INOVIO PHARMACEUTICALS, INC.
Form 10-K
March 14, 2018

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

FORM 10-K

x ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
FOR THE FISCAL YEAR ENDED DECEMBER 31, 2017

OR

¨ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
FOR THE TRANSITION PERIOD FROM TO

COMMISSION FILE NO. 001-14888

INOVIO PHARMACEUTICALS, INC.
(EXACT NAME OF REGISTRANT AS SPECIFIED IN ITS CHARTER)

| DELAWARE | 33-0969592 |
|---|---|
| (State or other jurisdiction of incorporation or organization) | (I.R.S. Employer Identification No.) |
| 660 W. GERMANTOWN PIKE, SUITE 110 PLYMOUTH MEETING, PENNSYLVANIA | 19462 |
| (Address of principal executive offices) | (Zip Code) |

REGISTRANT'S TELEPHONE NUMBER, INCLUDING AREA CODE: (267) 440-4200

SECURITIES REGISTERED PURSUANT TO SECTION 12(B) OF THE ACT:

| COMMON STOCK, $0.001 PAR VALUE | Nasdaq Global Select Market |
|---|---|
| (Title of 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 ¨ 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 ¨ 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 ¨

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

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K 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. x

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

Large accelerated filer ¨ Accelerated filer x

Non-accelerated filer ¨(Do not check if a smaller reporting company) Smaller reporting company ¨
Emerging growth company ¨

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes ¨ No x

The aggregate market value of the voting and non-voting common equity (which consists solely of shares of Common Stock) held by non-affiliates of the Registrant as of June 30, 2017 was approximately $608,649,117 based on $7.84, the closing price on that date of the Registrant's Common Stock on the Nasdaq Global Select Market.

The number of shares outstanding of the Registrant's Common Stock, $0.001 par value, was 90,403,853 as of March 8, 2018.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive proxy statement to be filed with the Commission pursuant to Regulation 14A in connection with the registrant's 2017 Annual Meeting of Stockholders (the "Proxy Statement') are incorporated by reference into Part III of this Report. Such Proxy Statement will be filed with the Commission not later than 120 days after the conclusion of the registrant's fiscal year ended December 31, 2017.

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Unless stated to the contrary, or unless the context otherwise requires, references to "Inovio," "the company," "our company," "our," or "we" in this report include Inovio Pharmaceuticals, Inc. and subsidiaries.

PART I

ITEM 1. BUSINESS

This Annual Report (including the following section regarding Management's Discussion and Analysis of Financial Condition and Results of Operations) contains forward-looking statements regarding our business, financial condition, results of operations and prospects. Words such as "expects," "anticipates," "intends," "plans," "believes," "seeks," "estimates" similar expressions or variations of such words are intended to identify forward-looking statements, but are not the exclusive means of identifying forward-looking statements in this Annual Report. Additionally, statements concerning future matters, including statements regarding our business, our financial position, the research and development of our products and other statements regarding matters that are not historical are forward-looking statements.

Although forward-looking statements in this Annual Report reflect the good faith judgment of our management, such statements can only be based on facts and factors currently known by us. Consequently, forward-looking statements are inherently subject to risks and uncertainties and actual results and outcomes may differ materially from the results and outcomes discussed in or anticipated by the forward-looking statements. Factors that could cause or contribute to such differences in results and outcomes include without limitation those discussed under the heading "Risk Factors" below, as well as those discussed elsewhere in this Annual Report. Readers are urged not to place undue reliance on these forward-looking statements, which speak only as of the date of this Annual Report. We undertake no obligation to revise or update any forward-looking statements in order to reflect any event or circumstance that may arise after the date of this Annual Report. Readers are urged to carefully review and consider the various disclosures made in this Annual Report, which attempt to advise interested parties of the risks and factors that may affect our business, financial condition, results of operations and prospects.

Overview

Inovio is developing active SynCon® DNA immunotherapies and vaccines focused on treating and preventing cancers and infectious diseases. SynCon® immunotherapies, in combination with our proprietary CELLECTRA® delivery devices, are intended to generate optimal antigen production in vivo, in particular functional CD8+ killer T cell and antibody responses, to fight target diseases. We seek to become the "go-to" immunotherapeutic solution provider for all diseases caused by human papillomavirus, or HPV, including for pre-cancer diseases like cervical intra-epithelial neoplasia, or CIN, vulvar intraepithelial neoplasia, or VIN, and anal intraepithelial neoplasia, or AIN, as well as cancers caused by HPV, such as head and neck cancer and cervical cancer. We believe that we are a leader in T cell-generating immunotherapy with our product candidate INO-3112, also known as MEDI0457, being developed in collaboration with MedImmune as a combination therapy with MedImmune's PD-1/PDL-1 checkpoint inhibitor candidate for the potential treatment of multiple cancers and an innovator in vaccine development for rapidly combating emerging infectious diseases.

In September 2015, proof of concept data was published in the medical journal The Lancet from a controlled Phase 2b clinical trial in which we generated significant, functional antigen-specific T cells that correlated to clinically relevant efficacy against HPV-associated cervical dysplasia (precancer). In June 2017, we began a Phase 3 clinical trial of our product candidate VGX-3100 for the treatment of cervical dysplasia.

Our novel SynCon® immunotherapy design can help break the immune system's tolerance of cancerous cells and is also intended to facilitate cross-strain protection against known and new unmatched strains of pathogens, such as influenza. Given the recognized role of CD8+ killer T cells in eliminating cancerous or infected cells from the body and the published results from our Phase 2b clinical trial, we believe that our active immunotherapies may play an important role in helping fight multiple cancers and infectious diseases. Human data to date have shown a favorable safety profile of our DNA immunotherapies delivered using electroporation.

We or our collaborators are currently conducting or planning clinical studies of our proprietary SynCon® immunotherapies for CIN, VIN and AIN; head and neck and cervical cancer caused by HPV; prostate cancer; bladder cancer; glioblastoma, or GBM; breast, lung and pancreatic cancers; hepatitis C virus, or HCV; hepatitis B virus, or HBV; human immunodeficiency virus, or HIV; Ebola virus; Middle East Respiratory Syndrome, or MERS; and Zika virus.

Our corporate strategy is to advance and protect our differentiated immunotherapy platform and use its unique capabilities to design and develop an array of cancer and infectious disease immunotherapy and vaccine products. We

aim to advance products through to commercialization. We continue to leverage third-party resources through collaborations and partnerships, including product license agreements. Our partners and collaborators include MedImmune, LLC, The Wistar Institute, University of Pennsylvania, GeneOne Life Science, Inc., Regeneron Pharmaceuticals, Inc., Genentech, Inc., Plumbline Life Sciences, Inc., the Parker Institute for Cancer Immunotherapy, Drexel University, National Microbiology Laboratory of the Public Health Agency of Canada, National Institute of Allergy and Infectious Diseases ("NIAID"), United States Military HIV Research Program ("USMHRP"), U.S. Army Medical Research Institute of Infectious Diseases

("USAMRIID"), National Institutes of Health ("NIH"), HIV Vaccines Trial Network ("HVTN") and Defense Advanced Research Projects Agency ("DARPA").

Inovio's Differentiated Immunotherapy Platform

We believe that stimulating the immune system to prevent or treat infections and cancers is a compelling concept and that today the opportunity for immune activating technologies with the potential to fight cancers and infectious diseases is promising, especially in light of notable technology advancements such as checkpoint inhibitors leading the way in oncology. Despite promising results in clinical trials, there remains a significant need and opportunity for further advancements.

Our ASPIRE™ (Antigen SPecific Immune REsponses) immunotherapy platform comprising our DNA-based immunotherapy and CELLECTRA® delivery technologies has an important fundamental capability with a number of possible disease targets and product opportunities. The basic goal of our platform is to enable in vivo (in the body) generation of useful immune responses to achieve desired therapeutic and preventive outcomes. We have historically been primarily focused on in vivo generation of disease-specific antigens in the body in order to stimulate prophylactic or therapeutic immune responses. More recently, we have embarked on an additional new application for the platform: in vivo generation of monoclonal antibodies to achieve preventive and therapeutic outcomes complementary to our antigen-generating immunotherapies.

The essence of our platform is that we encode a DNA plasmid (circular string of DNA) for an engineered and optimal genetic sequence of an antigen or monoclonal antibody specific to a targeted disease. We can combine multiple such plasmids into a "product," inject the plasmids into tissue of the body, use CELLECTRA® devices to apply transient electrical energy to facilitate significant cellular uptake of the plasmids, and then enhance the ability of the intracellular machinery that usually produces useful proteins for the functioning of the body to temporarily produce the target antigen or monoclonal antibody. An antigen produced in this manner will then induce the immune system to generate polyclonal antibodies or T cells with the ability to perform their preventive or therapeutic functions. Similarly, DNA encoded monoclonal antibodies (dMAbs™) generated in this manner can then also trigger desired immune system functions.

With our core technologies, we have developed a pipeline of pre-clinical and clinical-stage product candidates that have generated best-in-class in vivo immune responses, in particular CD8+ T cells that are fundamental in eliminating cancerous or infected cells. Our lead immunotherapy product candidate, VGX-3100, met its primary and secondary endpoints in a controlled Phase 2b clinical trial of patients HPV-associated precancer, achieving statistically significant and clinically relevant efficacy in association with robust T cell activation. This data was published in The Lancet in a paper entitled, "Safety, efficacy, and immunogenicity of VGX-3100, a therapeutic synthetic DNA vaccine targeting human papillomavirus 16 and 18 E6 and E7 proteins for cervical intraepithelial neoplasia 2/3: a randomized, double-blind, placebo-controlled Phase 2b trial." These results were achieved without serious adverse events. The most common adverse event was temporary injection site pain and redness.

Our immunotherapies are non-live and non-replicating, and therefore do not cause the underlying disease. Compared to other technologies, our immunotherapies work more naturally with the immune system and within its controls to reduce or minimize the risk of unwanted inflammatory responses.

The results of our Phase 2b clinical trial of VGX-3100 suggest that our platform can be used to design and develop a number of cancer and infectious disease product candidates.

The Next Generation of Cancer and Infectious Disease Treatment: Inovio's SynCon® Immunotherapies

Our SynCon® immunotherapies are designed to treat an existing disease (therapeutic) or prevent a disease (prophylactic) by activating and magnifying an immune response to one or more disease-specific antigens (proteins associated with a cancer or infectious disease that the body will recognize as foreign or not normal). Without the quality control and manufacturing challenges and costs of medicines involving ex vivo processes, such as T cells with chimeric antigen receptors, or CAR-Ts, our product candidates are able to direct the patient's immune system to fight specific organisms or cells in a highly targeted and robust fashion. We do this by introducing the genetic code for a target antigen into the cells of the body that will serve as a temporary antigen production facility.

Our immunotherapies consist of one or more DNA plasmids encoding one or more selected antigens. Our approach enables dramatic uptake of the DNA plasmids by cells in localized tissue (typically muscle in the arm for

immunotherapies or in the skin for vaccines). After the DNA code for the targeted antigen(s) is introduced to cells, the cells' natural machinery for producing proteins necessary for the body's many functions temporarily produce the selected antigen(s) encoded by the DNA sequences. The antigenic proteins manufactured through this process are then presented to the immune system and trigger one or both of two arms of the immune system:

- the production of preventive antibodies, known as a humoral immune response; and/or
- the activation of therapeutic CD8+ T-cells, known as a cellular or cell-mediated immune response.

These responses then neutralize or eliminate infectious agents, such as viruses, bacteria, and other microorganisms, or abnormal cells, such as malignant tumor or infected cells. T cells can be immediately "trafficked" to parts of the body where cells are displaying the target antigen. Memory cells are also created for durable effects.

Our SynCon® DNA immunotherapies are designed to generate antigen-specific antibody and T cell responses. First we identify one or more antigens that we believe are the best targets to direct the immune system toward a particular cancer or infectious disease. We then apply our SynCon® design process, which uses the genetic make-up of the selected antigens from multiple variants of a cancer or strains of a virus.

For each antigen we synthetically create a new genetic sequence that represents a consensus of the slightly different DNA from multiple variants or strains of the targeted antigen. We can synthetically create a differentiated SynCon® variant to help the immune system better recognize a cancer self-antigen (a cell and antigen grown in the body) and "break the tolerance" of cancer cells in the body. In human clinical trials, we have generated immune responses with SynCon® immunotherapies that were not matched to different strains of an infectious disease, such as influenza or HIV, indicating that such immunotherapies may have more universal protective capabilities against unmatched strains of a circulating virus. As a result, these SynCon® constructs may provide a solution to broadly cover the genetic "shift" and "drift" that is typical of many infectious diseases. This new synthetically engineered sequence is similar to the originating sequences but does not match any. It does not exist in nature and is patentable.

The SynCon® sequence is inserted into a circular DNA plasmid with its own promoter. The plasmid is optimized at the DNA level for codon usage, improved mRNA stability, and provided with enhanced leader sequences for ribosome loading; it is optimized at the genetic level to enable high expression in human cells. We believe these design capabilities allow us to better target appropriate immune system mechanisms and produce a higher level of the coded antigen to enhance the overall ability of the immunotherapy to induce the desired immune response.

The plasmids are manufactured in a bacterial fermentation process using scalable technology. These DNA-based immunotherapies can be stable under normal environmental conditions for extended periods of time.

Inovio's immunotherapies are injected in a local area of selected tissue (muscle or skin) and then electroporated to facilitate significant cellular uptake of the plasmid and expression (production) of the encoded DNA. The resulting immune response to the produced antigens results in significant production of antibodies or T cells.

Our product development platform also allows for rapid design, pre-clinical testing, cGMP manufacturing and clinical development of our vaccine and immunotherapy products. Speed is an important feature, particularly as it relates to developing a response to globally emerging infectious diseases. In 2016, we were the first entity able to advance a Zika vaccine into human clinical trials, just 4.5 months after World Health Organization, or WHO, declared the emerging Zika infections to be a Pandemic Health Emergency of International Concern. Previously, we led the development of the first MERS vaccine to enter into human clinical trials. We believe that our development platform is well positioned to support global health agencies in order to develop preparedness countermeasures against bioterrorism and/or emerging pandemic agents.

Published human data from three different SynCon® DNA immunotherapies--two for treating HPV-caused pre-cancers and cancers as well as one for treating HIV infection--have generated best-in-class T cell responses in terms of magnitude, durability, and/or killing effect, providing evidence of their potential to provide preventive and therapeutic capabilities against cancers and infectious diseases. This best-in-class T cell generation has also been correlated to efficacy.

CELLECTRA® Electroporation Delivery Technology

Despite how compelling the idea of delivering DNA encoding an antigen has been, delivering the DNA or nucleic acids directly into a cell through the cell's protective membrane has been a significant challenge in the broad field of DNA and RNA vaccines. Our immunotherapies are delivered into cells of the body in a small local area of tissue using our proprietary CELLECTRA® in vivo electroporation DNA delivery technology. CELLECTRA® uses brief, locally applied electric fields to create temporary and reversible permeability, or pores, in the cell membrane. Using this method increases the cellular uptake of the DNA plasmids by more than one thousand times when compared to delivering "naked DNA" alone. This improved cellular uptake has enabled the best-in-class immune responses that we have observed in our clinical trials, along with the efficacy results generated by these immune responses.

Alternative delivery approaches based on the use of viruses, bacteria, nanoparticles, and lipids are complex and expensive and have created concerns regarding safety. Because the vector itself possesses many additional antigens

specific to the vector it can attract unwanted immune responses against itself (believed to compromise such vectors' ability to deliver their DNA "payload" and provide protection). In contrast, DNA plasmid vectors possess no antigens of their own: the plasmid results in production of only the target antigen.

We have published data in which immune responses generated by our SynCon® immunotherapies delivered using our CELLECTRA® electroporation technology were improved as compared to a leading viral vector (Adenovirus type 5) based

approach. We are not aware of any published data indicating the capability of alternative technologies focused on using genetic code to generate preventive or therapeutic antigens to exceed our immune response data obtained to date, nor to match the efficacy and immune response data generated in our controlled Phase 2b study based on in vivo production of such immune responses.

We believe electroporation provides a relatively straightforward, cost effective method for delivering DNA and RNA into cells with high efficiency, minimal complications and the ability to enable what we believe to be clinically relevant levels of gene expression, immune responses and efficacy.

Inovio's Immunotherapy Products and Product Development

Our primary focus is to advance the products developed from our integrated ASPIRE™ platform. Using this platform, we are currently developing a number of DNA-based immunotherapies for the prevention or treatment of cancer and chronic infectious diseases. The table below summarizes the status of our product development programs.

