funds received under the grant are subject to refund in the case of non-compliance with the provisions of the grant, which include, but are not limited to, the eligibility of costs, calculation of personnel rates, selection of subcontractors, and other provisions. As of December 31, 2015, the Company is in compliance with all provisions of the grants and no refunds are payable to the grantor. During the years ended December 31, 2015, 2014 and 2013, the Company incurred $912, $1,109 and $882, respectively, of research and development expenses under the grant program. The Company recorded grant revenue of $258, $832 and $661 related to the grant program for the years ended December 31, 2015, 2014 and 2013, respectively. As of December 31, 2015 and 2014, the Company had $534 and $865, respectively, of accounts receivable under the grant program, of which $0 and $320, respectively, is included in unbilled receivables on the balance sheets.

Federal Grants. The Company has received grant awards from agencies of the U.S. federal government to support critical research and development projects for the Company. In 2010, the Company was awarded two grants from the National Institute of Health (NIH) in amounts totaling $3,063. In 2012, the Company was awarded two additional grants from the NIH totaling $515. In 2013, the Company was awarded an additional grant from the NIH totaling $261. Funds received under the grants are subject to

refund in the case of non-compliance with the provisions of the grant, which include, but are not limited to, the eligibility of costs, calculation of personnel rates, selection of subcontractors, and other provisions. As of December 31, 2015, the Company is in compliance with all provisions of the grants and no refunds are payable to the grantor. As a result of the NIH grants, the Company has recorded revenue from reimbursement of qualified research and development costs of $46, $387 and $1,303 for the years ended December 31, 2015, 2014 and 2013, respectively. As of December 31, 2014 the Company had $51 of accounts receivable under the NIH grants. As of January 2015, all NIH grants were completed and the Company has no amounts receivable under the grants as of December 31, 2015.

10. Stock-based Compensation

Equity Incentive Plans

In September 2014, the Board of Directors adopted the 2014 Stock Plan (2014 Plan). As of December 31, 2014, the number of shares of common stock authorized for issuance under the 2014 Plan was 2,500.

In June 2015, the Company's Board of Directors adopted the 2015 Equity Incentive Plan (2015 Plan), which became effective on September 16, 2015, the date on which the registration statement for the IPO was declared effective. The 2015 Plan replaced the 2014 Plan, and as of the effective date of the 2015 Plan, no further awards may be issued under the 2014 Plan. Any options or awards outstanding under the 2014 Plan at the effective date of the 2015 Plan remained outstanding and effective. The initial amount of shares authorized for issuance under the 2015 Plan was 2,952. The number of authorized shares under the 2015 Plan automatically increases annually on January 1, beginning January 1, 2016, by the lesser of (i) 4% of the total number of shares of common stock outstanding on December 31 of the prior year, or (ii) a number of common shares determined by the Board of Directors. As of December 31, 2015, the total number of shares of common stock authorized for issuance under the 2015 Plan and 2014 Plan is 6,125, of which 2,314 remain available for future grants under the 2015 Plan.

The 2014 Plan and 2015 Plan provide for the issuance of stock options, stock appreciation rights, restricted and unrestricted stock awards and performance cash awards to employees, members of the Board of Directors and consultants of the Company. No stock appreciation rights, restricted or unrestricted stock awards or performance cash awards have been granted under the 2014 Plan and 2015 Plan, since the inception of the plans. Stock options under the 2014 Plan and 2015 Plan generally expire ten years following the date of grant. Options typically vest over a four year period, but vesting provisions can vary by award based on the discretion of the Board of Directors. Certain awards issued by the Company include performance conditions that must be achieved in order for vesting to occur. Stock options under the 2014 Plan and 2015 Plan carry an exercise price at least equal to the estimated fair value of the Company's common stock on the date of grant.

Shares of common stock underlying awards previously issued under the 2014 Plan and 2015 Plan which are reacquired by the Company, withheld by the Company in payment of the purchase price, exercise price or withholding taxes, expired, cancelled due to forfeiture or otherwise terminated other than by exercise, are added to the number of shares of common stock available for issuance under the 2015 Plan. Shares available for issuance under the 2015 Plan may be authorized but unissued shares of the Company's common stock or common stock reacquired by the Company and held in treasury. The 2015 Plan expires in June 2025, ten years from the date it was adopted by the Board of Directors, unless earlier terminated.

The following table summarizes stock option activity under the Company's equity incentive plans:

	Shares	Weighted-average Exercise Price	Weighted-average Remaining Contractual Life (Years)	Aggregate Intrinsic Value (a)
Outstanding at December 31, 2013	—	$ —	—	$ —
Granted	2,132	$ 0.85		
Exercised	(2)	$ 0.85		
Cancelled or forfeited	(23)	$ 0.85		
Outstanding at December 31, 2014	2,107	$ 0.85	9.8	$ 379
Granted	1,727	$ 10.80		
Exercised	(125)	$ 0.85		
Cancelled or forfeited	(25)	$ 1.19		
Outstanding at December 31, 2015	3,684	$ 5.52	9.1	$ 44,472
Exercisable at December 31, 2015	1,328	$ 1.45	8.8	$ 20,194
Vested and expected to vest at December 31, 2015	3,684	$ 5.52	9.1	$ 44,472

(a) 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 at the dates reported.

The weighted-average grant date fair value per share of options granted during the years ended December 31, 2015 and 2014 was $7.08 and $0.51, respectively. The weighted-average grant date fair value per share of options vested during the years ended December 31, 2015 and 2014 was $1.10 and $0.51, respectively. During the years ended December 31, 2015 and 2014, the total number of stock options exercised was 125 and 2, respectively, resulting in total proceeds of $107 and $1, respectively. The total intrinsic value of options exercised during the years ended December 31, 2015 and 2014 was $525 and $0, respectively. There were no stock options granted prior to the year ended December 31, 2014.

Stock-based compensation expense relates solely to stock options granted under the 2014 Plan and 2015 Plan. The Company has recorded aggregate stock-based compensation expense related to the issuance of stock option awards to employees and non-employees in the statement of operations and comprehensive loss as follows:

	Years Ended December 31,	
	2015	2014
Research and development	$1,760	$60
General and administrative	1,161	259
	$2,921	$319

There were no stock options granted prior to the year ended December 31, 2014, and accordingly, no stock-based compensation expense was recorded for the year ended December 31, 2013.

Valuation of Common Stock. Prior to the Company's IPO, the Company estimated the fair value of its common stock underlying stock option awards at the grant date of the award. Valuation estimates were prepared by management in accordance with the framework of the American Institute of Certified Public Accountants Practice Aid, Valuation of Privately-Held-Company Equity Securities Issued as Compensation, as well as through independent third-party valuations and were approved by the Company's Board of Directors. Valuation estimates were based on a variety of factors including the Company's financial position and historical financial performance, the Company's stage of development, the valuations of comparable publicly traded companies, marketplace and macro-economic factors, the illiquid nature of the common stock, arm's-length sales of the Company's preferred equity securities, the effect of the rights, preferences and privileges of preferred shareholders and preferred unit holders and the prospects of a liquidity event, among others. After the completion of the Company's IPO in September 2015, the fair value of the common stock is based on the closing price of the common stock on the date of grant.

Stock Options Granted to Employees. For the years ended December 31, 2015 and 2014, the Company recorded $1,443 and $299, respectively, of stock-based compensation expense related to employees' stock options. The fair value of options granted to employees was estimated at the date of grant using the Black-Scholes valuation model with the following weighted-average assumptions:

	Years Ended December 31,	
	2015	2014
Expected volatility	68 %	64 %
Expected term (in years)	6.1	6.0
Risk-free interest rate	1.7 %	2.0 %
Expected dividend yield	0.0 %	0.0 %

As of December 31, 2015, there was $11,133 of unrecognized stock-based compensation expense related to employees' awards that is expected to be recognized over a weighted-average period of 3.48 years.

Stock Options Granted to Non-employees. Stock-based compensation expense related to stock options granted to non-employees is recognized as the stock options are earned. The Company believes that the estimated fair value of the stock options is more readily measurable than the fair value of the services rendered. For the years ended December 31, 2015 and 2014, the Company recorded $1,478 and $20, respectively, of stock-based compensation expense related to non-employees' stock options. The Company used the following weighted-average assumptions in estimating non-employees' stock-based compensation expense:

	Years Ended December 31,	
	2015	2014
Expected volatility	75 %	65 %
Expected term (in years)	9.5	9.9
Risk-free interest rate	2.1 %	2.4 %
Expected dividend yield	0.0 %	0.0 %

Employee Stock Purchase Plan

In June 2015, the Company's Board of Directors adopted the 2015 Employee Stock Purchase Plan (2015 ESPP), which became effective on September 16, 2015, the date on which the registration statement for the IPO was declared effective. The 2015 ESPP authorizes the initial issuance of up to a total of 254 shares of the Company's common stock to participating employees. The number of shares reserved for issuance under the 2015 ESPP automatically increases on the first business day of each fiscal year, commencing in 2016, by a number equal to the lesser of (i) 1% of the shares of common stock outstanding on the last business day of the prior fiscal year; or (ii) the number of shares determined by the Company's Board of Directors. Unless otherwise determined by the administrator of the 2015 ESPP, two offering periods of six months' duration will begin each year on January 1 and July 1. As of December 31, 2015, there was no activity under the 2015 ESPP.

11. Retirement Plan

In February 2015, the Company established a defined-contribution retirement plan under Section 401(k) of the Internal Revenue Code (the 401(k) Plan). The 401(k) Plan covers all employees who meet defined minimum age and service requirements, and allows participants to defer a portion of their annual compensation. The Company matches employee deferrals up to 5.75 percent of eligible compensation. For the year ended December 31, 2015, the Company contributed $184 in matching contributions to the 401(k) Plan. As of December 31, 2014, the Company did not sponsor any retirement plans.