Active SynCon® Immunotherapy Development Programs

| | | Development Status | | | | |
|---|---|---|---|---|---|---|
| Product Area | Product and Indication(s) | Pre-Clinical | Phase 1 | Phase 2 | Phase 3 | Partner/Funding/Sponsor |
| Cancer | Cervical dysplasia (cervical HSIL) (VGX-3100) | X | X | X | IP | Inovio |
| | Vulvar dysplasia (vulvar HSIL) (VGX-3100) | X | X | IP | | Inovio |
| | Head and neck cancer (MEDI0457) | X | X | IP | | MedImmune/AstraZeneca |
| | Bladder cancer (INO-5401 + atezolizumab) | X | X | IP | | Genentech/Roche |
| | Glioblastoma (INO-5401 + cemiplimab) | X | X | IP | | Regeneron |
| | Prostate cancer (INO-5150 + INO-9012) | X | X | SP | | Inovio |
| | hTERT expressing cancers (breast, lung, pancreatic) (INO-1400 + INO-9012) | X | IP | | | Inovio |
| Infectious Disease | Hepatitis B Virus (INO-1800) | X | IP | SP | | Inovio |
| | Zika (GLS-5700) | X | IP | | | GeneOne Life Sciences |
| | Ebola (INO-4212) | X | IP | | | GeneOne Life Sciences/DARPA |
| | MERS (GLS-5300) | X | IP | | | GeneOne Life Sciences/IVI |

| | | | | |
|---|---|---|---|---|
| HIV (preventive & therapeutic) (PENNVAX®-GP) | X | IP | SP | NIH/NIAID |

X = Completed
IP = In Progress
SP= Seeking Partner

Cancer Vaccines/Immunotherapies

Background

In recent years there have been multiple technology advancements and product approvals that have highlighted the potential of immunotherapies to usher in a new era of cancer therapeutics. Monoclonal antibodies (mAbs) such as Herceptin® and dendritic cell therapy Provenge® for prostate cancer have had their varying degrees of success. While a significant step forward, suitable monoclonal antibodies with desired characteristics have been difficult to design or identify and expensive to produce, and the technology does not lend itself to designing mAbs for many diseases. Dendritic or other cell-based therapy is

a highly personalized medicine involving removing cells from the patient, modifying them, multiplying them, then returning them to the body. Besides the high cost and complex processes to manufacture the product, one of the glaring weaknesses of this approach is that it has not been shown to generate high levels of cancer-specific T cells.
Progress in the field of immune checkpoint inhibitors (CIs) created significant optimism regarding the potential for new immunotherapies against a spectrum of cancers. The immune system relies on a safeguard system of checkpoint mechanisms to prevent excessive or incorrectly directed immune responses. Many cancer cells have the ability to "hijack" these checkpoints and neutralize T cells sent by the immune system to eliminate them. Checkpoint inhibitors prevent cancer cells' ability to interfere with these checkpoints and enable T cells (especially CD8 killer T cells) to complete their appropriate and intended killing function against cancer cells. Clinical trials of checkpoint inhibitors have shown notable therapeutic impact against melanoma and other cancers, but with response rates in the 15-20% range (and only in the case of melanoma going up to the 40% range), there remains an important and valuable opportunity to improve these results. Observations suggest CIs may be less effective if there is not a high enough pre-existing level of antigen-specific CD8 T cells in the tumor micro-environment, meaning that the tumor is "cold" rather than "hot" (with a significant level of T cells). More recently, scientists have recognized that a strong T cell generating "active" immunotherapy may be able to transform a "cold" tumor into a "hot" tumor and in combination with a checkpoint inhibitor may possess significant therapeutic potential to fight cancers.
More recently, a new category of immunotherapies called adoptive cell transfer, for example CAR-T technology, has provided further evidence of the merit of providing an enhanced T cell presence to fight cancer. CAR-T therapies have achieved dramatic results in B cell cancers. Unfortunately, they have also been associated with significant side effects. When this technology has been applied to solid tumors, it has generated significant cytokine storms that have resulted in severe side effects, including deaths. Moreover, adoptive cell transfer such as CAR-T, like dendritic cell therapy, involves removing T cells from a patient, modifying them to better target a cancer cell, multiplying the T cells, then returning them to the patient. These complex therapeutic products need to be manufactured and released for each patient, leading to expensive manufacturing and increased supply chain complexity.
Even though there have been promising technology advancements in recent years that better harness or activate capable killer T cells, we believe there is still significant untapped potential to develop "ideal" immunotherapies to fight cancers and infectious diseases.
What is an "ideal" active immunotherapy? We want products that are effective, efficient, and safe. Specifically we want immunotherapies that:

- target disease-specific antigens or proteins unique to a cancer or infectious disease;
- do not depend on complex manufacturing processes such as removal of dendritic cells or T-cells from the patient that are then modified in the laboratory, amplified and then re-introduced in the patient as autologous or allogeneic cell based therapies;
- activate functional killer T cells with the necessary killing tools, such as granzyme and perforin;
- generate robust T cell responses or a significant number of T cells, that are persistent and durable over time (memory response;
- do not induce unwanted immune responses;
- do not induce toxic inflammatory responses; and
- are capable of "breaking tolerance" of cancer cells grown in the body.

Our Phase 2b data (discussed below) show we are achieving these ideal characteristics with our active immunotherapy approach to activating significant antigen-targeted T cells and we are advancing a growing pipeline of pre-clinical and clinical immunotherapy products.
Our HPV Immunotherapy-VGX-3100 for the Treatment of Cervical High Grade Squamous Intraepithelial Lesions (HSIL)
Overview and Background
Human papillomavirus, or HPV, is a causative agent responsible for cervical pre-cancers (cervical dysplasia), cervical cancer, other anogenital cancers, and head & neck cancer, which is one of the most rapidly growing cancers in men. At any given time, approximately 11% of the world's population is infected with HPV.
HPV is the most common viral infection of the reproductive tract and is the major cause of cervical cancers. Almost 300 million women globally are estimated to be infected with HPV, with another 30 million additional cases that have

progressed to the pre-cancerous stage. Every year over 500,000 new cases of cervical cancer are diagnosed world-wide and approximately half of these women die. Virtually all cases are linked with persistent infection with HPV. Challenges with acceptance, accessibility, and compliance of preventive vaccines have resulted in only 40% of young women being vaccinated in the United States, and even less in other countries around the world.

While roughly 90% of HPV infections are cleared by the body's own immune system, persistent HPV infection can lead to high grade cervical dysplasia (CIN 2/3) and, if untreated, eventually invasive cervical cancer. Researchers have estimated the global prevalence of clinically pre-cancerous HPV infections at between 28 and 40 million. HPV 16 and 18 are the two most prevalent high-risk types of HPV worldwide, causing the significant majority of HPV-related cancers. HPV 16/18 are found in 52% of all high grade pre-cancerous cervical lesions and 70% of cervical cancers. There is an annual incidence rate of lower-grade cervical dysplasia (CIN 1) caused by HPV types 16 and 18 of 1.4 million persons in the United States and 1.3 million persons in the top 5 European countries. There is an annual incidence rate of CIN 2/3 caused by HPV types 16 and 18 of 195,000 persons in the United States and 233,000 persons in Europe. These represent a significant market opportunity. CIN 1 has no treatment. CIN 2/3 can only be treated by an invasive surgical procedure.

There are currently two FDA approved preventive vaccines, Gardasil® and Cervarix®, that protect against HPV types 16 and 18, as well as types 6 and 11 (Gardasil®). Preventive HPV vaccines cannot treat or protect those already infected with HPV, which is a large population. In addition, not all girls and women eligible to be vaccinated are receiving these vaccines. In 2013, a U.S. national survey found that 57% of girls aged 13-17 years had received at least one dose of the HPV vaccine series, but only 38% had received all three doses in the series. In 2014, only 40% had received the full regimen. Currently there is no viable immunotherapy or drug to fight established HPV infection or treat cervical dysplasia and/or cancer caused by HPV.

Current treatment options for cervical dysplasia are unappealing. The “watch-and-wait” process associated with low grade dysplasia (CIN 1) is a stressful approach. The only available treatment option for high grade cervical dysplasia (CIN 2/3) is surgery, which involves ablating or cutting a women’s cervix to remove the pre-cancerous lesions. While surgical procedures are generally effective in removing lesions, they can lead to cervical scarring and longer-term reproductive risks such as pre-term birth, miscarriage, and infertility. Current CIN excisional and ablative procedures increase risk of pre-term births from 5.6% to 10.7% according to Kyrgiou et al in a meta-analysis published June 2016 in the British Medical Journal. Anticipation of these procedures produces significant anxiety for patients, despite their doctor’s reassurances, and full recovery from surgery can take up to several weeks. Because surgery does not clear the underlying HPV infection, there is a 10-16% chance of pre-cancer lesion recurrence as a result of persistent infection or incomplete removal of the lesion during surgery.

Our product candidate VGX-3100 is designed to significantly increase T cell immune responses against the E6 and E7 antigens of HPV types 16 and 18 that are present in both pre-cancerous and cancerous cells transformed by these HPV types. E6 and E7 are oncogenes that play an integral role in transforming HPV-infected cells into pre-cancerous and cancerous cells. The goal of the immunotherapy is to stimulate the body's immune system to mount a killer T cell response strong enough to cause the killing of cells producing the E6/E7 protein. The potential of such an immunotherapy would be to treat pre-cancerous dysplasias caused by these HPV types.

Phase 2b Study Results

Based on the positive results from a Phase 1 clinical trial, in March 2011 we initiated a randomized, placebo-controlled, double-blind Phase 2b study of VGX-3100 delivered using our CELLECTRA® intramuscular electroporation device in women with HPV type 16 or 18 and diagnosed with, but not yet treated for, high grade cervical intraepithelial neoplasia (CIN 2/3). The women in the study received either 6 mg of VGX-3100, the highest dose used in the Phase 1 clinical trial, or a placebo. VGX-3100 and placebo were administered using the CELLECTRA® in vivo electroporation device at months 0, 1, and 3. The study assessed efficacy by measuring regression of cervical lesions from CIN 2/3 to CIN 1 or normal in the treated versus control subjects. Immunological responses were also measured in this clinical study to assess the ability of this therapy to generate strong T cell responses in a larger, controlled study. Safety was also assessed.

The primary endpoint of the trial, histologic regression, was evaluated 36 weeks after the first treatment. In the per protocol analysis of this three-immunization regimen, CIN2/3 resolved to CIN1 or no disease in 53 of 107 (49.5%) women treated with VGX-3100, compared to 11 of 36 (30.6%) who received placebo. This difference was statistically significant (p=0.017). Intent to treat results were also similar and statistically significant.

There was also a high level of complete clearance of CIN 2/3. In a post-hoc analysis, CIN 2/3 resolved to no disease in 43 of 107 (40.2%) women treated with VGX-3100, compared to 6 of 36 (16.7%) who received placebo (p=0.006).

A secondary endpoint of the trial was virological clearance of HPV 16 or 18 from the cervix in conjunction with histopathological regression of cervical dysplasia to CIN1 or no disease. This endpoint was achieved in 43 of 107 (40.2%) VGX-3100 recipients, compared to 5 of 35 (14.3%) placebo recipients (p=0.001). We believe this is an important outcome, as persistence of the HPV virus is associated with recurrence of cervical dysplasia.
All Phase 2b patients were monitored for an additional 52 weeks for a safety follow up. No significant safety issues were observed through week 88 following treatment.

In September 2015, this data was published in The Lancet in a paper entitled, “Safety, efficacy, and immunogenicity of VGX-3100, a therapeutic synthetic DNA vaccine targeting human papillomavirus 16 and 18 E6 and E7 proteins for cervical intraepithelial neoplasia 2/3: a randomized, double-blind, placebo-controlled Phase 2b trial.”

This paper reported further details regarding the characteristics of T cells generated and their association with efficacy outcomes. Analyses of patient immune responses showed that overall antigen-specific T cell levels in women treated with VGX-3100 were greater than those treated by placebo at all observation periods. At week 14, levels of CD8 T cells specific to the E6 and E7 HPV antigens in women treated with VGX-3100 were ten times greater than those in the placebo group. This response increased with each of the three immunizations, then declined modestly to a sustained and durable level of T cells (memory T cells) measured through 36 weeks (24 weeks post-treatment). Patients whose lesions regressed had higher frequencies of HPV-specific CD8+T cells which co-expressed key molecules important in the T cell killing cascade and directly correlated with clinical efficacy. Specifically, higher levels of CD8+ killer T cells co-expressing checkpoint molecule CD137 on their surface, as well as the cytolytic protein perforin, were observed to be a predictive tool for efficacy. As a strong activation marker for CD8+ T cells, stimulation through CD137 has been shown in some systems to confer resistance of CD8+ T cells to the suppressive activity of regulatory T cells, indicating that its presence can identify tumor reactive T cells. Perforin is a pore-forming protein deployed by killer T cells to bore holes into the target cell's plasma membrane and destroy the cell. The difference in frequencies of CD8+ cells expressing CD137 and perforin was greatest in patients who had both regressed their lesions and cleared HPV as compared to patients who did not.

This is the first publication to our knowledge that demonstrates the correlation of antigen-specific CD8 T cells generated in vivo directly to clinical efficacy. We have identified several key biomarkers of killer T cells that we believe can be used to predict the clinical efficacy of VGX-3100, as well as other immunotherapies, which we will seek to confirm in future clinical trials.

Our Phase 2b clinical trial of VGX-3100 highlights the ability of a DNA-based immunotherapy to be locally administered in tissue distant from the diseased tissue target, generate robust functional CD8+ killer T cells, traffic those T cells to the diseased tissue, infiltrate diseased cells displaying the target antigen, and facilitate the elimination of these cells both in “healthy” tissue and in diseased tissue (a lesion) with a statistically significant, clinically relevant outcome. We believe these results have significant implications in displaying the broad therapeutic and preventive potential of our existing and future cancer and infectious disease products.

Preparation and launch of VGX-3100 registration Phase 3 study

In preparation for pivotal Phase 3 development and commercialization, we completed a manufacturing technology-transfer to a commercial manufacturing facility and scaled up manufacturing of VGX-3100.

We also designed and manufactured a new electroporation device for commercial use, our CELLECTRA® 5PSP device, which is fully automated, smaller and more user-friendly compared to our device previously used in Phase 1 and Phase 2 clinical trials.

We have conducted additional market research with physicians and patients that have further characterized the unmet medical needs relating to the treatment of high grade cervical dysplasia (CIN 2/3). These include a preference for a non-invasive, non-surgical procedure for removing cervical lesions; a treatment that can clear HPV, the cause of the pre-cancer, throughout the body and not just in the limited area of the lesion; and a treatment that has no risk of causing pre-term births or infertility. We believe that CIN 2/3 represents a unique market opportunity for a novel therapy capable of providing a first-line alternative to surgery. This market research will help guide our communication and interaction with the physician, patient, and support communities.

Phase 3 program for VGX-3100 (REVEAL)

Our Phase 3 program, named REVEAL (Randomized Evaluation of VGX-3100 and Electroporation for the Treatment of Cervical HSIL), consists of a primary study (REVEAL 1) and confirmatory study (REVEAL 2), in accordance with the FDA's general guidance for Phase 3 programs, to be conducted in parallel. The studies will each enroll 198 patients in more than 100 study centers globally. Mark Einstein, MD, MS, FACS, FACOG, Professor and Chair Department of Obstetrics, Gynecology and Women’s Health Assistant Dean, Clinical Research Unit, Rutgers New Jersey Medical School, is Principal Investigator for the studies.

The REVEAL studies are prospective, randomized (2:1), double-blind, placebo-controlled trials evaluating adult women with HPV 16/18 positive biopsy-proven cervical HSIL (also known as CIN 2 or 3). The primary endpoint is

regression of cervical HSIL AND virologic clearance of HPV-16 and/or HPV-18 in the cervix. The studies will evaluate cervical tissue changes at approximately 9 months after beginning a three-dose regimen of VGX-3100 administered at months 0, 1, and 3. Secondary endpoints include safety; tolerability; regression of CIN 2/3 to CIN 1 or normal; virologic clearance of HPV; efficacy measured by non-progression to cancer; and clearance of HPV from non-cervical anatomic locations.

VGX-3100 for the Treatment of Vulvar High Grade Squamous Intraepithelial Lesion (HSIL)

In April 2017, we commenced a Phase 2 trial to evaluate the efficacy of VGX-3100 in patients with pre-cancerous lesions of the vulva, or vulvar intraepithelial neoplasia (VIN). VIN has less than a 5% rate of spontaneous, or natural, regression and there are no FDA approved non-surgical treatments. Surgery, the most common treatment, is associated with high rates of disease recurrence and can cause disfigurement, long-term pain, and psychological distress for the women who undergo the procedure. VIN recurs in approximately one of every two patients who undergo surgical treatment.

This randomized, open-label Phase 2 clinical trial will assess the efficacy of VGX-3100 in 36 women with high-grade HPV-related vulvar lesions. The immunotherapy will be administered with our CELLECTRA® intramuscular delivery device. The primary endpoint of the study is histologic clearance of high-grade lesions and virologic clearance of the HPV virus in vulvar tissue samples. The study will also evaluate safety and tolerability of VGX-3100.

We also plan to expand the clinical development program for VGX-3100 to include the potential treatment anal intraepithelial neoplasias, or AIN, with the intent to launch a Phase 2 study in 2018.

Further Analysis of VGX-3100 Phase 2b Data Reveals Immune Correlates and Biomarker Signatures

In November 2017, we announced that a post-hoc analysis of data generated from our Phase 2b trial of VGX-3100 identified immune correlates and biomarker signatures that were predictive of potential treatment success. Details of the new biomarker and immunologic data are highlighted in the peer-reviewed journal Clinical Cancer Research in the article, “Clinical and Immunologic Biomarkers for Histologic Regression of High-grade Cervical Dysplasia and Clearance of HPV-16 and HPV-18 after Immunotherapy,” by Inovio and its academic collaborators.

ApolloBio Commercial Agreement

In December 2017, we entered an amended agreement providing ApolloBio Corporation with the exclusive right to develop and commercialize VGX-3100 within Greater China (China, Hong Kong, Macao, Taiwan). Additional details on the ApolloBio Agreement are provided below under "Business-License, Collaboration and Supply Agreements".

Our HPV Immunotherapy-MEDI0457 (VGX-3100 +DNA-Based IL-12 Cytokine INO-9012) for the Treatment of Head & Neck Cancer

Overview and Background

HPV is also associated with some head and neck cancers, especially those in the oropharynx and perhaps to some extent the larynx and oral cavity. The incidence of HPV-caused oropharyngeal cancer has increased significantly within the last 30 years, including a 225% increase from 1988 to 2004, and is the fastest-rising cancer among young white men in the United States. In the United States, approximately 12,000 new cases of HPV-caused oropharyngeal cancer are diagnosed annually in men and women combined. The estimated U.S. prevalence of HPV-caused oral cavity and pharynx cancer was approximately 104,000 cases in 2014.

By 2020, scientists estimate that HPV will cause more cases of oropharyngeal cancer than cervical cancer and by 2025 HPV will be the causative factor of 90% of all head & neck cancers, up from 63% currently. Greater than 70% of cancers of the oropharynx are linked to HPV, with HPV16 being the most prevalent serotype of those HPV-caused cancers.

Improvements in primary treatment modalities (surgery and radiation) have produced significant improvements in morbidity, but intensive radiation has a profound long-term impact on mortality and quality of life. Based on these factors, we believe there is a significant opportunity for an effective immunotherapy.

Clinical Development

In June 2014, we initiated a Phase 1 clinical trial assessing the immunogenicity and safety of our product candidate INO-3112 (consisting of VGX-3100 in combination with a DNA-based IL-12 cytokine (INO-9012)) in head & neck cancer patients. We added our DNA-based IL-12 immune activator to VGX-3100 for this cancer study because our prior HIV vaccine clinical study had indicated that the addition of IL-12 to our DNA immunotherapy could enhance the activation of CD8 T cells.

We enrolled 22 adults with HPV16 and/or HPV18-positive head & neck squamous cell carcinoma (HNSCC) in this open-label Phase 1 trial. Patients were treated with INO-3112 and then followed for safety, immune and clinical responses. In one part of the study, 6 patients were treated with INO-3112 before and after resection of their tumor. In the second part of the study, 16 patients were treated with INO-3112 after completion of chemotherapy and radiation therapy. Each INO-3112 treatment was administered using our CELLECTRA® delivery system.

In November 2015, we reported interim data showing that INO-3112 had generated robust HPV16/18 specific CD8+ T cell responses and antibodies against HPV16/18 in all 10 tested patients for whom data analyses were complete at that time. The treatment was well tolerated in all evaluable patients.