12. Income Taxes

From inception through September 16, 2014, the Company was a Delaware LLC for federal and state income tax purposes, and therefore, all items of income or loss through September 16, 2014 flowed through to the members of the LLC. Effective September 16, 2014, the Company converted from an LLC to a C-corporation for federal and state income tax purposes. Prior to the conversion to a C-corporation, the Company did not record deferred tax assets or liabilities or have any net operating loss (NOL) carryforwards for federal income tax purposes. However, the Company had recorded a deferred tax asset for state income tax purposes, which consisted primarily of NOL carryforwards for state jurisdictions that did not recognize the Company’s LLC status.

Effective upon the conversion to a C-corporation, the Company became subject to income tax at the federal and state levels. Accordingly, as of December 31, 2015 and 2014 the Company recorded a deferred tax asset for federal and state income taxes.

As all of the Company's income is generated in the U.S., and attributable to the U.S. jurisdiction, there are no foreign income tax expenses for the years ended December 31, 2015, 2014 and 2013.

The Company did not record a current or deferred income tax expense or benefit for the years ended December 31, 2015, 2014 and 2013. Since the Company was an LLC for the year ended December 31, 2013, the Company was not subject to federal income tax. A reconciliation of income tax expense (benefit) computed at the statutory federal income tax rate of 34 percent to income tax expense (benefit) as reflected in the financial statements is as follows:

	Years Ended December 31,		
	2015	2014	2013
Federal income tax benefit at statutory rate	$(7,756)	$(1,089)	$—
State income tax benefit, net of federal benefit	(1,511)	(264)	(537)
Change in income tax rates upon conversion to C-corporation	—	427	—
Federal deferred tax assets upon conversion to C-corporation	—	(105)	—
Step-up in assets upon conversion to C-corporation	(709)	(448)	—
Stock-based compensation expense for incentive stock options	283	98	—
Imputed interest on related party promissory notes	—	52	—
Taxable gain upon conversion to C-corporation	—	73	—
Other non-deductible expenses and reconciling items	240	4	—
Change in valuation allowance	9,453	1,252	537
Total income tax expense (benefit)	$—	$—	$—

The significant components of the Company's deferred tax assets are as follows:

	December 31,	
	2015	2014
Deferred tax assets:		
Net operating loss carryforwards	$9,254	$1,844
Step-up in assets upon conversion to C-corporation	1,046	438
Stock-based compensation expense for non-qualified stock options	855	31
Unrealized losses on marketable securities	284	—
Deferred rent	97	—
Accruals and other	568	42
Total deferred tax assets before valuation allowance	12,104	2,355
Valuation allowance	(12,093)	(2,355)
Total deferred tax assets	11	—
Deferred tax liabilities:		
Depreciation	(11)	—
Total deferred tax liabilities	(11)	—

Net deferred tax assets	$—	$—

The Company has evaluated the positive and negative evidence bearing upon the realizability of its deferred tax assets. Based on the Company's history of operating losses, the Company has concluded that it is more likely than not that the benefit of its deferred tax assets will not be realized. Accordingly, the Company has provided a full valuation allowance for its net deferred tax assets as of December 31, 2015 and 2014. The valuation allowance increased approximately $9,453 and $1,252 during the years ended December 31, 2015 and 2014, respectively, due primarily to the conversion to a C-corporation and the federal and state net operating losses generated during the periods.

As of December 31, 2015 and 2014, the Company had U.S. federal NOL carryforwards of approximately $21,215 and $2,979, respectively, which may be available to offset future income tax liabilities and expire at various dates through 2035. As of December 31, 2015 and 2014, the Company also had U.S. state NOL carryforwards of approximately $34,199 and $13,406, respectively, which may be available to offset future income tax liabilities and expire at various dates through 2035.

Under the provisions of the Internal Revenue Code, the NOL carryforwards are subject to review and possible adjustment by the Internal Revenue Service and state tax authorities. NOL carryforwards may become subject to an annual limitation in the event of certain cumulative changes in the ownership interest of significant shareholders over a three-year period in excess of 50 percent, as defined under Sections 382 and 383 of the Internal Revenue Code, respectively, as well as similar state provisions. This could limit the amount of tax attributes that can be utilized annually to offset future taxable income or tax liabilities. The amount of the annual limitation is determined based on the value of the Company immediately prior to the ownership change. Subsequent ownership changes may further affect the limitation in future years. The Company has completed several financings since its inception which may have resulted in a change in control as defined by Sections 382 and 383 of the Internal Revenue Code, or could result in a change in control in the future.

The Company files income tax returns in the U.S. at the federal level and in states in which the Company conducts business activities. The federal and state income tax returns are generally subject to tax examinations for the tax years ended December 31, 2012 through December 31, 2015. To the extent the Company has tax attribute carryforwards, the tax years in which the attribute was generated may still be adjusted upon examination by the Internal Revenue Service or state tax authorities to the extent utilized in a future period.

13. Related Party Transactions

The Trustees of the University of Pennsylvania

Penn is a stockholder of the Company as a result of the intellectual property license granted to the Company in February 2009, and prior to September 30, 2015 the Company considered Penn to be a related party. See Note 7 for further information, including costs incurred by the Company, regarding its license from Penn.

As a result of various factors, including the dilution to the Company’s stockholders resulting from the sale and issuance of Series C Preferred Stock and Series D Preferred Stock, and the closing of the Company’s IPO on September 22, 2015, the Company no longer considers Penn to be a related party subsequent to the period ended September 30, 2015.

In addition to the license agreement, Penn also provides manufacturing and research and development services to the Company. Expenses incurred by the Company for manufacturing and research and development for the nine months ended September 30, 2015 and the years ended December 31, 2014 and 2013 are as follows:

	Nine Months Ended September 30,	Years Ended December 31,	
	2015	2014	2013
Manufacturing of reagents for sale	$ 80	$92	$143
Research and development services	5,136	1,286	2,778
	$ 5,216	$1,378	$2,921

As of December 31, 2014, the Company had accrued $677 in manufacturing and research and development costs to Penn which are included in other related party payables on the balance sheets.

GlaxoSmithKline LLC

GSK is a stockholder of the Company as a result of the intellectual property license granted to the Company in March 2009, and prior to September 30, 2015 the Company considered GSK to be a related party. See Note 7 for further information, including costs incurred by the Company, regarding its license from GSK.

As a result of various factors, including the dilution to the Company's stockholders resulting from the sale and issuance of Series C Preferred Stock and Series D Preferred Stock, and the closing of the Company's IPO on September 22, 2015, the Company no longer considers GSK to be a related party subsequent to the period ended September 30, 2015.

Dimension Therapeutics, Inc.

The Company and a number of its members, directors and management received common stock of Dimension as consideration for a license granted to Dimension in October 2013. Additionally, at the date of the license three of the Company's board members also served on the board of directors of Dimension. As a result, prior to September 30, 2015 the Company considered Dimension to be a related party.

As of September 30, 2015, the Company no longer had any overlapping board members with Dimension. Additionally, the Company's directors and management do not have significant influence over Dimension. Accordingly, the Company no longer considers Dimension to be a related party subsequent to the period ended September 30, 2015.

On October 30, 2013, the Company granted an exclusive, sublicensable, worldwide commercial license to Dimension for preclinical and clinical research and development and commercialization of drug therapies using the Company's licensed patents for the treatment of hemophilia A and hemophilia B, as well as a one year option to obtain exclusive licenses for the commercialization of two other diseases to be elected by Dimension in the future. The agreement requires on-going annual maintenance fees of $35, for each indication elected by Dimension, beginning in October 2014. The agreement also requires Dimension to pay royalties on net sales, if any, to the Company at an amount intended to approximate the royalties that will be due by the Company to Penn and GSK on such sales. In consideration for the license granted, Dimension issued the Company, and various members, directors and executives of the Company, an aggregate total of 10,000 shares of its common stock with an estimated fair value of $2,700. The Company recorded $2,700 as revenue upon delivery of the license. Of the 10,000 shares, a total of 10 shares were issued to the Company, with an estimated fair value of $3, which is included in cost method investments on the balance sheet as of December 31, 2014. As of the December 31, 2015 the investment in Dimension is included in marketable securities on the balance sheet as Dimension completed its IPO in October 2015 and the shares are now marketable. In consideration for the efforts by the various members, directors and executives of the Company which were responsible for executing the license agreement with Dimension, the Company recorded expenses equal to the estimated fair value of the 9,990 shares of common stock of Dimension received by those parties of $2,697, which is included in general and administrative expenses in the statements of operations and comprehensive loss for the year ended December 31, 2013. In accordance with its revenue recognition policy, the Company has determined that the $2,700 in revenue from the license granted to Dimension should be recognized in full upon the delivery of the license, as the Company has no further significant performance obligations under the agreement. Additionally, the Company determined that the $2,697 of general and administrative expenses to related parties should be recognized in full upon the execution of the agreement with Dimension, as those parties have no further performance obligations to the Company.

In addition to related parties of the Company holding common stock in Dimension as a result of the license agreement noted above, three of the Company's board members served on the board of directors of Dimension on the effective the date of the license. Management evaluated the consolidation guidance under ASC 810 and determined that Dimension was considered a VIE on the date of the license and as of December 31, 2014, however, it did not consolidate Dimension because it lacked the power to direct the activities of the VIE that most significantly impact the VIE's economic performance. The carrying amount of the investment in Dimension as of December 31, 2014 was $3 and receivables due from Dimension as of December 31, 2014 were $750. As a result of capital raised by Dimension in its IPO in October 2015, the Company no longer considers Dimension to be a VIE as of December 31, 2015.