In November 2016, at the Annual Meeting of the Society for Immunotherapy of Cancer (SITC), we reported interim immunology results showing that in the group of six patients treated before resection (one dose averaging 14 days and ranging 7 to 28 days prior to definitive surgery) and post-surgery (three additional doses), INO-3112 generated robust HPV16/18 specific CD8+ T cell responses in peripheral blood in four of five subjects who also showed increased T cell activation in resected tumor tissue samples. One subject withdrew consent after surgery, leaving five evaluable subjects in this group. These four subjects remained disease-free in continuing follow-up that ranged from nine to 24 months at the time of analysis. One subject with minimal increases in T cell immune responses developed progressive disease at 11 months after treatment.

CD8+ and FoxP3 T cell expression were evaluated in tumor samples obtained before and after surgery. In addition, ELISpot analysis was performed to determine the number of T cells capable of secreting IFN-ã in response to HPV antigen stimulation. Four of five subjects had robust T cell response as measured by blood ELISpot assay, and the same four subjects also showed an average increase of 60% of CD8+ to FoxP3 ratio measured by immunohistochemistry post vaccination, demonstrating increased infiltration of CD8+ T cells as well as reduction of regulatory T cells measured by FoxP3 expression in tumor tissue.

The second treatment group enrolled 16 subjects who received four doses of INO-3112 after at least two months following completion of definitive chemoradiation or surgery and adjuvant chemoradiation therapy.

Collaboration with MedImmune

In August 2015, we formed a strategic collaboration with MedImmune, LLC, the global biologics research and development arm of AstraZeneca, focused on cancer immunotherapies. Under this agreement MedImmune licensed INO-3112 (renamed MEDI0457), to be studied in combination with selected immunotherapy molecules within its pipeline in HPV-driven cancers. See “Business- License, Collaboration and Supply Agreements” for additional information about the collaboration agreement. Emerging evidence suggests that the benefits from immuno-oncology molecules, such as those in MedImmune's portfolio, can be enhanced when they are used in combination with cancer vaccines that generate tumor-specific T-cells.

In May 2017, we announced that MedImmune will conduct a Phase 1/2 clinical trial investigating the combination of MEDI0457 and durvalumab, a PD-L1 checkpoint inhibitor. The combination trial will enroll patients with metastatic HPV-associated SCCHN with persistent or recurrent disease after chemotherapy treatment.

The open-label clinical trial is designed to evaluate the safety and efficacy of the combination therapy in approximately 50 subjects at multiple U.S. sites. Subjects will receive multiple doses of MEDI0457 and durvalumab. The primary endpoints of the trial are safety and objective response rate. The trial will also evaluate immunological impact, progression-free survival and overall survival.

Under our collaboration agreement, MedImmune will fund all of the costs of this trial.

Our Prostate Cancer Immunotherapy-INO-5150

The development of a new treatment for prostate cancer would be a significant medical advance given that present treatment options (surgery, radiation and hormone deprivation), while somewhat effective, all carry deleterious side effects and often do not confer long-term cure. Across the United States, there were 238,000 new cases of prostate cancer and more than 29,000 deaths in 2013.

In July 2015, we initiated a Phase 1 trial to evaluate our DNA immunotherapy for prostate cancer, INO-5150, in men with biochemically relapsed prostate cancer. This study is evaluating the safety, tolerability and immunogenicity of INO-5150 alone or in combination with INO-9012, Our DNA-based IL-12 immune activator. The multi-centered study is also evaluating changes in prostate specific antigen, or PSA, levels, an important biomarker in prostate cancer. We have fully enrolled 62 patients in the trial across 4 dose cohorts.

An interim data analysis presented in September 2017 at the European Society of Medical Oncology (ESMO) meeting in Madrid, Spain showed that INO-5150 had generated antigen-specific CD8+ killer T cell responses measured in peripheral blood from subjects with biochemically recurrent prostate cancer. Treatment with INO-5150 as a monotherapy generated PSA and prostate specific membrane antigen, or PSMA, specific T cell responses in peripheral blood in 60% (35/58) of the subjects. Patients with specific CD8+ T cell responses experienced dampening in the rise of PSA and significant increases in PSA Doubling Times (PSADT).

We are seeking strategic collaborators in order to continue the development of INO-5150.

Our hTERT Immunotherapy-INO-1400

Human telomerase reverse transcriptase (hTERT) is a significant cancer immunotherapy target. High levels of hTERT have been detected in more than 85% of all human cancers, including breast, lung, and pancreatic cancers, while normal cells showed undetectable levels of telomerase expression. Immunological analysis indicated that hTERT is a widely applicable target recognized by T-cells and can be potentially used as a universal cancer immunotherapy. In 2017, over 530,000 new cases of breast, lung, or pancreatic cancers were reported in the United States and over 240,000 people died from these

cancers. Despite available treatments, mortality rates remain unacceptably high in these tumor types. In addition, many existing treatment modalities are associated with significant adverse events.

In December 2014, we initiated a Phase 1 clinical trial of INO-1400 alone or in combination with INO-9012 in adults with breast, lung or pancreatic cancer at high risk of relapse after surgery and other cancer treatments. This open label, dose escalation study is evaluating the safety, tolerability, and immunogenicity of INO-1400, as well as another hTERT construct called INO-1401. To date, we have treated 90 patients with nine different types of solid tumors. All patients received treatment using our CELLECTRA® delivery device.

In November 2017, in poster presentations at the SITC Annual Meeting, we reported additional results from the ongoing Phase 1 trial in which that INO-1400 generated hTERT-specific IFN-gamma secreting T cells, suggesting an ability to break immune tolerance.

INO-1400 is also part of our product candidate INO-5401, an immunotherapy comprising hTERT and two other tumor-associated antigens for which we intend to initiate a clinical study in combination with a checkpoint inhibitor.

Our Cancer Immunotherapy-INO-5401

Our immunotherapy product candidate INO-5401 is comprised of three tumor-associated antigens, Wilms' tumor gene, or WT1, as well as hTERT and PSMA.

In February 2017, we reported data indicating that our SynCon® WT1 cancer antigen was capable of breaking immune tolerance - a major challenge to researchers striving to develop potent cancer therapies -- and induced neo-antigen-like T cell responses to cause tumor regression in pre-clinical studies. The results were published in Molecular Therapy in an article entitled, “A novel DNA vaccine platform enhances neo-antigen-like T-cell responses against WT1 to break tolerance and induce anti-tumor immunity.”

While mice in a preclinical study did not mount an immune response to native mouse WT1 antigens, mice immunized with our SynCon® WT1 antigen broke tolerance and generated robust neo-antigen-like T cells. The immunized mice also exhibited smaller tumors and prolonged survival in a tumor challenge study. SynCon® WT1 DNA vaccination also broke tolerance and generated neo-antigen-like T cell immune responses in Rhesus monkeys, a species whose immune system closely resembles that of humans. The ability to overcome the immune system’s usual tolerance of WT1 antigen suggests the potential of our SynCon® WT1 antigen to tackle any WT1-expressing cancer in humans, including pancreatic, brain, lung, thyroid, breast, testicular, ovarian, and melanoma.

We previously reported similar results for our SynCon® hTERT and PSMA cancer antigens.

The National Cancer Institute previously highlighted WT1, hTERT and PSMA among a list of attractive cancer antigens, designating them as high priorities for cancer immunotherapy development. WT1 was at the top of the list. The hTERT antigen relates to 85% of cancers and WT1 and PSMA antigens are also widely prevalent in many cancers.

These attributes of breaking tolerance and having broader prevalence across different cancers create the potential for INO-5401 to be an effective universal cancer immunotherapy in combination with different checkpoint inhibitors.

INO-5401 for Metastatic Bladder Cancer Treatment

Nearly 430,000 new cases of urinary bladder cancer are diagnosed each year worldwide; it accounts for about 165,000 deaths worldwide annually. Advanced unresectable or metastatic urothelial carcinoma, or UC, the most common type of bladder cancer, remains a high unmet medical need, as survival remains poor for most patients who experience disease progression or intolerance to treatment during or after platinum-containing chemotherapy. The approval of several checkpoint inhibitors for advanced unresectable or metastatic UC has improved response and survival rates for some patients; however, the majority of patients do not experience meaningful clinical responses to checkpoint inhibitor monotherapy.

In October 2017, we announced an initiation of a Phase 1b/2 immuno-oncology trial to evaluate Genentech/Roche’s atezolizumab (TECENTRIQ®) in combination with INO-5401 and INO-9012. We will manage the multi-center, open-label efficacy trial, and Genentech will supply atezolizumab. The trial will evaluate the safety, immune response and clinical efficacy of the combination therapy in approximately 80 patients with advanced bladder cancer, specifically advanced unresectable or metastatic UC. The majority of the patients to be enrolled in the trial will have previously received and failed to demonstrate meaningful response to an anti-PD-1 or PD-L1 checkpoint inhibitor alone. The study will evaluate the potential benefit of a checkpoint inhibitor combined with a DNA-based immunotherapeutic and T cell activator within a bladder cancer patient population with very limited treatment options

and poor outcomes. The immunologic analyses accompanying the study will provide further insight into mechanisms of checkpoint inhibition and T cell activation in bladder cancer.

In November 2017, we announced the results of preclinical studies in which researchers observed a synergistic effect in combining our TERT (telomerase reverse transcriptase) cancer immunotherapy with a checkpoint inhibitor. In a mouse model, the combination resulted in robust anti-tumor effects and significant improvement in survival compared to either therapy alone. These results were detailed in a paper published in Molecular Therapy entitled, “Synergy of Immune Checkpoint

Blockade with a Novel Synthetic Consensus DNA Vaccine Targeting TERT". This published paper highlights the potential benefits of DNA immunotherapy/immune checkpoint blockade combinations using PD-1 or CTLA4 checkpoint inhibitors in patients that respond poorly to immune checkpoint blockade alone, allowing for improved rational design of potential combination therapies. These preclinical results also suggest that the synergistic anti-tumor effect is due to the effect of immune checkpoint blockade on expanding effector T cells generated from the TERT therapy in the tumor microenvironment rather than boosting vaccine responses in the periphery.

INO-5401 for Glioblastoma Multiforme (GBM) Treatment

GBM is a devastating disease for both patients and caregivers. It is the most aggressive brain cancer and its prognosis is extremely poor, despite a limited number of new therapies approved over the last 10 years. The median overall survival for patients receiving standard of care therapy is approximately 15 months and the average five-year survival rate is less than three percent.

In November 2017, we initiated a Phase 1b/2a immuno-oncology trial in patients with newly diagnosed GBM designed to evaluate cemiplimab (also known as REGN2810), a PD-1 inhibitor developed by Regeneron Pharmaceuticals, in combination with INO-5401 and INO-9012.

The open-label trial of 50 patients will be conducted at approximately 30 U.S. sites, and the primary endpoints are safety and tolerability. The study will also evaluate immunological impact, progression-free survival and overall survival.

Infectious Disease Vaccines/Immunotherapies

Our Hepatitis B Virus-INO-1800

Although an effective preventive vaccine against hepatitis B virus, or HBV, infection has existed for over three decades, HBV remains a major epidemic, especially among people of Asian and African descent. The World Health Organization estimates that 2 billion people globally have been infected with HBV, with over 257 million people chronically infected with the virus and at risk of developing cirrhosis or liver cancer. It is estimated that over two million people in the United States are infected with the virus. Currently, the only therapies available for chronically infected individuals are interferon-alpha and nucleoside analog treatments, which function by controlling viral replication, but they do not clear infection. Interferon can prevent viral replication in only 30% of patients and does so with undesirable side effects.

Liver cancer is the second most common cause of death from cancer worldwide, killing most patients within five years of diagnosis. About 782,000 new cases arise each year. One of the major causes and risk factors for liver cancer is infection by hepatitis B. Chronically infected individuals may develop a permanent scarring of the liver, a condition called cirrhosis. Liver cirrhosis can evolve into hepatocellular carcinoma, which claims 746,000 lives annually.

INO-1800 is encoded for the HBcAg antigen and represents a consensus of the unique HBcAg DNA sequences of all major HBV genotypes (A through E). When delivered by electroporation, in a preclinical study, INO-1800 elicited strong HBcAg-specific T cell and antibody responses in the periphery (outside of the liver) as measured by ELISpot, ICS and cell proliferation assays. Researchers observed that the immunization could also induce antigen-specific CD8 and CD4 T cells that produced both IFN-y and TNF-a in the liver, indicating that a strong immunotherapy-induced T cell response was also present in the liver.

In the preclinical study, the antigen-specific T cells exhibited a killing function and were able to migrate to and stay in the liver and cause clearance of target cells without any evidence of liver injury. This was the first study to provide evidence that intramuscular immunization could induce killer T cells that can migrate to the liver and eliminate target cells.

In April 2015, we initiated a Phase 1 trial to evaluate INO-1800 in patients chronically infected with HBV. This randomized, open-label, active-controlled, dose escalation study was designed to evaluate the safety, tolerability, and immunogenicity of INO-1800 alone or in combination with INO-9012. This international study enrolled patients in the United States and Asia Pacific region with a primary endpoint of safety and tolerability of the therapy. Secondary endpoints are evaluating the cellular and humoral immune response to INO-1800 and its effect on several viral and antiviral parameters. All trial subjects are also medicated with standard-of-care antiviral therapies.

We expect to report interim data from this Phase 1 clinical trial in the first quarter of 2018.

Our Vaccines for Emerging Infectious Diseases

Recognizing the impact of epidemic outbreaks of infectious diseases and the potential of DNA-based technology to play a vital role in rapidly and effectively addressing such diseases, we have been proactively advancing specific product development initiatives with an array of academic, government, non-government, and private collaborators in areas including Zika, Ebola, and MERS.

Zika Virus Overview

First identified in the late 1940s in Uganda, Zika virus subsequently spread to equatorial Asia in 1969 and then rapidly spread through the Pacific, and still later, in the 2014-2016 period, to and through South America, Central America and the Caribbean. In the end of that period, Zika virus emerged in two portions of the continental United States (extreme Southeastern Florida and extreme South Texas). Zika virus is a flavivirus, a family of viruses including yellow fever, dengue, and West Nile virus, which are introduced to people through mosquito bites. Because the Aedes species of mosquitoes that spread Zika virus are found in much of the world, there is concern that the virus will spread to new countries and cause additional outbreaks. There is also concern that Zika spreads sexually in humans, at least by males to females, as has been reported for some returning travelers and documented in multiple studies.

In February 2016, the WHO stated that 39 countries had reported locally acquired circulation of the Zika virus since January 2007. Geographical distribution of the virus has expanded, and currently the WHO lists at least 93 countries as having risk of Zika virus infection. No vaccine or therapy currently exists for the Zika virus.

The most common symptoms of Zika virus are fever, rash, joint pain, and conjunctivitis. More seriously, health authorities have observed neurological and autoimmune complications potentially associated with Zika virus, including microcephaly in newborn children and Guillain-Barre syndrome. Microcephaly is a rare condition marked by an abnormally small head and incomplete brain development. There may also be a link with Guillain-Barré syndrome, a disease in which the body's immune system mistakenly attacks peripheral nerves. Symptoms start with muscle weakness. In severe cases the person is almost totally paralyzed and the disorder can be life threatening.

In January 2016, we and GeneOne announced a joint research collaboration with academic collaborators of a SynCon® Zika virus vaccine known as GLS-5700.

Preclinical Studies- Zika Virus

In February 2016, we announced that our Zika vaccine administered using our CELLECTRA® electroporation delivery device resulted in seroconversion, or the development of detectable specific antibodies in the blood, in all vaccinated mice. The vaccinations also generated robust and broad T cell responses as analyzed by the standardized T cell ELISPOT assay. In data reported in May 2016, two doses of the Zika DNA vaccine delivered either intramuscularly or intradermally resulted in seroconversion, in all vaccinated non-human primates and broad T cell responses as analyzed by the standardized T cell ELISPOT assay.

These results were later published in Nature Partner Journals (npj) Vaccines in November 2016. Additional data indicated that in the study GLS-5700 protected animals from infection, brain damage and death. All GLS-5700 vaccinated animals were protected from Zika infection after exposure to the virus. In addition, vaccinated mice were protected from degeneration in the cerebral cortex and hippocampal areas of the brain while unvaccinated mice showed significant degeneration of the brain after Zika infection.

Prior preclinical studies have tested potential Zika vaccine candidates in animal models involving normal mice and non-human primates that are naturally resistant to Zika. While providing useful immunology data, they cannot provide relevant evidence of an effective means of controlling the spread or medical impacts of this disease by vaccination. In addition to reporting immunogenicity in such Zika-resistant species, this paper represents the first published research to also analyze a Zika vaccine using the special transgenic murine strain A129 lacking interferon alpha and beta receptors (IFNAR-/-), making them highly susceptible to Zika infection and disease. Taking this extra step provided stronger data on how vaccine-generated immune responses could protect against a lethal viral challenge and demonstrates the benefit a Zika vaccine might provide in people.

In another preclinical study, the results of which were published in June 2017, GLS-5700 was observed to have protected against Zika virus-induced damage to testes and sperm, and prevented persistence of the virus in the reproductive tract of all vaccinated male mice challenged with a high dose of the Zika virus. This preclinical study data was published in Nature Communications in an article entitled, “DNA Vaccination Protects Mice Against Zika Virus-Induced Damage to the Testes”.

Phase 1- 40 Patient Zika Study in U.S. & Canada

In June 2016, we were the first to commence a human Zika trial in healthy adult volunteers, with sites in the U.S. and Canada, with the first subject dosed in July. This Phase 1, open-label, dose-ranging study of 40 healthy adult volunteers was designed to evaluate the safety, tolerability and immunogenicity of GLS-5700 administered with CELLECTRA®-3P, our intradermal DNA delivery device.

In this Phase 1 trial, a total of 40 participants (20 in each of two groups) received GLS-5700 in a 1 mg or 2 mg dose. The vaccine was administered in 0.1 ml intradermal injections. In October 2017, we announced positive safety and immune response results from the Phase 1 trial. The GLS-5700 Zika vaccine induced binding antibodies in 100% of the participants after a three-dose vaccination regimen and in 95% after two doses of vaccine. In addition, neutralizing antibodies were observed in more than 95% of the serum samples that were assayed on neuronal-cell targets. Serum samples from vaccinated subjects when subsequently transferred to mice were found to be protective from death and illness in more than 90% of

animals after they were challenged with a lethal dose of the Zika virus. These results appeared in the New England Journal of Medicine in the article, “Safety and Immunogenicity of an Anti-Zika Virus DNA Vaccine.”