In connection with the license agreement granted to Dimension, the Company entered into an arrangement with Penn and Dimension in which the Company helped coordinate and manage research and development activities performed by Penn on behalf of Dimension. Under the arrangement, Dimension reimbursed the Company at an amount equal to costs incurred and paid to Penn, and the Company retains rights to certain intellectual property discovered under the contracted research and development. Due to the uncertainty of any future intellectual property rights that may be discovered and retained by the Company, and because such intellectual property would have no future alternative use due to the stage of development of the drug therapies under development, the Company has not recognized any benefit from the arrangement as consideration paid by Dimension to the Company as a result of the license agreement. Management has evaluated the facts and circumstances of the arrangements with regards to ASC 605-45 Revenue Recognition-Principal Agent Considerations and determined that the proceeds received from Dimension should be recorded on a net basis. Accordingly, proceeds received from Dimension under the arrangement were recorded as a

reduction of research and development expense in the statements of operations and comprehensive loss. For the years ended December 31, 2014 and 2013, the Company recorded research and development expense to Penn, and related reimbursements from Dimension of $6,177 and $924, respectively, for a net cost of $0 for each period. As of December 31, 2014, the Company had recorded a related party payable of $750 to Penn and a related party receivable of $750 from Dimension under the arrangement. The arrangement expired on December 31, 2014 and as of December 31, 2015 the final payments under this arrangement were received by the Company and paid to Penn, and the arrangement has ended.

In September 2014, Dimension elected its third indication under the license agreement, and the license was amended to extend the term of the option to elect the fourth and final disease indication for an additional six months. In consideration for the extension of the option, Dimension paid an extension fee of $150. In January 2015, Dimension elected its fourth and final indication under the license.

In March 2015, the Company entered into an option and license agreement with Dimension that grants Dimension options to commercial exclusive licenses for four new disease indications to be elected by Dimension in the future. If elected, each option carries an option fee of $1,000 payable to the Company upon exercise, and annual maintenance fees of $50. Additionally, for each option

exercised, Dimension is obligated to pay the Company up to $9,000 upon achievement of various substantive milestones, as well as mid to upper-single digit percentage royalties on net sales of licensed products and mid-single digit to low-double digit percentage sublicense fees, if any. In May 2015, Dimension exercised its first option under the agreement and paid $1,000 to the Company. In August 2015, Dimension exercised its second option under the agreement and paid $1,000 to the Company. In December 2015, Dimension exercised its third option under the agreement and paid $1,000 to the Company.

During the nine months ended September 30, 2015, and the years ended 2014 and 2013, the Company recognized $2,000, $220 and $2,700, respectively, in license revenue from license agreements with Dimension which is included in license revenue from related party in the statements of operations and comprehensive loss. License revenue recognized from Dimension subsequent to September 30, 2015 is no longer included in license revenue from related party in the statements of operations and comprehensive loss.

During the year ended December 31, 2014, the Company received $200 from Dimension for the purchase of materials owned by the Company and used in the Company's manufacturing process for research and development and clinical trials. The $200 is recognized as a gain on disposal of the material as the material is delivered to Dimension. For the years ended December 31, 2015 and 2014, the Company recognized gains of $26 and $47, respectively, related to the delivery of purchased material. Gains resulting from the delivery of the purchased material to Dimension is included in other operating income in the statements of operations. As of December 31, 2015 and 2014, the Company recorded an advance payment liability of $127 and $153, respectively, for proceeds received for undelivered material.

FoxKiser

The Company was party to a services agreement, as amended from time to time, with FoxKiser, an affiliate of certain stockholders of the Company and affiliate of one current and one former member of the Board of Directors, which was terminated in January 2015. Under the agreement, the Company paid a fixed monthly fee plus an additional support fee, as determined by FoxKiser on a monthly basis, as consideration for office facilities, equipment, supplies, general management, accounting, financial management, human resources, legal, secretarial, regulatory compliance and other services provided to the Company. The amounts outstanding to FoxKiser under the services agreement in excess of 30 days from their due date accrued interest at 1.5 percent per month, compounding monthly. The Company allocated the service fees from FoxKiser between research and development and general and administrative expense. Costs incurred by the Company under the services agreement with FoxKiser were as follows:

	Years Ended December 31,		
	2015	2014	2013
Research and development	$168	$1,283	$1,111
General and administrative	237	1,696	1,469
	$405	$2,979	$2,580

As of December 31, 2014, the Company had recorded $1,423 payable to FoxKiser under the services agreement. As discussed in Note 6, amounts owed under the services agreement were converted into Series C Preferred Stock on January 13, 2015. In January 2015, the services agreement was terminated and the remaining amounts due to the FoxKiser under the agreement were paid in full in cash. The Company also entered into promissory notes with FoxKiser as discussed in Note 6.

The Company entered into a Professional Services Agreement with FoxKiser effective as of January 1, 2016, pursuant to which the Company incurs a fixed monthly fee of $80 in consideration for certain strategic planning, development and regulatory services to be provided by FoxKiser. The Professional Services Agreement has an initial term of one year and is terminable by either party, at any time, upon sixty days prior written notice to the other party.

Chief Scientific Advisor

In September 2014, the Company entered into an advisory agreement with its Chief Scientific Advisor, who is also the Chairman of the Company's Scientific Advisory Board. The agreement was amended in May 2015 and expires in March 2017. During the years ended December 31, 2015 and 2014, the Company incurred advisory fees of $180 and $45, respectively, to the Chief Scientific Advisor under the agreement. Additionally, the Company granted 70 and 142 options to purchase common stock to the Chief Scientific Advisor during the years ended December 31, 2015 and 2014, respectively, as compensation for services to be provided to the Company, which vest partially upon the completion of future service conditions, and partially upon the achievement of specified performance conditions as set forth in the award agreements.

14. Net Loss Per Share

The following potentially dilutive securities outstanding at the end of the period were excluded from the computations of diluted weighted-average shares outstanding for the periods indicated as they would be anti-dilutive:

	Years Ended December 31,		
	2015	2014	2013
Series A convertible preferred stock and preferred units	—	2,393	2,393
Series B convertible preferred stock and preferred units	—	1,906	1,906
Stock options issued and outstanding	3,684	2,107	—
Debt with share settlement option (Note 6)	—	3,715	—
	3,684	10,121	4,299

Amounts in the table above reflect the common stock equivalents of the noted instruments.

15. Supplemental Disclosures

Accrued expenses and other current liabilities consists of the following:

	As of December 31,	
	2015	2014
Accrued personnel costs	$ 1,371	$ —
Accrued external research and development	791	781
Accrued sublicense fees and royalties on reagent sales	260	—
Other accrued expenses and current liabilities	776	334
	$ 3,198	$ 1,115

Accrued external research and development, accrued sublicense fees and royalties on reagent sales and other accrued expenses to Penn and GSK as of December 31, 2014 were included in related party payables on the Company's balance sheet. Subsequent to September 30, 2015, neither party is considered to be a related party of the Company. See Note 13 for further information on related party transactions with Penn and GSK prior to September 30, 2015.

16. Selected Quarterly Financial Information (Unaudited)

The following table contains quarterly financial information for 2015 and 2014. Management believes that the following information reflects all normal recurring adjustments necessary for a fair statement of the information for the periods presented. The operating results for any quarter are not necessarily indicative of results for any future period. Amounts in the following table are in thousands, except per share data.

	Quarters Ended			
	March 31, 2015	June 30, 2015	September 30, 2015	December 31, 2015
Total revenues	$644	$1,363	$ 1,140	$ 4,441
Total operating expenses	$4,637	$7,659	$ 8,487	$ 9,942
Net loss	$(4,011)	$(6,290)	$ (7,332)	$ (5,178)
Basic and diluted net loss per common share	$(0.94)	$(3.24)	$ (1.52)	$ (0.20)

	Quarters Ended			
	March 31, 2014	June 30, 2014	September 30, 2014	December 31, 2014
Total revenues	$2,937	$1,549	$ 483	$ 1,151
Total operating expenses	$2,102	$2,150	$ 2,184	$ 3,366
Net income (loss)	$795	$(672)	$ (1,793)	$ (2,333)
Basic and diluted net income (loss) per common share	$0.08	$(0.34)	$ (0.73)	$ (0.97)