Phase 1- 160 Patient Zika Study in Puerto Rico

In August 2017, we and GeneOne initiated a second clinical trial of GLS-5700. In this second trial, we have enrolled 160 subjects in Puerto Rico, where the Zika virus outbreak has been declared a public health emergency. In this placebo-controlled, double-blind trial involving healthy adult volunteers, 80 subjects have received GLS-5700 and 80 subjects have received placebo. The study will evaluate the safety, tolerability and immunogenicity of GLS-5700 administered with our CELLECTRA®-3P device. We will also assess differences in Zika infection rates in participants given either placebo or vaccine as part of an exploratory endpoint. We expect to report data from this trial in the second half of 2018.

Zika dMAb®

In December 2016, we received a $6.1 million sub-grant through The Wistar Institute (total grant value of $8.8 million) to develop a DNA-based monoclonal antibody designed to provide a fast-acting treatment against Zika infection and its debilitating effects. The goal of this program, which was funded by the Bill & Melinda Gates Foundation, is for the researchers to develop a Zika dMAb® therapy ready for human clinical trials in less than two years. See the section below entitled "Synthetic DNA-based Monoclonal Antibodies" for further information on our DNA-based monoclonal antibody program.

Ebola Virus Overview

The Ebola virus has been described as one of the most virulent viral diseases, with lethality rates approaching 90%. Ebola can spread through human-to-human transmission by direct contact with the blood, secretions, organs or bodily fluids of an infected individual and with surfaces or materials that contain the contaminated fluids of an infected person, such as bedding and clothing. It is capable of causing death within two to twenty-one days of exposure. There are no approved preventive vaccines or effective therapeutic treatments for Ebola. In addition, various experimental approaches have already been associated with undesirable side effects and limited ability to scale manufacturing. According to the CDC, the 2014 Ebola epidemic was the largest in history, resulting in 28,603 suspected and confirmed cases and 11,301 deaths as of January 31, 2016.

Preclinical and Clinical Development -- Ebola

In 2014, we entered into a collaboration with GeneOne to advance a DNA immunotherapy for Ebola into clinical development. The decision to advance our Ebola immunotherapy was based on positive results observed in preclinical studies, in which 100% of immunized guinea pigs and mice were protected from death after being exposed to the Ebola virus. Unlike the non-immunized animals, immunized animals were also protected from weight loss, a measure of morbidity. Researchers found significant increases in neutralizing antibody titers and strong and broad levels of immunotherapy-induced T-cells, including "killer" T-cells, suggesting that this product could provide both preventive and treatment benefits. This data was published in 2013 in the peer-reviewed journal Molecular Therapy in a paper titled, "Induction of Broad Cytotoxic T Cells by Protective DNA Vaccination Against Marburg and Ebola."

In April 2015, we received a $44.2 million contract from the Defense Advanced Research Projects Agency (DARPA) to lead a consortium to develop multiple treatment and prevention approaches against Ebola. Other collaborators are MedImmune, the global biologics research and development arm of AstraZeneca; GeneOne Life Sciences and its manufacturing subsidiary, VGXI, Inc.; and David B. Weiner, Ph.D., a director of our company, who also serves as executive vice president at the Wistar Institute and retired professor of Pathology and Laboratory Medicine at The Perelman School of Medicine at the University of Pennsylvania, Emory University and Vanderbilt University. The previous collaboration agreement with GeneOne for Ebola was incorporated into this consortium funded by DARPA.

We are taking a multi-faceted approach to develop products to prevent and treat Ebola infection. These programs include development and early clinical testing of:

- a therapeutic DNA-based monoclonal antibody product against the Ebola virus infection, which we believe has properties that best fit a response to the outbreak in that they could be designed and manufactured expediently on a large scale using common fermentation technology, are thermal-stable, and may provide more rapid therapeutic benefit;
- a highly potent conventional protein-based therapeutic monoclonal antibody (mAb) product against Ebola virus infection; and

- a DNA-based vaccine against Ebola.

Pathogen specific mAbs have emerged as a viable approach for immunoprophylaxis against Ebola and other pathogens where anti-viral drugs or vaccinations are not currently available. mAbs can be administered either just before or just after exposure to the pathogen and serve to combat the immediate effects of the pathogen. Unlike vaccines, immunoprophylaxis by

mAbs does not develop long-term immune memory. Therefore, an ideal approach would include the administration of a mAb for immediate protection and a vaccine to train the immune system for longer-term protection.

Previous Ebola research studies have shown that monoclonal antibodies, such as ZMapp, could be useful in treating patients who have been infected with Ebola virus by selectively binding and neutralizing the virus in the body.

Our contract with DARPA covers the pre-clinical development costs for the dMAb products and protein mAb candidates, as well as GMP manufacturing costs and the Phase 1 clinical trial costs for the three product candidates described above. Our academic collaborators are leading Ebola research and medical centers. We have completed the vaccine development milestones contemplated by the DARPA grant and are on track to complete the protein Mab and the dMAb milestones in 2018.

In May 2015, we and our collaborators initiated a Phase 1 clinical trial of INO-4212, an Ebola DNA vaccine to evaluate safety, tolerability and immune responses in 75 healthy subjects divided into five study arms. INO-4212 consists of two optimized SynCon® DNA plasmids coding for the Ebola glycoprotein antigen from circulating Ebola strains from 1975-2014. The study was designed to evaluate INO-4212 and its components INO-4201 and INO-4202, alone or in combination with INO-9012, delivered into muscle or skin using our proprietary DNA delivery technology.

In March 2016, we reported initial results from the trial. Of 69 evaluated subjects, 64 (92.8%) seroconverted and mounted a strong antibody response to the Ebola glycoprotein antigen following the three dose immunization regimen; 48 subjects (69.6%) seroconverted after only two doses.

In the study arm using intradermal (skin) administration, 13 of 13 evaluable subjects (100%) generated antigen-specific antibody responses after only two doses, and all remained seropositive after three immunizations. Similarly, in the study arm receiving the vaccine with intramuscular administration in combination with plasmid IL-12, 13 of 13 evaluable subjects (100%) produced strong antibody responses after three immunizations, and 12 of 13 (92.3%) achieved strong antibody responses after only two immunizations.

The Ebola glycoprotein specific geometric mean antibody titers measured in the five cohorts ranged from over 2,000 to greater than 46,000. Significantly, a majority of vaccinated subjects in each of the five cohorts produced strong Ebola antigen specific T-cell responses as measured by interferon gamma ELISpot analysis.

INO-4212 was well tolerated, with no systemic serious adverse effects observed. Side effects, such as fever, joint pain, and low white blood cell counts have previously been reported following treatment with some viral vector based Ebola vaccines currently in development. Moreover, unlike the viral vectored vaccines which must be kept frozen, the INO-4212 formulation used in the trial was kept in a solution which was refrigerated at 2-8 degrees Celsius.

Detailed immunogenicity and safety data is being prepared for peer-reviewed publication.

In August 2016, we announced that enrollment of this study was being expanded to up to 200 subjects to further characterize and identify in humans the most optimal immunization regimen using intradermal (skin) delivery of the Ebola DNA vaccine.

In April 2017, we reported preliminary results from the expanded Phase 1 trial. Across both stages of the trial, including both intramuscular and intradermal delivery, 95% (170/179) of evaluable subjects generated an Ebola-specific antibody immune response, with the mean antibody titer comparable or superior to those reported from viral vector-based Ebola vaccines. Our Ebola vaccine was also well tolerated in the second stages of the trial, with a favorable safety profile compared to viral vector-based Ebola vaccines, some of which have been associated with serious adverse events including myalgia, arthralgia, fever, and rash.

We expect to report additional data from our Ebola virus development programs in 2018.

Middle East Respiratory Syndrome (MERS) Overview

MERS is a viral respiratory illness first reported in Saudi Arabia in 2012. MERS appears to have been transmitted from an animal reservoir to humans but human to human transmission has been confirmed. This communicable virus has not been shown to spread in a sustained way in communities, but rapid spread in the nosocomial setting, such as emergency rooms and/or hospitals without state-of-the-art infection control practices, can result in outbreaks with many cases, including superspreading events. Like the severe acute respiratory syndrome (SARS) outbreak in 2003, which made approximately 8,000 people ill and was fatal in nearly 10% of those cases, MERS is caused by a coronavirus and appears to cause a severe lung infection. However, the case-fatality rate (death rate) of MERS has typically been between 30% and 40%, which is significantly higher than that of SARS. While the SARS epidemic in

2003 killed 10% of those who became ill from the SARS virus, MERS has killed approximately 36% of people who people who became ill from the MERS virus from 2012 to December 2017. MERS differs in that it also causes rapid kidney failure. Its high death rate has caused serious concern among global health officials.

Despite the continuing threat of MERS outbreaks, there are no licensed vaccines or treatments for MERS. Since the virus was first identified in Saudi Arabia in 2012, the World Health Organization reports 2,127 laboratory-confirmed cases of MERS

and 757 deaths from MERS worldwide as of December 2017. Twenty seven countries have reported cases, including Korea where an outbreak in the summer of 2015 resulted in 186 cases and 38 deaths.

Preclinical and Clinical Development - MERS

In November 2013, we announced that preclinical testing of our SynCon® MERS vaccine candidate, GLS-5300, had induced robust and durable immune responses in mice, demonstrating the potential for such a vaccine to prevent and treat this deadly virus. DNA vaccine constructs targeting multiple MERS antigens were designed using our SynCon® vaccine platform with the goal to universally protect against multiple strains of MERS, which has been shown to have diverse genetic variants. These SynCon® constructs were administered via our CELLECTRA® electroporation-based delivery technology.

A consensus MERS "spike" protein vaccine construct was created based on multiple strains of the MERS virus. Our MERS DNA vaccine was immunogenic in mice and seroconversion was observed in all animals. The antibodies generated by the vaccine in 100% of mice (20 of 20) were able to neutralize or completely block actual infection of MERS virus in the cells, demonstrating the protective potential of this vaccine. In contrast, none of the 10 unvaccinated mice in the control group generated neutralizing antibodies.

The vaccinations were also highly T-cell immunogenic, generating robust and broad T cell responses as extensively analyzed by the standardized T cell ELISPOT assay. The vaccine produced robust CD8+ and CD4+ T cell responses against multiple epitopes of the MERS spike protein. This increased diversity and magnitude of cellular responses may be critical for effectively mitigating MERS infection.

We believe these preclinical findings are vital given the importance of neutralizing antibodies in preventing infection and the role T cells play in clearing infection by killing cells that harbor the virus.

In August 2015, we announced that our MERS vaccine had induced 100% protection from a live virus challenge in a preclinical study in mice, camels and monkeys, or non-human primates. In all three species, the vaccine induced robust immune responses capable of preventing the virus from infecting cells. We believe the data from camels is an important finding because camels represent not only a host reservoir of the disease, but also act as a mode of transmission to humans. In monkeys, all vaccinated animals in the study were protected from symptoms of MERS disease when challenged with a live MERS virus.

The preclinical results appeared in the peer-reviewed journal Science Translational Medicine in an article entitled, "A synthetic consensus anti-spike protein DNA vaccine induces protective immunity against Middle East Respiratory Syndrome Coronavirus in non-human primates."

In February 2016, we and our collaborator GeneOne commenced a Phase 1 clinical trial of GLS-5300 in 75 healthy volunteers at the Walter Reed Army Institute of Research (WRAIR) in Maryland. The primary and secondary goals of this first-in-man Phase 1 trial are to obtain safety and immunogenicity data. This trial represents the first MERS vaccine to be tested in humans for this disease that has no approved vaccines or treatments.

In December 2016, we announced that the International Vaccine Institute (IVI) will provide new funding and support to further advance the clinical development of GLS-5300. IVI will add technical, laboratory and financial support for GLS-5300 clinical trials in Korea with the goal to advance clinical testing toward emergency use authorization by the Korean government as well as authorities of other countries. This collaborative funding is part of a grant from the Samsung Foundation to IVI to support the development of a MERS vaccine for emergency use in Korea and internationally.

In February 2017, we reported results from the Phase 1 clinical trial of GLS-5300, in which high levels of binding antibodies were measured in 92% (57 of 62) of evaluated subjects after three vaccinations (84% after two doses; 44% after one dose). The vaccine was well tolerated, with no significant safety concerns observed to date.

HIV Preventive and Therapeutic Immune Therapies-PENNVAX®-GP

Since its discovery in 1981, HIV, the virus which causes AIDS, has killed more than 36 million people. In 2011, there were roughly 2.5 million new cases of HIV diagnosed. In 2012, approximately 35 million people were living with HIV worldwide. Each year in the United States, about 50,000 people become newly infected with HIV. At the end of 2010, 1.1 million people in the United States were living with HIV.

Effective vaccines have been actively pursued for over 30 years, without significant success. HIV represents one of the most confounding targets in medicine. The virus's high mutagenicity (ability to mutate) has made effective vaccine development very challenging. Its outer envelope, swathed in sugar molecules, is difficult to attack, and HIV strikes

the very cells that the immune system launches to thwart such an infection. Although several drugs (anti-retrovirals) are available to treat the patients once they are infected, vaccines and immunotherapies are necessary to stop the spread of disease and perhaps reduce the need for anti-retroviral treatment.

Noting that many long-term survivors have high counts of killer CD8 T cells, the HIV vaccine and immunotherapy field has turned to stimulating the immune system to generate those cells. Recent HIV vaccine candidates used an adenovirus (a common human cold virus) genetically modified to contain code for HIV antigens to prevent viral replication. These vaccines have proven to not be effective. More recently, the RV-144 trial, which employed an ALVAC™ (canary pox) vaccine prime followed by a protein vaccine boost, demonstrated 30% efficacy in preventing acquisition of infection amongst the vaccinated population compared to the control group. Although the efficacy was relatively modest, the finding for the first time showed that an immunotherapy may be able to combat spread of HIV and has spurred the development of newer immunotherapy candidates. We believe, however, that a different approach is needed to develop an effective vaccine or immunotherapy for HIV.

PENNVAX®-GP is a developmental vaccine to prevent and treat HIV strains present in Africa, Asia, Europe, and North America. Using our ASPIRE™ technology, it has been optimized to target two env antigens, as well as gag and pol antigens. This comprehensive targeting gives PENNVAX®-GP the potential to provide global coverage against HIV-1 subtypes. PENNVAX®-GP is delivered intramuscularly using the CELLECTRA® delivery device. The development of the PENNVAX®-GP program was funded by a seven-year $25 million NIAID contract to us and our collaborators.

In September 2015, the first patient was dosed in a Phase 1 trial to evaluate the safety and tolerability of PENNVAX®-GP. This trial was conducted in collaboration with the HIV Vaccine Trials Network (HVTN). The trial measured immune responses following administration of the vaccine in four groups of healthy subjects receiving the vaccine with and without an immune activator (IL-12) and delivered into muscle or skin using our CELLECTRA® delivery technology.

In May 2017, we announced results from the trial, in which PENNVAX®-GP produced among the highest overall levels of immune response rates (cellular and humoral) ever observed in a human clinical trial by an HIV vaccine. Overall, 71 of 76 (93%) evaluable vaccinated participants showed a CD4+ or CD8+ cellular immune response to at least one of the four vaccine antigens. Similarly, 62 of 66 (94%) evaluated participants demonstrated an env specific antibody response. None of the placebo recipients (0 of 9; 0%) had either a cellular or an antibody response in the study. Notably, amongst the participants receiving PENNVAX®-GP vaccine and IL-12 with intradermal immunization, 27 of 28 (96%) participants achieved a cellular response and 27 of 28 (96%) achieved an HIV env specific antibody response.

Amongst the evaluated participants receiving PENNVAX®-GP and IL-12 via intramuscular vaccination, 27 of 27 (100%) achieved a cellular response and 19 of 21 (90%) achieved an env specific antibody response. Similar immune responses and response rates were achieved via both intradermal and intramuscular administration of the vaccine, even though participants vaccinated via intradermal administration received 1/5th of the dose of vaccine compared to those vaccinated via intramuscular administration.

In addition to our NIAID contract that funded our Phase 1 clinical trial of PENNVAX®-GP, in 2015, we and our collaborators were awarded an additional $16 million Integrated Preclinical/Clinical AIDS Vaccine Development (IPCAVD) grant from the NIAID. We will use this additional grant to design and test new PENNVAX® envelope constructs with our DNA-based immune activator encoding novel cytokine genes in a prime-boost strategy with recombinant HIV envelope proteins. Our collaborators will assess different combinations in preclinical models with the goal of generating high levels of neutralizing antibodies mirroring the robust CD8+ T cell responses generated by our PENNVAX®-B DNA vaccine in previously published clinical studies. The overall goal of this project is to further build upon this important HIV vaccine approach as well as to gain fundamental insight into new technologies to improve vaccination outcomes.

In March 2017, Inovio and its collaborators received an additional multi-year $7.0 million grant from NIAID to develop a single or combination therapy using PENNVAX®-GP, with the goal of attaining long-term HIV remission in the absence of antiviral drugs. This is a two-step clinical study in HIV-positive subjects to assess PENNVAX®-GP with INO-9012 alone and with the addition of a PD-1 checkpoint inhibitor. All trials will be randomized, double-blind, placebo-controlled assessments of PENNVAX®-GP and will be conducted at the University of California in San Francisco and Los Angeles.

HIV dMAb®

In July 2016, we announced that our DNA-based monoclonal antibody technology will be deployed to develop products which could be used alone and in combination with other immunotherapies in the pursuit of new ways to treat and potentially cure infection from HIV. See the section below titled "Synthetic DNA-based Monoclonal Antibodies" for more details on this technology.

Universal Influenza Immunotherapy

Conventional vaccines are strain-specific and have limited ability to protect against genetic shifts in the influenza strains they target. They are therefore modified annually in anticipation of the next flu season’s new strain(s). If a significantly different, unanticipated new strain emerges, such as the 2009 swine-origin pandemic strain, then the current vaccines provide little or no protective capability. In contrast, we believe that our design approach to characterize a broad consensus of antigens across variant strains of each influenza sub-type creates the ability to protect against new strains that have common genetic

roots, even though they are not perfectly matched. By formulating a single immunotherapy with some or all of the key sub-types, protection may be achieved against seasonal as well as pandemic strains such as swine flu or pandemic-potential strains, such as avian influenza. We are focused on developing DNA-based influenza immunotherapies able to provide broad protection against known as well as newly emerging, unknown seasonal and pandemic influenza strains.