EXHIBIT INDEX

Exhibit	Description
3.1	Restated Certificate of Incorporation (filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K as filed on September 22, 2015, and incorporated herein by reference)
3.2	Amended and Restated Bylaws (filed as Exhibit 3.2 to the Registrant's Current Report on Form 8-K as filed on September 22, 2015, and incorporated herein by reference)
4.1	Specimen stock certificate evidencing the shares of common stock (filed as Exhibit 4.1 to the Registrant's Registration Statement on Form S-1 (SEC File No. 333-206430), as filed on August 17, 2015, and incorporated herein by reference)
4.2	Amended and Restated Investors' Rights Agreement dated as of May 15, 2015 (filed as Exhibit 4.2 to the Registrant's Registration Statement on Form S-1 (SEC File No. 333-206430), as filed on August 17, 2015, and incorporated herein by reference)
10.1	Form of Indemnity Agreement for directors and officers (filed as Exhibit 10.1 to the Registrant's Registration Statement on Form S-1 (SEC File No. 333-206430), as filed on August 17, 2015, and incorporated herein by reference)
10.2+	2014 Stock Plan, as amended (filed as Exhibit 10.2 to the Registrant's Registration Statement on Form S-1 (SEC File No. 333-206430), as filed on August 17, 2015, and incorporated herein by reference)
10.3+	2015 Equity Incentive Plan and form of option agreement thereunder (filed as Exhibit 10.3 to the Registrant's Registration Statement on Form S-1/A (SEC File No. 333-206430), as filed on September 15, 2015, and incorporated herein by reference)
10.4+	2015 Employee Stock Purchase Plan (filed as Exhibit 10.4 to the Registrant's Registration Statement on Form S-1/A (SEC File No. 333-206430), as filed on September 8, 2015, and incorporated herein by reference)
10.5+	Employment Agreement effective as of June 30, 2015 between the Registrant and Kenneth T. Mills (filed as Exhibit 10.5 to the Registrant's Registration Statement on Form S-1 (SEC File No. 333-206430), as filed on August 17, 2015, and incorporated herein by reference)
10.6+	Employment Agreement effective as of June 30, 2015 between the Registrant and Stephen Yoo, M.D. (filed as Exhibit 10.6 to the Registrant's Registration Statement on Form S-1 (SEC File No. 333-206430), as filed on August 17, 2015, and incorporated herein by reference)
10.7+	Employment Agreement effective as of June 30, 2015 between the Registrant and Vittal Vasista (filed as Exhibit 10.7 to the Registrant's Registration Statement on Form S-1 (SEC File No. 333-206430), as filed on August 17, 2015, and incorporated herein by reference)
10.8+	Independent Director Compensation Policy (filed as Exhibit 10.8 to the Registrant's Registration Statement on Form S-1 (SEC File No. 333-206430), as filed on August 17, 2015, and incorporated herein by reference)

10.9† License Agreement effective February 24, 2009 between the Registrant and The Trustees of the University of Pennsylvania (filed as Exhibit 10.9 to the Registrant's Registration Statement on Form S-1/A (SEC File No. 333-206430), as filed on September 15, 2015, and incorporated herein by reference)

10.10† First Amendment to License Agreement dated March 6, 2009 between the Registrant and The Trustees of the University of Pennsylvania (filed as Exhibit 10.10 to the Registrant's Registration Statement on Form S-1 (SEC File No. 333-206430), as filed on August 17, 2015, and incorporated herein by reference)

10.11† Second Amendment to License Agreement effective September 9, 2014 between the Registrant and The Trustees of the University of Pennsylvania (filed as Exhibit 10.11 to the Registrant's Registration Statement on Form S-1/A (SEC File No. 333-206430), as filed on September 15, 2015, and incorporated herein by reference)

10.12† License Agreement dated March 6, 2009 between the Registrant and SmithKline Beecham Corporation d/b/a GlaxoSmithKline (filed as Exhibit 10.12 to the Registrant's Registration Statement on Form S-1/A (SEC File No. 333-206430), as filed on September 15, 2015, and incorporated herein by reference)

Exhibit	Description
10.13	Amendment to License Agreement dated April 15, 2009 between the Registrant and SmithKline Beecham Corporation d/b/a GlaxoSmithKline (filed as Exhibit 10.13 to the Registrant's Registration Statement on Form S-1 (SEC File No. 333-206430), as filed on August 17, 2015, and incorporated herein by reference)
10.14†	License Agreement dated April 10, 2014 between the Registrant and AAVLife (filed as Exhibit 10.14 to the Registrant's Registration Statement on Form S-1/A (SEC File No. 333-206430), as filed on September 15, 2015, and incorporated herein by reference)
10.15†	License Agreement dated July 9, 2013 between the Registrant and Audentes Therapeutics, Inc. (filed as Exhibit 10.15 to the Registrant's Registration Statement on Form S-1/A (SEC File No. 333-206430), as filed on September 15, 2015, and incorporated herein by reference)
10.16†	License Agreement dated March 21, 2014 between the Registrant and AveXis, Inc. (filed as Exhibit 10.16 to the Registrant's Registration Statement on Form S-1/A (SEC File No. 333-206430), as filed on September 15, 2015, and incorporated herein by reference)
10.17†	License Agreement dated November 22, 2010 between the Registrant and Baxalta US Inc. (as assignee of Baxter Healthcare Corporation, as assignee of Chatham Therapeutics, LLC) (filed as Exhibit 10.17 to the Registrant's Registration Statement on Form S-1/A (SEC File No. 333-206430), as filed on September 15, 2015, and incorporated herein by reference)
10.18†	License Agreement dated October 30, 2013 between the Registrant and Dimension Therapeutics, Inc. (filed as Exhibit 10.18 to the Registrant's Registration Statement on Form S-1/A (SEC File No. 333-206430), as filed on September 16, 2015, and incorporated herein by reference)
10.19†	First Amendment to License Agreement dated June 18, 2014 between the Registrant and Dimension Therapeutics, Inc. (filed as Exhibit 10.19 to the Registrant's Registration Statement on Form S-1/A (SEC File No. 333-206430), as filed on September 15, 2015, and incorporated herein by reference)
10.20†	Second Amendment to License Agreement dated September 29, 2014 between the Registrant and Dimension Therapeutics, Inc. (filed as Exhibit 10.20 to the Registrant's Registration Statement on Form S-1/A (SEC File No. 333-206430), as filed on September 16, 2015, and incorporated herein by reference)
10.21†	Option and License Agreement dated March 10, 2015 between the Registrant and Dimension Therapeutics, Inc. (filed as Exhibit 10.21 to the Registrant's Registration Statement on Form S-1/A (SEC File No. 333-206430), as filed on September 16, 2015, and incorporated herein by reference)
10.22†	License Agreement dated March 5, 2014 between the Registrant and Laboratorios Del Dr. Esteve, S.A. (filed as Exhibit 10.22 to the Registrant's Registration Statement on Form S-1/A (SEC File No. 333-206430), as filed on September 15, 2015, and incorporated herein by reference)
10.23†	License Agreement dated December 2, 2013 between the Registrant and Lysogene Société par Actions Simplifiée (filed as Exhibit 10.23 to the Registrant's Registration Statement on Form S-1/A (SEC File No. 333-206430), as filed on September 15, 2015, and incorporated herein by reference)
10.24†	License Agreement dated May 28, 2014 between the Registrant and Voyager Therapeutics, Inc. (filed as Exhibit 10.24 to the Registrant's Registration Statement on Form S-1/A (SEC File No. 333-206430), as filed