Instead of targeting a specific strain or strains, we have developed a universal vaccine strategy to deal with ever-changing flu threats. Using our SynCon® process, our scientists have designed immunotherapies targeting an optimal consensus of HA, NA, and NP proteins derived from multiple strains of each of the Type A sub-types H1N1, H2N2, H3N2 (these three influenza sub-types having been responsible for the majority of seasonal and pandemic influenza outbreaks in humans during the last century), as well as H5N1. In theory, consensus HA vaccine constructs from each sub-type, delivered using our electroporation device, could potentially protect immunized subjects from 90-95% of all human seasonal and pandemic influenza concerns. Additionally, we have also developed an optimal consensus of HA sequences derived from influenza Type B strains. Type B is one of three components of current seasonal influenza vaccinations. Using our SynCon® constructs, we have now developed immunotherapy elements that can target both pandemic-risk (H5N1, H7N9, H1N1) as well as seasonal influenza strains (H3N2, H1N1, influenza B).

Moreover, using our approach the immunotherapies might not have to be administered annually after the first few priming sessions. Rather, the same combination could be used to boost the immune system every few years.

In January 2018, we announced results from a preclinical study in which our synthetic vaccine approach, using a collection of synthetic DNA antigens, generated broad protective antibody responses against all major deadly strains of H1 influenza viruses from the last 100 years, including the virus that caused “Spanish Flu” in 1918 in multiple animal models, including mice, guinea pigs and non-human primates. The vaccine also protected 100% of immunized ferrets from a lethal virus challenge. The preclinical results were detailed in a paper published in the journal Vaccine entitled, “Broad cross-protective anti-hemagglutination responses elicited by influenza microconsensus DNA vaccine."

We are seeking additional grant and/or collaboration funding to further advance this program.

Immunotherapies for Biodefense and Biosecurity

A number of infectious agents that are relatively rare today are poised for an upsurge in incidence by either “natural” or terrorism-related means. For example, natural threats are posed by the influenza strains H5N1 and H7N9. At the same time, an engineered influenza virus for intentional release would pose a significant human threat.

Since 2001, the United States government has spent or allocated over a billion dollars in funding to address the threat of biological weapons. United States funding for bioweapons-related activities focuses primarily on research for and acquisition of medicines for defense. Biodefense funding also goes toward stockpiling protective equipment, increased surveillance and detection of biological agents, and improving state and hospital preparedness. The increase in this type of funding is mainly due to the Project BioShield Act adopted in 2004.

There are opportunities to secure development funding and for proof-of principle immunotherapy studies for bio-warfare pathogens. We have secured funding from the U.S. government for these projects.

We continue to actively pursue grant and contract funding from the NIH, Department of Defense and other government funding agencies as an important source of non-dilutive funding to support development of specific technologies that are broadly applicable across multiple product development programs in the areas of cancer, infectious diseases and biodefense. Based on various initiatives and with the support of NIH funding we are an active collaborator with the Department of Defense (U.S. Army) and continue research and development of DNA-based immunotherapies delivered via our proprietary electroporation system. Specifically, our projects are focused on identifying immunotherapy candidates with the potential to provide rapid, robust immunity to protect against bio-warfare and bioterror attacks as well as development of our electroporation devices.

In October 2014, we announced that DARPA had awarded $12.2 million to our scientists and those from the Perelman School of Medicine at the University of Pennsylvania and MedImmune to develop and assess dMAb products for influenza and antibiotic resistant bacteria in preclinical studies. This collaboration aims to demonstrate that DNA plasmids can activate sufficient quantities of disease-specific monoclonal antibodies in the body to be protective against a pathogen challenge. See the section below titled "Synthetic DNA-based Monoclonal Antibodies" for more details on our dMAb programs.

Ebola grant

In January 2016, we received a $500,000 grant from the U.S. Army's SBIR program to further advance the development of our next-generation delivery device capable of simultaneously administering multiple vaccines via a skin-surface, needle-free electroporation delivery. The primary goal of this effort is to further advance and commercialize a needle and pain-free electroporation device to deliver products from our portfolio of biodefense and commercial infectious disease vaccines including those for MERS, Ebola, HIV, influenza, and RSV, particularly for prophylactic vaccination. Such a device could facilitate rapid vaccination of U.S. troops stationed around the world against multiple infectious diseases and protect civilian

populations from pandemic threats. Initial testing of a prototype design has already yielded excellent antigen expression and immunogenicity from the dermal tissue being accessed using this novel non-invasive electroporation delivery concept.

Synthetic DNA-based Monoclonal Antibodies Program

Monoclonal antibodies (mAbs) have become one of the most valuable therapeutic technologies of recent years. In 2012, global sales of mAbs exceeded $50 billion. Among the top 10 best-selling drugs in 2012, six were monoclonal antibodies, each with annual sales exceeding $5 billion.

mAbs are designed to enhance the immune system's ability to regulate cell functions. They are designed to bind to a very specific epitope (area) of an antigen or cell surface target and can bind to almost any selected target. They have the ability to alert the immune system to attack and kill specific cancer cells (as in the case of Yervoy®) or block certain biochemical pathways (such as those leading to rheumatoid arthritis, as in the case of Humira®). However, mAb technology has limitations. As a passive immunotherapy, meaning they are manufactured outside the body, mAbs require costly large-scale laboratory development and production. Additional limitations include high cost to develop and manufacture, their limited duration of in vivo potency, and a pharmacokinetic profile that can result in toxicity. We have created DNA based monoclonal antibodies that we believe overcome many of the limitations associated with conventional mAb technology.

Using our core platform technology, we encode the DNA sequence for a specific monoclonal antibody in a DNA plasmid. We deliver the plasmid directly into cells of the body using electroporation, enabling these cells to manufacture the mAbs in vivo, - unlike conventional mAb technology that requires manufacture outside of the body. We believe this approach provides potentially significant advantages in terms of lower production costs, as well as the ability to target a pharmacokinetic profile that provides control in terms of dosing regimen, peak responses, duration of responses, and toxicity.

We expect to design dMAb product candidates not only for new disease targets not currently addressable with conventional mAbs, but also targets of existing, commercially available mAb products. We have already designed and produced dMAb product candidates targeting cancer mechanisms including checkpoint inhibition, anti-cancer pathways and anti-Tregs, as well as prophylactic and therapeutic dMAb product candidates for infectious diseases including Ebola, influenza, antibiotic resistant bacteria, dengue and Chikungunya. When the mAb binds to an infectious disease receptor, the immune system then generates natural killer cells and macrophages to clear the virus or bacteria-bound mAbs.

Proof of Concept

Our first published research on a DNA-based on monoclonal antibody was presented in October 2013 in Human Vaccines & Immunotherapeutics in a paper entitled, “Optimized and enhanced DNA plasmid vector based in vivo construction of a neutralizing anti-HIV-1 envelope glycoprotein Fab.” In a preclinical study, a single administration in mice of a highly optimized dMAb® HIV immunotherapy generated antibody molecules in the bloodstream that possessed desirable functional activity, including high antigen-binding and HIV-neutralization capabilities, against diverse strains of HIV viruses. In the study, this delivery strategy resulted in an increase in Fab levels in as little as 48 hours, when compared with protein-based immunization.

A second paper was published in July 2015 in Scientific Reports, a Nature Publishing Group journal, in the paper, "Protection against dengue disease by synthetic nucleic acid antibody prophylaxis/immunotherapy." In this study, a single intramuscular injection of a DNA plasmid encoding a monoclonal antibody targeting dengue protected mice subsequently exposed to the dengue virus. The protection conferred by the monoclonal antibodies expressed by these dMAb product candidates was very rapid, with 100% survival in mice challenged with lethal enhanced dengue disease less than a week after dMAb administration. While conventional vaccine and monoclonal antibody technologies have shown limited ability to provide an effective solution to dengue to date, the unique attributes and data generated by dMAb immunotherapies show their potential to provide a needed solution. Furthermore, this short time frame to achieve full protection is significantly more rapid than vaccine-driven protection, which can take weeks to months to reach peak efficacy levels.

A paper published in March 2016 in The Journal of Infectious Diseases entitled, “Rapid and long-term immunity elicited by DNA encoded antibody prophylaxis and DNA vaccination against Chikungunya virus,” discussed the results

of our preclinical study in which animals transfected with our DNA-based mAb targeting Chikungunya virus (CHIKV) exhibited the specific ability to bind to the CHIKV envelope antigen, and this serum possessed CHIKV-neutralizing activity. CHIKV is a serious mosquito-borne alpha-virus responsible for several recent epidemics in tropical Africa and Asia. In mid-2015, the CDC reported that suspected or confirmed cases of Chikungunya had reached 1.74 million in 45 countries or territories in the Americas. There is currently no vaccine or therapeutic against this virus. In the study, the treatment of the animals with anti-CHIKV mAb plasmids protected 100% of the treated animals from a lethal injection of CHIKV virus while 100% of the control animals died. The treated animals were also spared virus-related morbidity, as measured by dramatic weight loss and lethargy.

Next Steps

In October 2014, we announced that the DARPA had awarded a $12.2 million grant to our scientists and those from the Perelman School of Medicine at the University of Pennsylvania and MedImmune in order to develop and assess dMAb product candidates in preclinical studies.

This collaboration aims to demonstrate that DNA plasmids can activate sufficient quantities of disease-specific monoclonal antibodies in the body to be protective against a pathogen challenge. Using the capabilities and advantages of DNA plasmids delivered using electroporation, the team is constructing and evaluating multiple dMAb product candidates focused on influenza virus and antibiotic resistant bacteria, such as Pseudomonas aeruginosa and Staphylococcus aureus.

In 2016, we expanded the collaboration to include The Wistar Institute after the collaborating investigator, Dr. David Weiner, a member of our board of directors, moved to the Institute.

Depending on the outcome of the preclinical studies, we and our collaborators may seek to advance a dMAb product candidate into clinical trials, if we are able to obtain additional governmental or non-governmental funding to do so.

As described above, in April 2015, we received a grant from DARPA to lead a consortium to develop multiple treatment and prevention approaches against Ebola. The aim of the research funded by this grant is to compare combinations of a DNA vaccine with conventional or DNA-based monoclonal antibodies.

In July 2016, we announced that our DNA-based monoclonal antibody technology will be deployed to develop product candidates which could be used alone and in combination with other immunotherapies in the pursuit of new ways to treat and potentially cure infection from HIV. Funding for this research is part of a $23 million grant from the National Institutes of Health to our collaborator, The Wistar Institute.

As described above, we have also received a sub-grant through The Wistar Institute to develop a DNA-based monoclonal antibody designed to provide a fast-acting treatment against Zika infection and its debilitating effects.

Electroporation Delivery Technology

The essence of our platform is to design and inject a DNA plasmid encoded for a target antigen or monoclonal antibody into tissue of the body and most pertinently, into cells, to enable the intracellular machinery that normally produces useful proteins for the functioning of the body to temporarily produce the target antigen or monoclonal antibody. An antigen will then induce the immune system to produce polyclonal antibodies or T cells with the ability to perform their preventive or therapeutic functions. Monoclonal antibodies generated in this manner can bind to targeted cells and enable the immune system to clear these cells. Fundamental to this mechanism functioning well and providing clinical utility is that there be significant cellular uptake of the DNA plasmids.

Electroporation uses controlled, millisecond electrical pulses to create temporary pores in the cell membrane and allow significant cellular uptake of a synthetic DNA immunotherapy previously injected into muscle or skin. This uptake can be up to a thousand times greater than the injection of a DNA plasmid alone without other delivery mechanisms. The cellular machinery then uses the DNA’s instructions to produce the encoded antigen or monoclonal antibody.

We are a leader in refining the methods and conditions for using in vivo electroporation to enable cellular transfection and significant uptake of a locally injected biologic material. In multiple clinical trials, our electroporation technology has shown the ability to effectively deliver DNA-based immunotherapies to achieve best-in-class immune responses. The delivery of our synthetic DNA immunotherapies using our electroporation devices has to date shown a favorable safety profile, without serious adverse events and only mild local injection-related side effects such as redness and swelling. Electroporation is tolerable without anesthetic, and because it does not induce unwanted immune responses, it can be repeatedly administered for booster vaccinations.

Choice of Tissue for DNA Delivery

Skeletal muscle has been a core focus for delivery of DNA-based immunotherapies via electroporation because it is mainly composed of large elongated cells with multiple nuclei. Muscle cells are non-dividing, hence longer-term expression can be obtained without integration of the gene of interest into the genome. Muscle cells have been shown to have a capacity for secretion of proteins into the blood stream. Secreted therapeutic proteins may therefore act systemically and produce therapeutic effects in distant tissues of the body. In this respect, the muscle functions as a factory for the production of the biopharmaceutical needed by the body. In our Phase 2 clinical trial of VGX-3100 for HPV-related cervical dysplasia, intramuscular delivery by electroporation of DNA-encoded antigens induced both

humoral (antibody) and cellular (T cell) immune responses. We envision that delivery of DNA by electroporation to muscle cells will circumvent the costly and complicated production procedures of viral gene delivery vectors, bacterial gene delivery vectors, protein-based drugs, conventional vaccines and monoclonal antibodies. This approach may provide long-term stable expression of a therapeutic protein or monoclonal antibody at a sustained level. While we have generated pre-clinical and clinical evidence that intramuscular electroporation-based DNA delivery will be effective for a number of immunotherapies, electroporation of the skin may also be a relevant route of administration. Skin

or intradermal administration is important and is becoming an attractive site for immunization given its high density of antigen presenting cells (APCs). Unlike muscle, skin is the first line of defense against most pathogens and is therefore very rich in immune cells and molecules. Skin specifically contains certain cells that are known to help in generating a robust immune response. With intradermal administration of electroporation, we may be able to demonstrate a comparable immune response to muscle delivery. Drug delivery into skin, or dermal tissue, is attractive given that the skin is the largest, most accessible, and most easily monitored organ of the human body, and it is highly immuno-competent (able to recognize antigens and mount an immune response to them).

Our CELLECTRA® Delivery Systems

There are several configurations in the CELLECTRA® device family. The first configuration covers intramuscular (IM) delivery of DNA; the second covers intradermal/subcutaneous delivery (ID) of DNA. Devices with these configurations have been validated, manufactured under Current Good Manufacturing Practices (cGMP) and are being used in human clinical trials. We have filed a device master file (MAF) with the FDA covering the use of the CELLECTRA® devices in human clinical trials. These devices are intended to be used in combination with a DNA plasmid-based immunotherapy.

Our CELLECTRA®-SP devices combine the functionality of our current generation of skin and intramuscular electroporation devices in clinical testing with enhanced form, design and portability. All components of the pulse generator and applicator are integrated into a cordless, rechargeable device. The rechargeable battery can enable immunization of several hundred subjects, making the device useful for mass vaccinations. The devices are designed to accommodate different electrode arrays to meet the requirements of the particular immunotherapy and targeted tissue for delivery.

In preparation for our Phase 3 clinical trial of VGX-3100 and anticipated commercial use, we designed and manufactured a new electroporation device, CELLECTRA® 5PSP, a fully automated, smaller and user-friendly device. The new CELLECTRA®-5PSP device is being used in our ongoing VGX-3100 Phase 3 trial, which started in June 2017.

Next Generation Electroporation Research and Devices

We are developing new delivery systems and technologies designed to optimally deliver our DNA-based immunotherapies and vaccines. All of our current delivery systems described above can increase levels of gene expression, or production of the immune-stimulating protein that the immunotherapy was coded to produce, of DNA immunotherapies by more than one thousand times compared to delivery of DNA immunotherapies via conventional injection alone. Our SynCon® immunotherapies delivered into muscle or skin tissue with our electroporation systems have generated robust immune responses in humans using different SynCon® immunotherapy products for HPV-related precancers (also generating statistically significant efficacy in a controlled Phase 2b study) and cancers, Zika, Ebola, influenza (H5N1 and H1N1) and HIV, as well as against other diseases in animal models.

While our current intramuscular (IM) delivery technologies are well tolerated, we are also advancing next generation, minimally invasive intradermal electroporation delivery devices. One intradermal (ID) device penetrates no more than 3 mm into the target tissue, compared to intramuscular devices that go deeper. The positive immunological effects in preclinical animal models of the optimized electroporation parameters of this minimally invasive ID EP delivery device were highlighted in September 2012 in Human Gene Therapy in a paper entitled, “Intradermal DNA vaccination enhanced by low-current electroporation improves antigen expression and induces robust cellular and humoral immune responses.” The optimized conditions decreased required immunotherapy dose levels, increased tolerability of the vaccination, and increased the breadth of viable vaccine targets. This research was funded in part by a $25 million HIV vaccine development contract from the NIAID and a $3.1 million National Institutes of Health Director's Transformative Research Award for universal flu vaccine development.

In March 2011, we received a U.S. Department of Defense Small Business Innovation Research Grant to test the feasibility of delivering unique DNA vaccines by intradermal electroporation simultaneously to two or more spatially distinct sites on the body. Results from this research revealed that this device could allow for the delivery of multi-plasmid formulations without the risk of interference of immune responses from combination vaccines that are formulated together. This could be useful for combination immunotherapies that are rapidly formulated such as in response to emerging infectious disease threats or pandemics and could overcome the issue of limited dosing often associated with intradermal delivery. Results from this study were published in Human Vaccines Immunotherapeutics

in a paper titled, “A multi-head intradermal electroporation device allows for tailored and increased dose DNA immunotherapy delivery to the skin.”

A second ID approach is surface electroporation (SEP) using a device that sits on the skin and uses a virtually undetectable scratch to facilitate electroporation and intracellular delivery of the immunotherapy.

In October 2010, research on this minimally-invasive DNA vaccine delivery device was published in Gene Therapy in the paper, "Prototype development and preclinical immunogenicity analysis of a novel minimally invasive electroporation device." Using voltages averaging roughly seven times less than our current devices, this very low voltage device, which does not penetrate the skin, further enhances the previously established tolerability of our electroporation devices. DNA vaccines

delivered using this device produced strong antibody and T-cell immune responses and achieved protection from lethal challenge in multiple animal models including non-human primates.

In April 2012, we received a grant from the U.S. Army's Small Business Innovation Research (SBIR) to advance the development of a low-cost, non-invasive surface electroporation delivery device and test its utility in combination with our novel synthetic DNA vaccines against viruses with bioterrorism potential, including hanta, puumala, arenavirus and pandemic influenza. This project was a continuation of the DOD grant awarded in 2011. The objective was to further advance and validate this device and the resulting immune responses in appropriate animal models. The research also investigated the development and manufacture of low-cost sterile disposables for the device and the possibility of integrating dermal injection capabilities into a combined inject/EP device platform.

In January 2016, we received a $500,000 SBIR grant to further advance the development of a device capable of simultaneously administering multiple vaccines via skin-surface, needle-free electroporation delivery.

We have also been researching other avenues for needle-free, contactless electroporation technology for immunotherapy delivery. In February 2011, Human Vaccines published our paper entitled, "Piezoelectric permeabilization of mammalian dermal tissue for in vivo DNA delivery leads to enhanced protein expression and increased immunogenicity." This innovative electroporation method is based on the generation of an electric field or electric potential by certain materials in response to applied mechanical stress.

With the advancement of these devices our aim is to make electroporation delivery amenable to mass prophylactic vaccination by decreasing dose levels, increasing tolerability of the vaccination, increasing the breadth of viable immunotherapy targets, and enhancing portability. Based on our data from studies of influenza, HIV, malaria, and smallpox antigens, we believe that DNA delivery with this newer generation of ID delivery including SEP devices yields levels of immunogenicity in terms of both antibody and T cell responses and/or efficacy against a virus challenge that are comparable to intramuscular electroporation devices currently in the clinic.

In March 2016, we acquired needle-free jet injection technology, devices and intellectual property from Bioject Medical Technologies Inc. We are developing an integrated non-invasive delivery device combining Bioject's jet injection technology with our needle-free, skin-surface electroporation technology. Bioject's needle-free devices, which use high pressure gas or springs to propel liquid medicine into skin, have been observed to have desirable utility, safety, and tolerability attributes in preclinical studies and clinical trials. Under a prior research agreement, we assessed the Bioject technology with our new EP delivery system and generated compelling antigen expression and immune responses in animal studies.

License, Collaboration and Supply Agreements

We have entered into various arrangements with corporate, academic, and government collaborators, licensors, licensees and others. These arrangements are summarized below.

MedImmune

In August 2015, we entered into a strategic cancer vaccine collaboration and license agreement with MedImmune, the global biologics research and development arm of AstraZeneca. Under the agreement, MedImmune acquired exclusive rights to our immunotherapy candidate INO-3112 (renamed MEDI0457), which targets cancers caused by human papillomavirus (HPV) types 16 and 18.

Under the terms of the agreement, MedImmune made an upfront payment of $27.5 million to us in the third quarter of 2015. MedImmune will fund all development costs. The agreement also calls for potential future payments totaling up to $700 million upon reaching specified development and commercial milestones. We are entitled to receive up to double-digit tiered royalties on MEDI0457 product sales.

MedImmune is studying MEDI0457 in combination with its PD-L1 checkpoint inhibitor, durvalumab, in a Phase 1/2 clinical trial in patients with recurrent or metastatic head and neck squamous cancer associated with HPV. On December 28, 2017, we received a $7.0 million milestone payment from MedImmune, which was triggered by the initiation of the Phase 2 portion of this ongoing clinical trial.

Within the broader collaboration, we and MedImmune may co-develop up to two new, additional DNA-based cancer vaccine products not included in our current product pipeline, which MedImmune will have the exclusive rights to develop and commercialize those candidates. We will receive development, regulatory and commercialization milestone payments and will be eligible to receive royalties on worldwide net sales for these additional cancer vaccine products.

GeneOne

In September 2014, we and GeneOne announced a collaboration in which the companies will co-develop our DNA-based Ebola vaccine through a Phase 1 clinical trial. In April 2015, the collaborators received an award from DARPA to further advance the Ebola project. The previous collaboration agreement with GeneOne for Ebola vaccine was incorporated

into this consortium funded by DARPA. In May 2015, a Phase 1 study of the DNA vaccine part of the project was initiated. Enrollment of this study has been completed. Details of this project are provided under "Ebola" above.

In May 2015, we announced that we will advance a DNA vaccine for MERS into a Phase 1 clinical trial in healthy volunteers in a collaboration with GeneOne. Under the terms of the agreement, GeneOne will be responsible for funding all preclinical and clinical studies through Phase 1. In return, GeneOne will receive up to a 35% milestone-based ownership interest in the MERS immunotherapy upon achievement of the last milestone event of completion of the Phase 1 safety and immunogenicity study. In January 2016, the collaborators announced the initiation of recruitment for the Phase 1 study in partnership with the Walter Reed Army Institute of Research (WRAIR) in Maryland, where the trial is being conducted.

In January 2016, we and GeneOne expanded the collaboration agreement to test and advance our DNA-based vaccine for preventing and treating Zika virus.

ApolloBio

In December 2017, we entered into an Amended and Restated License and Collaboration Agreement with Beijing Apollo Saturn Biological Technology Limited, a corporation organized under the laws of China, or ApolloBio. Under the terms of this License and Collaboration Agreement, we granted to ApolloBio the exclusive right to develop and commercialize VGX-3100, our DNA immunotherapy product candidate designed to treat pre-cancers caused by HPV, within the territories of China, Hong Kong, Macao and Taiwan. The territory may be expanded to include Korea in the event that no patent covering VGX-3100 issues in China within the three years following the Effective Date (as defined below).

As part of the License and Collaboration Agreement, we have granted to ApolloBio an option to negotiate an exclusive license to research, develop and commercialize MEDI0457 in the event of termination of our current collaboration with MedImmune for the development of MEDI0457 in the territory covered by the License and Collaboration Agreement. As part of the collaboration, ApolloBio will fund all clinical development costs within the licensed territory, and the parties will discuss in good faith the inclusion of clinical trial sites in China as part of our ongoing Phase 3 clinical development program for VGX-3100.

Under the License and Collaboration Agreement, ApolloBio will pay us an upfront payment of $23.0 million, such payment to be made within three business days following the date of approval of the License and Collaboration Agreement by the board of directors and shareholders of ApolloBio and other regulatory approvals, or the “Effective Date”, which Effective Date is expected to occur in the first quarter of 2018. The payment is subject to Chinese regulatory approval as well. In the event that such upfront payment is not made on or before April 7, 2018, we have the right to terminate the License and Collaboration Agreement in its entirety.

In addition to the upfront payment, we are entitled to receive up to an aggregate of $20.0 million upon the achievement of specified milestones related to the regulatory approval of VGX-3100 in the United States, China and Korea. In the event that VGX-3100 is approved for marketing in these territories, we will be entitled to receive royalty payments based on a tiered percentage of annual net sales, with such percentage being in
the low- to mid-teens, subject to reduction in the event of generic competition in a particular territory. ApolloBio’s obligation to pay royalties will continue for 10 years after the first commercial sale in a particular territory or, if later, until the expiration of the last-to-expire patent covering the licensed products in the specified territory. The License and Collaboration Agreement, once effective, will continue in force until ApolloBio has no remaining royalty obligations.

Agreements Focused on Advancing Immuno-Oncology

In May 2017, we entered into a supply agreement with Genentech, a member of the Roche Group, for Genentech to provide TECENTRIQ® (atezolizumab) for use in our clinical trials evaluating INO-5401, a T cell activating immunotherapy encoding multiple antigens, and INO-9012, an immune activator encoding IL-12, in combination with TECENTRIQ® in approximately 80 patients with advanced bladder cancer. We will manage and fund the costs of the multi-center, open-label trial.

In May 2017, we entered into a clinical study and supply agreement with Regeneron to provide its PD-1 inhibitor, REGN2810, for use in our clinical trials evaluating INO-5401 and INO-9012, in combination with REGN2810 in patients with newly diagnosed glioblastoma multiforme (GBM). Under the terms of the agreement, we will conduct and fund the trial based upon a mutually agreed upon study design.

In January 2018, we entered into a Clinical Collaboration Agreement with the Parker Institute for Cancer Immunotherapy to undertake clinical evaluation of novel combination regimens within the field of immuno-oncology. We expect to benefit from the Parker Institute's innovative research model, which brings together leading academic cancer institutions and companies to share resources, data and technology, accelerate research through unifying and managing clinical trial design, and conduct multi-center clinical trials. The goal of our collaboration is to design studies that have the potential to address cancers with high unmet need. The initial trial under consideration would address muscle-invasive bladder cancer with INO-5401 in combination with other immunotherapies.

Under the agreement, the Parker Institute will have responsibility for clinical study execution, working in collaboration with its established network of clinical academic and industry cancer centers. We will provide financial contributions if the product candidate studied under the collaboration reaches the initiation of a Phase 3 clinical trial.
In August 2016, we incorporated a subsidiary, GENEOS Therapeutics, Inc., to develop and commercialize neoantigen based personalized cancer therapies. We currently own 100% of the outstanding equity of GENEOS, although GENEOS plans to raise capital from the issuance of equity to third parties, which would reduce our ownership percentage. While we leverage our SynCon® immunotherapy and CELLECTRA® electroporation technologies to break tolerance and create cancer products targeting shared tumor specific antigens, GENEOS will focus exclusively on leveraging our immunotherapy technology platform to advance the field of patient-specific neoantigen therapies for cancer. We believe that our clinically validated DNA-based platform is well suited for advancing individualized therapies due to its rapid product design and manufacturing benefits, ability to combine multiple neoantigens into formulations, and generation of potent killer T cell responses that are needed to drive clinical efficacy. We have exclusively licensed our SynCon® immunotherapy and CELLECTRA® electroporation technology platform to GENEOS to be used in the field of personalized, neoantigen based therapy for cancer.

Core DNA Immunotherapy Technology and Product License

In March 2016, we entered into a collaborative research agreement with the Wistar Institute for preventive and therapeutic DNA-based immunotherapy applications and products for cancers and infectious diseases developed by David B. Weiner, Ph.D., and his Wistar laboratory. We will have the exclusive right to in-license new intellectual property developed in this collaboration.
We also have license agreements for intellectual property relating to DNA-based immunotherapy technology and multiple products developed at the University of Pennsylvania, or UPenn. Under the terms of the license agreement with UPenn, we have obtained exclusive worldwide rights to develop multiple DNA plasmids and constructs with the potential to treat and/or prevent cancer therapeutic vaccines targeting WT1, prostate cancer, other undisclosed cancer antigen targets, HPV, HBV, HCV, HIV, influenza, RSV (respiratory syncytial virus), cytomegalovirus, Chikungunya, dengue fever, malaria, herpes viruses, MERS, Ebola and the family of Filovirus such as Marburg, tuberculosis, foot-and-mouth disease, intestinal infections including Clostridium difficile, and MRSA (methicillin-resistant staphylococcus aureus). In addition, the amended agreement provides us with global rights to DNA-based monoclonal antibodies and new chemokine and cytokine molecular adjuvant technologies.
This agreement, as amended to date, provides for royalty payments, based on future sales of licensed products, to UPenn.

The Wistar Institute Collaboration for Programs against Tuberculosis and Malaria

In early 2018, we announced that we will collaborate with The Wistar Institute to advance two novel SynCon® vaccine programs against tuberculosis (TB) and malaria, fully funded by more than $4.6 million in total grants from the Bill & Melinda Gates Foundation and the National Institutes of Health (NIH). Grants from the Gates Foundation (for malaria) and from the National Institute of Allergy & Infectious Diseases (for TB) will support our efforts to develop new DNA vaccines employing our ASPIRE platform.

Competition

As we develop and seek to ultimately commercialize our product candidates, we face and will continue to encounter competition with an array of existing or development-stage drug and immunotherapy approaches targeting diseases we are pursuing. We are aware of various established enterprises, including major pharmaceutical companies, broadly engaged in vaccine/immunotherapy research and development. These include Janssen Pharmaceuticals (part of J&J), Sanofi-Aventis, GlaxoSmithKline plc (following its acquisition of Novartis Vaccines), Merck, Pfizer, and our collaborator MedImmune. There are also various development-stage biotechnology companies involved in different vaccine and immunotherapy technologies including Aduro Biotech, Advaxis, BioNTech, Curevac, Dynavax, Kite (recently acquired by Gilead), Juno, Moderna, and Novavax. If these companies are successful in developing their technologies, it could materially and adversely affect our business and our future growth prospects.
Specifically, Bavarian Nordic, Merck and GlaxoSmithKline have commercialized preventive vaccines against HPV to protect against cervical cancer. Some companies are seeking to treat early HPV infections or low grade cervical dysplasias. LEEP is the current standard of care for treating high grade cervical dysplasia. Advaxis and Kite have

therapeutic cervical cancer product candidates under development. Many companies are pursuing different approaches to prostate, breast, lung and other cancers we are targeting.

We also compete more specifically with companies seeking to utilize antigen-encoding DNA delivered with electroporation or other DNA delivery technologies such as viral vectors or lipid vectors to induce in vivo generated antigen

production and immune responses to prevent or treat various diseases. These competitive technologies have shown promise, but they each also have their unique obstacles to overcome.

Viral DNA Delivery

This technology utilizes a virus as a carrier to deliver genetic material into target cells. The method is efficient for delivering immunotherapy antigens and has the advantage of mimicking real viral infection so that the recipient will mount a broad immune response against the immunotherapy. The greatest limitation of the technology stems from problems with unwanted immune responses against the viral vector, limiting its use to patients who have not been previously exposed to the viral vector and making repeated administration difficult. In addition, complexity and safety concerns increase their cost and complicate regulatory approval.

Lipid DNA Delivery

A number of lipid formulations have been developed that increase the effect of DNA/RNA immunotherapies. These work by either increasing uptake of the DNA/RNA into cells or by acting as an adjuvant, alerting the immune system. While there has been progress in this field, lipid delivery tends to be less efficient than viral vectors and is hampered by concerns regarding toxicity and increased complexity.

DNA Immunotherapy Delivery With Electroporation

There are other companies with electroporation intellectual property and devices. We believe we have significant competitive advantages over other companies focused on electroporation for multiple reasons:

- We have an extensive history and experience in developing the methods and devices that optimize the use of electroporation in conjunction with DNA-based agents. This experience has been validated with multiple sets of interim data from multiple clinical studies assessing DNA-based immunotherapies and vaccines against cancers and infectious disease.
- We have a broad product line of electroporation instruments designed to enable DNA delivery in tumors, muscle, and skin.
- We have been proactive in filing for patents, as well as acquiring and licensing additional patents, to expand our global patent estate.

If any of our competitors develop products with efficacy or safety profiles significantly better than our product candidates, we may not be able to commercialize our products, and sales of any of our commercialized products could be harmed. Some of our competitors and potential competitors have substantially greater product development capabilities and financial, scientific, marketing and human resources than we do. Competitors may develop products earlier, obtain FDA approvals for products more rapidly, or develop products that are more effective than those under development by us. We will seek to expand our technological capabilities to remain competitive; however, research and development by others may render our technologies or products obsolete or noncompetitive, or result in treatments or cures superior to ours.

Our competitive position will be affected by the disease indications addressed by our product candidates and those of our competitors, the timing of market introduction for these products and the stage of development of other technologies to address these disease indications. For us and our competitors, proprietary technologies, the ability to complete clinical trials on a timely basis and with the desired results, and the ability to obtain timely regulatory approvals to market these product candidates are likely to be significant competitive factors. Other important competitive factors will include the efficacy, safety, ease of use, reliability, availability and price of products and the ability to fund operations during the period between technological conception and commercial sales.

The FDA and other regulatory agencies may expand current requirements for public disclosure of DNA-based product development data, which may harm our competitive position with foreign and United States companies developing DNA-based products for similar indications.

Government Regulation

DNA Vaccine Product Regulation

Any pharmaceutical products we develop will require regulatory clearances prior to clinical trials and additional regulatory approvals prior to commercialization. New gene-based products for vaccine or therapeutic applications are subject to extensive regulation by the FDA and comparable agencies in other countries. Our potential products will be regulated as biological products that are used to treat or prevent disease. In the United States, drugs are subject to regulation under the Federal Food, Drug and Cosmetic Act, or the FDC Act. Biological products, in addition to being

subject to provisions of the FDC Act, are regulated in the United States under the Public Health Service Act. Both statutes and related regulations govern, among other things, testing, manufacturing, safety, efficacy, labeling, storage, record keeping, advertising, and other promotional practices.

Obtaining FDA approval or comparable approval from similar agencies in other countries is a costly and time-consuming process. Generally, FDA approval requires that pre-clinical studies be conducted in the laboratory and in animal model systems to gain preliminary information on efficacy and to identify any major safety concerns. In the United States, the results of these studies are submitted as a part of an IND application which the FDA must review and allow before human clinical trials can start. The IND application includes a detailed description of the proposed clinical investigations.

A company must submit an IND application or equivalent application in other countries for each proposed product and must conduct clinical studies to demonstrate the safety and efficacy of the product necessary to obtain FDA approval or comparable approval from similar agencies in other countries. For example, in the United States, the FDA receives reports on the progress of each phase of clinical testing and may require the modification, suspension, or termination of clinical trials if an unwarranted risk is presented to patients.

To obtain FDA approval prior to marketing a pharmaceutical product in the United States typically requires several phases of clinical trials to demonstrate the safety and efficacy of the product candidate. Clinical trials are the means by which experimental treatments are tested in humans, and are conducted following pre-clinical testing. Clinical trials may be conducted within the United States or in foreign countries. If clinical trials are conducted in foreign countries, the products under development as well as the trials are subject to regulations of the FDA and/or its counterparts in the other countries. Upon successful completion of clinical trials, approval to market the treatment for a particular patient population may be requested from the FDA in the United States and/or its counterparts in other countries.

Clinical trials for therapeutic products are normally done in three phases. Phase 1 clinical trials are typically conducted with a small number of patients or healthy subjects to evaluate safety, determine a safe dosage range, identify side effects, and, if possible, gain early evidence of effectiveness. Phase 2 clinical trials are conducted with a larger group of patients to evaluate effectiveness of an investigational product for a defined patient population, and to determine common short-term side effects and risks associated with the drug. Phase 3 clinical trials involve large scale, multi-center, comparative trials that are conducted to evaluate the overall benefit-risk relationship of the investigational product and to provide an adequate basis for product labeling. In some special cases where the efficacy testing of a product may present a special challenge to testing in humans, such as in the case of a vaccine to protect healthy humans from a life-threatening disease that is not a naturally occurring threat, effectiveness testing may be required only in animals.

After completion of clinical trials of a new product, FDA marketing approval must be obtained or equivalent approval in comparable agencies in other countries. For the FDA, if the product is regulated as a biologic, a Biologics License Application, or BLA, is required. The BLA must include results of product development activities, pre-clinical studies, and clinical trials in addition to detailed chemistry, manufacturing and control information.

Applications submitted to the FDA are subject to an unpredictable and potentially prolonged approval process. Despite good-faith communication and collaboration between the applicant and the FDA during the development process, the FDA may ultimately decide, upon final review of the data, that the application does not satisfy its criteria for approval or requires additional product development or further pre-clinical or clinical studies. Even if FDA regulatory clearances are obtained, a marketed product is subject to continual review, and later discovery of previously unknown problems or 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.

Before marketing clearance for a product can be secured, the facility in which the product is manufactured must be inspected by the FDA and must comply with cGMP regulations. In addition, after marketing clearance is secured, the manufacturing facility must be inspected periodically for cGMP compliance by FDA inspectors.