on September 15, 2015, and incorporated herein by reference)

10.25† Exclusive Patent License Agreement dated November 10, 2014 between the Registrant and the Regents of the University of Minnesota (filed as Exhibit 10.25 to the Registrant's Registration Statement on Form S-1/A (SEC File No. 333-206430), as filed on September 15, 2015, and incorporated herein by reference)

10.26 Lease dated March 6, 2015 between the Registrant and BMR-Medical Center Drive LLC (filed as Exhibit 10.26 to the Registrant's Registration Statement on Form S-1 (SEC File No. 333-206430), as filed on August 17, 2015, and incorporated herein by reference)

10.27† Development, Manufacturing, and Testing Standard Terms and Conditions dated April 3, 2015 between the Registrant and WuXi AppTec, Inc. (filed as Exhibit 10.27 to the Registrant's Registration Statement on Form S-1/A (SEC File No. 333-206430), as filed on September 15, 2015, and incorporated herein by reference)

Exhibit	Description
10.28†	Cooperation Agreement dated May 28, 2015 between the Registrant and WuXi AppTec, Inc. (filed as Exhibit 10.28 to the Registrant's Registration Statement on Form S-1 (SEC File No. 333-206430), as filed on August 17, 2015, and incorporated herein by reference)
10.29+	REGENXBIO Inc. Management Cash Incentive Plan (filed as Exhibit 10.29 to the Registrant's Registration Statement on Form S-1 (SEC File No. 333-206430), as filed on August 17, 2015, and incorporated herein by reference)
10.30	Board of Managers Agreement dated February 6, 2013 between the Registrant and Donald J. Hayden, Jr. (filed as Exhibit 10.30 to the Registrant's Registration Statement on Form S-1 (SEC File No. 333-206430), as filed on August 17, 2015, and incorporated herein by reference)
10.31*	First Amendment to Lease dated September 30, 2015 between the Registrant and BMR-Medical Center Drive LLC
10.32*	Second Amendment to Lease dated November 23, 2015 between the Registrant and BMR-Medical Center Drive LLC
10.33*	Lease dated January 28, 2016 between the Registrant and TNREF III 9600 Blackwell, LLC
10.34*	Employment Agreement effective as of February 16, 2016 between the Registrant and Curran Simpson
23.1*	Consent of PricewaterhouseCoopers LLP, independent registered accounting firm
31.1*	Certification of the Chief Executive Officer, as required by Section 302 of the Sarbanes-Oxley Act of 2002
31.2*	Certification of the Chief Financial Officer as required by Section 302 of the Sarbanes-Oxley Act of 2002
32.1*	Certifications of the Chief Executive Officer and Chief Financial Officer as required by 18 U.S.C. 1350
101.INS*	XBRL Instance Document
101.SCH*	XBRL Taxonomy Extension Schema Document
101.CAL*	XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF*	XBRL Taxonomy Extension Definition Linkbase Document
101.LAB*	XBRL Taxonomy Extension Label Linkbase Document
101.PRE*	XBRL Taxonomy Extension Presentation Linkbase Document

+ Indicates management contract or compensatory plan.
† Confidential treatment has been granted with respect to certain portions of this document.
* Filed herewith.

The certification attached as Exhibit 32.1 that accompanies this Annual Report on Form 10-K is not deemed filed with the SEC and is not to be incorporated by reference into any filing of REGENXBIO Inc. under the Securities Act or the Exchange Act, whether made before or after the date of this Annual Report on Form 10-K, irrespective of any general incorporation language contained in such filing.