In addition to the FDA requirements, the NIH has established guidelines for research involving human genetic materials, including recombinant DNA molecules. The FDA cooperates in the enforcement of these guidelines, which apply to all recombinant DNA research that is conducted at facilities supported by the NIH, including proposals to conduct clinical research involving gene therapies. The NIH review of clinical trial proposals and safety information is a public process and often involves review and approval by the Recombinant DNA Advisory Committee, of the NIH.

Sponsors of clinical trials are required to register and report results for all controlled clinical investigations, other than Phase 1 investigations, of a product subject to FDA regulation. Trial registration may require public disclosure of confidential commercial development data resulting in the loss of competitive secrets, which could be commercially

detrimental.

Medical Device Manufacturing Regulation

In addition, we are subject to regulation as a medical device manufacturer. We must comply with a variety of manufacturing, product development and quality regulations in order to be able to distribute our electroporation devices commercially around the world. In Europe, we must comply with the Medical Device Directives. We have a Quality System certified by its international Notified Body to be in compliance with the international Quality System Standard, ISO13485, and

meeting the Annex II Quality System requirements of the MDD. We completed Annex II Conformity Assessment procedures to allow for the CE Mark of our electroporation devices.

In the United States, we are required to maintain facilities, equipment, processes and procedures that are in compliance with quality systems regulations. Our systems have been constructed to be in compliance with these regulations and our ongoing operations are conducted within these systems. Commercially distributed devices within the United States must be developed under formal design controls and be submitted to the FDA for clearance or approval. All development activity is performed according to formal procedures to ensure compliance with all design control regulations.

We employ modern manufacturing methods and controls to optimize performance and control costs. Internal capabilities and core competencies are strategically determined to optimize our manufacturing efficiency. We utilize contract manufacturers for key operations, such as clean room assembly and sterilization, which are not economically conducted in-house. We outsource significant sub-assemblies, such as populated printed circuit boards, for which capital requirements or manufacturing volumes do not justify vertical integration.

Other Regulations

We also are subject to various federal, state and local laws, regulations, and recommendations relating to safe working conditions, laboratory and manufacturing practices, the experimental use of animals, and the use and disposal of hazardous or potentially hazardous substances, including radioactive compounds and infectious disease agents, used in connection with our research. The extent of government regulation that might result from any future legislation or administrative action cannot be accurately predicted.

Commercialization and Manufacturing

Because of the broad potential applications of our technologies, we intend to develop and commercialize products both on our own and through our collaborators and licensees. We intend to develop and commercialize products in well-defined specialty markets, such as infectious diseases and cancer. Where appropriate, we intend to rely on strategic marketing and distribution alliances.

We believe our plasmids can be produced in commercial quantities through uniform methods of fermentation and processing that are applicable to all plasmids. We believe we will be able to obtain sufficient supplies of plasmids for all foreseeable clinical investigations.

Relationship with GeneOne

We acquired an equity interest in GeneOne in 2005. As of December 31, 2017, we owned 7.8% of the outstanding capital stock of GeneOne and GeneOne owned 73,590 shares of our common stock. To our knowledge, none of our current officers, directors, or key employees beneficially owns, directly or indirectly, any securities of GeneOne.

In 2008, we sold our manufacturing operations (including patent rights to certain manufacturing technology) to VGXI, Inc., a wholly-owned United States subsidiary of GeneOne. In connection with this transfer we entered into a Supply Agreement pursuant to which VGXI, Inc., a cGMP contract manufacturer, produces and supplies the DNA plasmids for all of our research and early clinical trials. The price of the plasmids we purchase from VGXI, Inc. is determined by us and GeneOne at the time of order placement or, with respect to product supplied in connection with a grant contract, based on the contracted bid provided by the applicable agency. We agreed to treat GeneOne and its subsidiary as our most favored supplier for DNA plasmids and GeneOne and its subsidiary agreed to treat us as their most favored customer. Before we can manufacture DNA plasmids on our own behalf or engage a third party other than GeneOne or its subsidiary to manufacture DNA plasmids for us, we must first offer such manufacturing work to GeneOne or its subsidiary.

In 2014, we entered into a Collaborative Development Agreement with GeneOne to co-develop an Ebola vaccine through Phase 1 clinical trials. In 2015, we amended the agreement to provide that we would have control over the development program, in return for the payment of certain development fees.

In 2015, we entered into a Collaborative Development Agreement with GeneOne to co-develop a DNA vaccine for MERS through Phase 1 clinical trials. Under the terms of the agreement, GeneOne will be responsible for funding all preclinical and clinical studies through Phase 1. In return, GeneOne will receive up to 35% milestone-based ownership interest in the MERS immunotherapy upon achievement of the last milestone event of completion of the Phase 1 safety and immunogenicity study. The collaborative research program will terminate upon the completion of

activities under the development plan, unless sooner terminated.

In January 2016, we and GeneOne expanded the collaboration agreement to test and advance our DNA-based vaccine for preventing and treating Zika virus. GeneOne will be responsible for funding all preclinical and clinical studies through Phase 1. In return, GeneOne will receive up to a 35% milestone-based ownership interest in the Zika immunotherapy upon achievement of the last milestone event of the completion of the Phase 1 safety and immunogenicity study.

In December 2017, we completed the sale of certain assets related to our compound VGX-1027 to GeneOne for $1.0 million.

Revenue recognized from GeneOne consists of licensing and other fees from the influenza and Zika collaborations. For the years ended December 31, 2017 and 2016, we recognized revenue from GeneOne of $0.6 million and $1.2 million, respectively. Operating expenses recorded from transactions with GeneOne relate primarily to biologics manufacturing. These operating expenses for the years ended December 31, 2017 and 2016 were $2.3 million and $2.8 million, respectively. At December 31, 2017 and 2016, we had an accounts receivable balance of $0 and $441,000, respectively, and an accounts payable and accrued liability balance of $107,000 and $379,000, respectively, related to GeneOne and its subsidiaries. At December 31, 2017 and 2016, $331,000 and $571,000, respectively, of prepayments made to GeneOne were classified as long-term other assets on the consolidated balance sheet.

Intellectual Property

Patents and other proprietary rights are essential to our business. We file patent applications to protect our technologies, inventions and improvements to our inventions that we consider important to the development of our business. We file for patent registration extensively in the United States and in key foreign markets. Although our patent filings include claims covering various features of our products and product candidates, including composition, methods of manufacture and use, our patents do not provide us with complete protection, or guarantee, against the development of competing products. In addition, some of our know-how and technology are not patentable. We thus also rely upon trade secrets, know-how, continuing technological innovations and licensing opportunities to develop and maintain our competitive position. We also require employees, consultants, advisors and collaborators to enter into confidentiality agreements, but such agreements may provide limited protection for our trade secrets, know-how or other proprietary information.

Our intellectual property portfolio covers our proprietary technologies, including electroporation delivery and vaccine related technologies. As of December 31, 2017, our patent portfolio included over 139 issued United States patents and 525 issued foreign counterpart patents.

Key vaccine related technology patents and published patent applications include the following:

- US Pat. No. 6,733,994, entitled, “Highly expressible genes” including claims directed to IgE signal leaders;
- US Pat. No. 8,133,723, entitled, “Novel Vaccines Against Multiple Subtypes Of Influenza”;
- US Pat. No. 8,168,769, entitled, “Improved Vaccines and Methods for Using the Same,” with claims directed to HPV vaccine products;
- US Pat. No. 8,178,660, entitled, "Vaccines And Immunotherapeutics Using Codon Optimized IL-15 And Methods For Using The Same";
- US Pat. No. 8,535,687, entitled, "Smallpox DNA Vaccine And The Antigens Therein That Elicit An Immune Response";
- US Pat. Nos. 8,697,084, and 9,376,471, entitled, "HIV Consensus Envelop Sequences And Methods For Using The Same";
- US Pat. No. 8,835,620, entitled, “Novel Vaccines Against Multiple Subtypes Of Influenza Virus”;
- US Pat. No. 8,852,609, entitled, “Consensus Sequences of Chikungunya Viral Proteins, Nucleic Acid Molecules Encoding the Same and Compositions and Methods for Using the Same”;
- US Pat. Nos. 8,927,692 and 9,399,056, entitled, “Consensus Prostate Antigens, Nucleic Acid Molecule Encoding The Same And Vaccine And Uses Comprising The Same";
- US Pat. No. 8,961,994, entitled, “DNA Constructs Eliciting Immune Response Against Flavivirus and Effective Adjuvants”;
- US Pat. No. 9,034,313, entitled, “Nucleic Acid Molecules Encoding Rantes, and Compositions and Methods of Using The Same”;
- US Pat. Nos. 9,050,287 and 8,389,706, entitled, “Vaccines for Human Papilloma Virus and Methods for Using the Same”;
- US Pat. Nos. 9,156,891, 9,156,890, 8,921,536, and 8,829,174, entitled, "Improved HCV Vaccines And Methods For Using The Same";
- US Pat. Nos. 9,192,660 and 8,298,820, entitled, “Influenza Nucleic Acid Molecules and Vaccines Made Therefrom”;

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- US Pat. Nos. 9,238,679 and 9,403,879, entitled, “Nucleic acid molecule encoding hepatitis B virus core protein and vaccine comprising the same”;
- US Pat. No. 9,243,041, entitled, “Nucleic acid molecule encoding novel herpes antigens, vaccine comprising the same, and methods of use thereof”;
- US Pat. No. 9,272,024 entitled, “Compositions, comprising improved IL-12 genetic constructs and vaccines, immunotherapeutics and methods of using the same”;
- US Pat. No. 9,290,546 entitled, “hTERT sequences and methods for using the same”;
- US Pat. No. 9,446,112 entitled, “Clostridium difficile DNA vaccine”; and
- US Pat. No. 9,446,114 entitled, “Cross-protective arenavirus vaccines and their method of use.”

Key electroporation related patents covering range of field strengths and novel processes include the following:

- US Pat. No. 6,110,161, entitled, “Method for introducing pharmaceutical drugs and nucleic acids into skeletal muscle”;
- US Pat. No. 6,261,281, entitled, “Method for genetic immunization and introduction of molecules into skeletal muscle and immune cells”;
- US Pat. No. 6,697,669, entitled, “Skin and muscle-targeted gene therapy by pulsed electrical field”;
- US Pat. No. 6,752,780, entitled, “Intradermal injection system for injecting DNA-based injectables into humans”;
- US Pat. No. 6,752,781, entitled, “Durable hypodermic jet injector apparatus and method”;
- US Pat. No. 6,939,862, entitled, “Method for transferring nucleic acid into striated muscles”;
- US Pat. No. 6,958,060, entitled, “Method for muscle delivery of drugs, nucleic acids and other compounds”;
- US Pat. No. 7,245,963, entitled, “Electrode assembly for constant-current electroporation and use”;
- US Pat. No. 7,328,064, entitled, “Electroporation device and injection apparatus,” with claims directed to methods of delivering an agent plus electroporation;
- US Pat. No. 7,442,182, entitled, “Spring powered needle-free injection system”;
- US Pat. No. 7,547,293, entitled, “Triggering mechanism for needle-free injector”;
- US Pat. No. 7,664,545, entitled, “Electrode assembly for constant-current electroporation and use”;
- US Pat. No. 7,717,874, entitled, “Needle-free injection system”;
- US Pat. No. 7,922,709, entitled, “Enhanced delivery of naked DNA to skin by non-invasive in vivo electroporation”;
- US Pat. No. 7,942,845, entitled, “Needle-free injector and process for providing serial injections”;
- US Pat. No. 8,209,006, entitled, “Constant current electroporation device and methods of use”;
- US Pat. No. 8,617,099, entitled, “Injection device plunger auto-disable”; and
- US Pat. No. 9,452,285, entitled, “Electroporation devices and methods of using same for electroporation of cells in mammals.”

If we fail to protect our intellectual property rights adequately our competitors might gain access to our technology and our business would thus be harmed. In addition, defending our intellectual property rights might entail significant expense. Any of our intellectual property rights may be challenged by others or invalidated through administrative processes or litigation through the courts. In addition, our patents, or any other patents that may be issued to us in the future, may not provide us with any competitive advantages, or may be challenged by third parties. Furthermore, legal standards relating to the validity, enforceability and scope of protection of intellectual property rights are uncertain. Effective patent, trademark, copyright and trade secret protection may not be available to us in each country where we operate. The laws of some foreign countries may not be as protective of intellectual property rights as those in the United States, and domestic and international mechanisms for enforcement of intellectual property rights in those countries may be inadequate. Accordingly, despite our efforts, we may be unable to prevent third parties from infringing upon or misappropriating our intellectual property or

otherwise gaining access to our technology. We may be required to expend significant resources to monitor and protect our intellectual property rights. We may initiate claims or litigation against third parties for infringement of our proprietary rights or to establish the validity of our proprietary rights. Any such litigation, whether or not it is ultimately resolved in our favor, would result in significant expense to us and divert the efforts of our technical and management personnel.

There may be rights we are not aware of, including applications that have been filed but not published that, when issued, could be asserted against us. These third-parties could bring claims against us, and that would cause us to incur substantial expenses and, if successful against us, could cause us to pay substantial damages. Further, if a patent infringement suit were brought against us, we could be forced to stop or delay research, development, manufacturing or sales of the product or biologic drug candidate that is the subject of the suit. As a result of patent infringement claims, or in order to avoid potential claims, we may choose or be required to seek a license from the third-party. These licenses may not be available on acceptable terms, or at all. Even if we are able to obtain a license, the license would likely obligate us to pay license fees or royalties or both, and the rights granted to us might be non-exclusive, which could result in our competitors gaining access to the same intellectual property. Ultimately, we could be prevented from commercializing a product, or be forced to cease some aspect of our business operations, if, as a result of actual or threatened patent infringement claims, we are unable to enter into licenses on acceptable terms. All of the issues described above could also impact our collaborators, which would also impact the success of the collaboration and therefore us.

Important legal issues remain to be resolved as to the extent and scope of available patent protection for biologic products, including vaccines, and processes in the United States and other important markets outside the United States, such as Europe and Japan. Foreign markets may not provide the same level of patent protection as provided under the United States patent system. We recognize that litigation or administrative proceedings may be necessary to determine the validity and scope of certain of our and others' proprietary rights. Any such litigation or proceeding may result in a significant commitment of resources in the future and could force us to interrupt our operations, redesign our products or processes, or negotiate a license agreement, all of which would adversely affect our revenue. Furthermore, changes in, or different interpretations of, patent laws in the United States and other countries may result in patent laws that allow others to use our discoveries or develop and commercialize our products.

We cannot guarantee that the patents we obtain or the unpatented technology we hold will afford us significant commercial protection.

Significant Customers and Research and Development

During the years ended December 31, 2017 and 2016, we derived 53% and 4% of our revenue from MedImmune, 24% and 75% of our revenue from DARPA, and 14% and 14% of our revenue from Roche, respectively. Since our inception, virtually all of our activities have consisted of research and development efforts related to developing our electroporation technologies and immunotherapies. Research and development expense consists of expenses incurred in performing research and development activities including salaries and benefits, facilities and other overhead expenses, clinical trials, contract services and other outside expenses. Our research and development expense was $98.6 million in 2017 and $88.7 million in 2016.

Geographic Information

All of our revenue for the years ended December 31, 2017, 2016 and 2015 was earned in the United States. All of our long-lived assets are located in the United States.

Corporate History and Headquarters

We have been a leader in advancing the capabilities of DNA-based immunotherapies to treat infectious diseases and cancers going back to the original incorporation of Viral Genomix, Inc. under the laws of Delaware on April 17, 2000. We were renamed VGX Pharmaceuticals, Inc. on May 31, 2006. On February 21, 2007, VGX Pharmaceuticals acquired Advisys, Inc., a company possessing DNA and electroporation technology, through an asset purchase agreement. On April 14, 2007, VGX Pharmaceuticals entered into an exclusive license agreement with the Trustees of the University of Pennsylvania related to therapeutic and prophylactic DNA vaccines developed by Professor David B. Weiner at the University of Pennsylvania School of Medicine.

Recognizing the value of electroporation delivery technology, devices, and patents in advancing DNA-based immunotherapy products, on June 1, 2009, VGX Pharmaceuticals completed a merger with Inovio Biomedical Corporation, a publicly listed company focused on electroporation delivery technology.

Inovio Biomedical Corporation started as Biotechnologies & Experimental Research, Inc. and was incorporated on June 29, 1983 in California to create products for the research marketplace. The company changed its corporate name to BTX, Inc.

on December 10, 1991, and to Genetronics, Inc. on February 8, 1994. On April 14, 1994, Genetronics, Inc. became a public company through a share exchange agreement with Consolidated United Safety Technologies, Inc., a company listed on the Vancouver Stock Exchange under the laws of British Columbia, Canada. The company changed its name to Genetronics Biomedical Ltd. on September 29, 1994. Genetronics, Inc. remained as a wholly owned operating subsidiary. On September 2, 1997, the company listed on the Toronto Stock Exchange. On December 8, 1998, the company listed on the American Stock Exchange (now NYSE MKT) and voluntarily de-listed from the Toronto Stock Exchange on January 17, 2003. On June 15, 2001, Genetronics Biomedical Ltd. completed a change in jurisdiction of incorporation from British Columbia, Canada, to the state of Delaware and became Genetronics Biomedical Corporation. On January 25, 2005, Genetronics Biomedical Corporation acquired Inovio AS, a gene delivery technology company located in Norway. On March 31, 2005, Genetronics Biomedical Corporation was renamed Inovio Biomedical Corporation.

The merger between VGX Pharmaceuticals and Inovio Biomedical Corporation was effected pursuant to the terms of an Amended and Restated Agreement and Plan of Merger dated December 5, 2008, as further amended on March 31, 2009. On May 14, 2010, the combined entity changed its corporate name to Inovio Pharmaceuticals, Inc. We conduct our business through our United States wholly-owned subsidiaries, VGX Pharmaceuticals, LLC and Genetronics, Inc. Our corporate headquarters are located at 660 W. Germantown Pike, Suite 110, Plymouth Meeting, Pennsylvania 19462, and our telephone number is (267) 440-4200.

Available Information

Our Internet website address is www.inovio.com. In addition to the information contained in this Annual Report, information about us can be found on our website. Our website and information included in or linked to our website are not part of this Annual Report.

We make our annual report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, or the Exchange Act, available free of charge on our website as soon as reasonably practicable after we electronically file such material with, or furnish it to, the Securities and Exchange Commission, or the SEC. You can also read and copy any materials we file with the SEC at the SEC's Public Reference Room at 100 F Street, NE, Washington, DC 20549. You can obtain additional information about the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. In addition, the SEC maintains an Internet site (www.sec.gov) that contains reports, proxy and information statements, and other information regarding issuers that file electronically with the SEC, including us.

Information regarding our corporate governance, including the charters of our audit committee, our nomination and corporate governance committee and our compensation committee, our Code of Business Conduct and Ethics, our Corporate Governance Policy and information for contacting our board of directors is available on our website.

Our Code of Business Conduct and Ethics includes our Code of Ethics applicable to our Chief Executive Officer and Chief Financial Officer, who also serves as our principal accounting officer. Any amendments to or waivers of the Code of Ethics will be promptly posted on our website or in a report on Form 8-K, as required by applicable law.

Employees

As of March 9, 2018, we employed 278 people on a full-time basis and 2 people under consulting and project employment agreements. Of the combined total, 226 were in product research, which includes research and development, quality assurance, clinical, engineering, and manufacturing, and 54 were in general and administrative functions, which includes corporate development, information technology, legal, investor relations, finance, and corporate administration. None of our employees are subject to collective bargaining agreements.

ITEM 1A. RISK FACTORS

You should carefully consider the following factors regarding information included in this Annual Report. The risks and uncertainties described below are not the only ones 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, financial condition and operating results could be materially adversely affected.

Risks Related to Our Business and Industry

We have incurred losses since inception, expect to incur significant net losses in the foreseeable future and may never become profitable.

We have experienced significant operating losses to date. As of December 31, 2017 our accumulated deficit was approximately $523.4 million. We have generated limited revenues, primarily consisting of milestone and other payments under license and collaboration agreements, and revenue, from government grants. We expect to continue to incur substantial additional operating losses for at least the next several years as we advance our clinical trials and research and development activities. We may never successfully commercialize our vaccine product candidates or electroporation-based synthetic vaccine delivery technology and thus may never have any significant future revenues or achieve and sustain profitability.

We have limited sources of revenue and our success is dependent on our ability to develop our vaccine and immunotherapies and other product candidates and electroporation equipment.

We do not sell any products and may not have any other products commercially available for several years, if at all. Our ability to generate future revenues depends heavily on our success in:

- developing and securing United States and/or foreign regulatory approvals for our product candidates, including securing regulatory approval for conducting clinical trials with product candidates;
- developing our electroporation-based DNA delivery technology; and
- commercializing any products for which we receive approval from the FDA and foreign regulatory authorities.

Our electroporation equipment and product candidates will require extensive additional clinical study and evaluation, regulatory approval in multiple jurisdictions, substantial investment and significant marketing efforts before we generate any revenues from product sales. We are not permitted to market or promote our electroporation equipment and product candidates before we receive regulatory approval from the FDA or comparable foreign regulatory authorities. If we do not receive regulatory approval for and successfully commercialize any products, we will not generate any revenues from sales of electroporation equipment and products, and we may not be able to continue our operations.

None of our human vaccine and immunotherapy product candidates have been approved for sale, and we may not develop commercially successful vaccine products.

Our human vaccine and immunotherapy programs are in the early stages of research and development, and currently include vaccine product candidates in discovery, pre-clinical studies and Phase 1, 2 and 3 clinical trials. There are limited data regarding the efficiency of synthetic vaccine and immunotherapy candidates compared with conventional vaccines, and we must conduct a substantial amount of additional research and development before any regulatory authority will approve any of our vaccine product candidates. The success of our efforts to develop and commercialize our product candidates could fail for a number of reasons. For example, we could experience delays in product development and clinical trials. Our product candidates could be found to be ineffective or unsafe, or otherwise fail to receive necessary regulatory clearances. The products, if safe and effective, could be difficult to manufacture on a large scale or uneconomical to market, or our competitors could develop superior products more quickly and efficiently or more effectively market their competing products.

In addition, adverse events, or the perception of adverse events, relating to vaccine and immunotherapy candidates and delivery technologies may negatively impact our ability to develop commercially successful products. For example, pharmaceutical companies have been subject to claims that the use of some pediatric vaccines has caused personal injuries, including brain damage, central nervous system damage and autism. These and other claims may influence public perception of the use of vaccine and immunotherapy products and could result in greater governmental regulation, stricter labeling requirements and potential regulatory delays in the testing or approval of our potential

products.

We will need substantial additional capital to develop our synthetic vaccine and immunotherapy programs and electroporation delivery technology.

Conducting the costly and time consuming research, pre-clinical and clinical testing necessary to obtain regulatory approvals and bring our product candidates and delivery technology to market will require a commitment of substantial funds in excess of our current capital. Our future capital requirements will depend on many factors, including, among others:

- the progress of our current and new product development programs;
- the progress, scope and results of our pre-clinical and clinical testing;
- the time and cost involved in obtaining regulatory approvals;
- the cost of manufacturing our products and product candidates;
- the cost of prosecuting, enforcing and defending against patent infringement claims and other intellectual property rights;
- competing technological and market developments; and
- our ability and costs to establish and maintain collaborative and other arrangements with third parties to assist in potentially bringing our products to market.

Additional financing may not be available on acceptable terms, or at all. Domestic and international capital markets have from time to time experienced heightened volatility and turmoil, making it more difficult to raise capital through the issuance of equity securities. Volatility in the capital markets can also negatively impact the cost and availability of credit, creating illiquid credit markets and wider credit spreads. Concern about the stability of the markets generally and the strength of counterparties specifically has led many lenders and institutional investors to reduce, and in some cases cease to provide, funding to borrowers. To the extent we are able to raise additional capital through the sale of equity securities or we issue securities in connection with another transaction, the ownership position of existing stockholders could be substantially diluted. If additional funds are raised through the issuance of preferred stock or debt securities, these securities are likely to have rights, preferences and privileges senior to our common stock and may involve significant fees, interest expense, restrictive covenants and the granting of security interests in our assets. Fluctuating interest rates could also increase the costs of any debt financing we may obtain. Raising capital through a licensing or other transaction involving our intellectual property could require us to relinquish valuable intellectual property rights and thereby sacrifice long-term value for short-term liquidity.

Our failure to successfully address ongoing liquidity requirements would have a substantially negative impact on our business. If we are unable to obtain additional capital on acceptable terms when needed, we may need to take actions that adversely affect our business, our stock price and our ability to achieve cash flow in the future, including possibly surrendering our rights to some technologies or product opportunities, delaying our clinical trials or curtailing or ceasing operations.

We depend upon key personnel who may terminate their employment with us at any time and we may need to hire additional qualified personnel in order to obtain financing, pursue collaborations or develop or market our product candidates.

The success of our business strategy will depend to a significant degree upon the continued services of key management, technical and scientific personnel and our ability to attract and retain additional qualified personnel and managers, including personnel with expertise in clinical trials, government regulation, manufacturing, marketing and other areas. Competition for qualified personnel is intense among companies, academic institutions and other organizations. If we are unable to attract and retain key personnel and advisors, it may negatively affect our ability to successfully develop, test, commercialize and market our products and product candidates.

We face intense and increasing competition and many of our competitors have significantly greater resources and experience.

If any of our competitors develop products with efficacy or safety profiles significantly better than our products, we may not be able to commercialize our products, and sales of any of our commercialized products could be harmed. Some of our competitors and potential competitors have substantially greater product development capabilities and financial, scientific, marketing and human resources than we do. Competitors may develop products earlier, obtain FDA approvals for products more rapidly, or develop products that are more effective than those under development by us. We will seek to expand our technological capabilities to remain competitive; however, research and

development by others may render our technologies or products obsolete or noncompetitive, or result in treatments or cures superior to ours.

Many other companies are pursuing other forms of treatment or prevention for diseases that we target. For example, many of our competitors are working on developing and testing cancer vaccines and immunotherapies and several products such as the CAR-Ts developed by our competitors have been approved for human use. Our competitors and potential competitors include large pharmaceutical and more established biotechnology companies. These companies have significantly greater

financial and other resources and greater expertise than us in research and development, securing government contracts and grants to support research and development efforts, manufacturing, pre-clinical and clinical testing, obtaining regulatory approvals and marketing. This may make it easier for them to respond more quickly than us to new or changing opportunities, technologies or market needs. Many of these competitors operate large, well-funded research and development programs and have significant products approved or in development. Small companies may also prove to be significant competitors, particularly through collaborative arrangements with large pharmaceutical companies or through acquisition or development of intellectual property rights. Our potential competitors also include academic institutions, governmental agencies and other public and private research organizations that conduct research, seek patent protection and establish collaborative arrangements for product and clinical development and marketing. Research and development by others may seek to render our technologies or products obsolete or noncompetitive.

If we lose or are unable to secure collaborators or partners, or if our collaborators or partners do not apply adequate resources to their relationships with us, our product development and potential for profitability will suffer.

We have entered into, or may enter into, distribution, co-promotion, partnership, sponsored research and other arrangements for development, manufacturing, sales, marketing and other commercialization activities relating to our products. For example, in the past we have entered into license and collaboration agreements. The amount and timing of resources applied by our collaborators are largely outside of our control.

If any of our current or future collaborators breaches or terminates our agreements, or fails to conduct our collaborative activities in a timely manner, our commercialization of products could be diminished or blocked completely. We may not receive any event-based payments, milestone payments or royalty payments under our collaborative agreements if our collaborative partners fail to develop products in a timely manner or at all. It is possible that collaborators will change their strategic focus, pursue alternative technologies or develop alternative products, either on their own or in collaboration with others. Further, we may be forced to fund programs that were previously funded by our collaborators, and we may not have, or be able to access, the necessary funding. The effectiveness of our partners, if any, in marketing our products will also affect our revenues and earnings.

We desire to enter into new collaborative agreements. However, we may not be able to successfully negotiate any additional collaborative arrangements and, if established, these relationships may not be scientifically or commercially successful. Our success in the future depends in part on our ability to enter into agreements with other highly-regarded organizations. This can be difficult due to internal and external constraints placed on these organizations. Some organizations may have insufficient administrative and related infrastructure to enable collaborations with many companies at once, which can extend the time it takes to develop, negotiate and implement a collaboration. Once news of discussions regarding possible collaborations are known in the medical community, regardless of whether the news is accurate, failure to announce a collaborative agreement or the entity's announcement of a collaboration with another entity may result in adverse speculation about us, resulting in harm to our reputation and our business.

Disputes could also arise between us and our existing or future collaborators, as to a variety of matters, including financial and intellectual property matters or other obligations under our agreements. These disputes could be both expensive and time-consuming and may result in delays in the development and commercialization of our products or could damage our relationship with a collaborator.

A small number of licensing partners and government contracts account for a substantial portion of our revenue.

We currently derive, and in the past we have derived, a significant portion of our revenue from a limited number of licensing partners and government grants and contracts. Revenue can fluctuate significantly depending on the timing of up-front and event-based payments and work performed. If we fail to sign additional future contracts with major licensing partners and the government, if a contract is delayed or deferred, or if an existing contract expires or is canceled and we fail to replace the contract with new business, our revenue would be adversely affected.

We have agreements with government agencies, which are subject to termination and uncertain future funding.

We have entered into agreements with government agencies, such as the NIAID and DARPA, and we intend to continue entering into these agreements in the future. Our business is partially dependent on the continued performance by these government agencies of their responsibilities under these agreements, including adequate continued funding of the agencies and their programs. We have no control over the resources and funding that government agencies may devote to these agreements, which may be subject to annual renewal and which generally

may be terminated by the government agencies at any time.

Government agencies may fail to perform their responsibilities under these agreements, which may cause them to be terminated by the government agencies. In addition, we may fail to perform our responsibilities under these agreements. Many of our government agreements are subject to audits, which may occur several years after the period to which the audit relates. If

an audit identifies significant unallowable costs, we could incur a material charge to our earnings or reduction in our cash position. As a result, we may be unsuccessful entering, or ineligible to enter, into future government agreements.

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 electroporation equipment, product candidates or future development programs;
- expenses related to corporate transactions, including ones not fully completed;
- addition or termination of clinical trials or funding support;
- any intellectual property infringement lawsuit in which we may become involved;
- any legal claims that may be asserted against us or any of our officers;
- regulatory developments affecting our electroporation equipment and product candidates or those of our competitors;
- our execution of any collaborative, licensing or similar arrangements, and the timing of payments we may make or receive under these arrangements; and
- if any of our products receives regulatory approval, the levels of underlying demand for our products.

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. We believe that quarterly comparisons of our financial results are not necessarily meaningful and should not be relied upon as an indication of our future performance.

If we are unable to obtain FDA approval of our products, we will not be able to commercialize them in the United States.

We need FDA approval prior to marketing our electroporation equipment and products in the United States. If we fail to obtain FDA approval to market our electroporation equipment and product candidates, we will be unable to sell our products in the United States, which will significantly impair our ability to generate any revenues.

This regulatory review and approval process, which includes evaluation of pre-clinical studies and clinical trials of our products as well as the evaluation of our manufacturing processes and our third-party contract manufacturers' facilities, is lengthy, expensive and uncertain. To receive approval, we must, among other things, demonstrate with substantial evidence from well-controlled clinical trials that our electroporation equipment and product candidates are both safe and effective for each indication for which approval is sought. Satisfaction of the approval requirements typically takes several years and the time needed to satisfy them may vary substantially, based on the type, complexity and novelty of the product. We do not know if or when we might receive regulatory approvals for our electroporation equipment and any of our product candidates currently under development. Moreover, any approvals that we obtain may not cover all of the clinical indications for which we are seeking approval, or could contain significant limitations in the form of narrow indications, warnings, precautions or contra-indications with respect to conditions of use. In such event, our ability to generate revenues from such products would be greatly reduced and our business would be harmed.

The FDA has substantial discretion in the approval process and may either refuse to consider our application for substantive review or may form the opinion after review of our data that our application is insufficient to allow approval of our electroporation equipment and product candidates. If the FDA does not consider or approve our application, it may require that we conduct additional clinical, pre-clinical or manufacturing validation studies and submit that data before it will reconsider our application. Depending on the extent of these or any other studies, approval of any applications that we submit may be delayed by several years, or may require us to expend more resources than we have available. It is also possible that additional studies, if performed and completed, may not be successful or considered sufficient by the FDA for approval or even to make our applications approvable. If any of these outcomes occur, we may be forced to abandon one or more of our applications for approval, which might significantly harm our business and prospects.

It is possible that none of our products or any product we may seek to develop in the future will ever obtain the appropriate regulatory approvals necessary for us or our collaborators to commence product sales. Any delay in obtaining, or an inability to obtain, applicable regulatory approvals would prevent us from commercializing our products, generating revenues and achieving and sustaining profitability.

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Clinical trials involve a lengthy and expensive process with an uncertain outcome, and results of earlier studies and trials may not be predictive of future trial results.

Clinical testing is expensive and can take many years to complete, and its outcome is uncertain. Failure can occur at any time during the clinical trial process. The results of pre-clinical studies and early clinical trials of our products may not be predictive of the results of later-stage clinical trials. Results from one study may not be reflected or supported by the results of similar studies. Results of an animal study may not be indicative of results achievable in human studies. Human-use equipment and product candidates in later stages of clinical trials may fail to show the desired safety and efficacy traits despite having progressed through pre-clinical studies and initial clinical testing. The time required to obtain approval by the FDA and similar foreign authorities is unpredictable but typically takes many years following the commencement of clinical trials, depending upon numerous factors. In addition, approval policies, regulations, or the type and amount of clinical data necessary to gain approval may change. We have not obtained regulatory approval for any human-use products.

Our products could fail to complete the clinical trial process for many reasons, including the following:

- we may be unable to demonstrate to the satisfaction of the FDA or comparable foreign regulatory authorities that our electroporation equipment and a product candidate are safe and effective for any indication;
- the results of clinical trials may not meet the level of statistical significance required by the FDA or comparable foreign regulatory authorities for approval;
- the FDA or comparable foreign regulatory authorities may disagree with the design or implementation of our clinical trials;
- we may not be successful in enrolling a sufficient number of participants in clinical trials;
- we may be unable to demonstrate that our electroporation equipment and a product candidate's clinical and other benefits outweigh its safety risks;
- we may be unable to demonstrate that our electroporation equipment and a product candidate presents an advantage over existing therapies, or over placebo in any indications for which the FDA requires a placebo-controlled trial;
- the FDA or comparable foreign regulatory authorities may disagree with our interpretation of data from pre-clinical studies or clinical trials;
- the data collected from clinical trials of our product candidates may not be sufficient to support the submission of a new drug application or other submission or to obtain regulatory approval in the United States or elsewhere;
- the FDA or comparable foreign regulatory authorities may fail to approve the manufacturing processes or facilities of us or third-party manufacturers with which we or our collaborators contract for clinical and commercial supplies; and
- the approval policies or regulations of the FDA or comparable foreign regulatory authorities may significantly change in a manner rendering our clinical data insufficient for approval.

Delays in the commencement or completion of clinical testing could result in increased costs to us and delay or limit our ability to generate revenues.

Delays in the commencement or completion of clinical testing could significantly affect our product development costs. We do not know whether planned clinical trials will begin on time or be completed on schedule, if at all. In addition, ongoing clinical trials may not be completed on schedule, or at all, and could be placed on a hold by the regulators for various reasons. The commencement and completion of clinical trials can be delayed for a number of reasons, including delays related to:

- obtaining regulatory approval to commence a clinical trial;
- adverse results from third party clinical trials involving gene based therapies and the regulatory response thereto;
- reaching agreement on acceptable terms with prospective CROs and trial sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and trial sites;
- future bans or stricter standards imposed on gene based therapy clinical trials;
- manufacturing sufficient quantities of our electroporation equipment and product candidates for use in clinical trials;
- obtaining institutional review board, or IRB, approval to conduct a clinical trial at a prospective site;
- slower than expected recruitment and enrollment of patients to participate in clinical trials for a variety of reasons, including competition from other clinical trial programs for similar indications;
- conducting clinical trials with sites internationally due to regulatory approvals and meeting international standards;

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- retaining patients who have initiated a clinical trial but may be prone to withdraw due to side effects from the therapy, lack of efficacy or personal issues, or who are lost to further follow-up;
- collecting, reviewing and analyzing our clinical trial data; and
- global unrest, terrorist activities, and economic and other external factors.

Clinical trials may also be delayed as a result of ambiguous or negative interim results. In addition, a clinical trial may be suspended or terminated by us, the FDA, the IRB overseeing the clinical trial at issue, any of our clinical trial sites with respect to that site, or other regulatory authorities due to a number of factors, including:

- failure to conduct the clinical trial in accordance with regulatory requirements or our clinical protocols;
- inspection of the clinical trial operations or trial sites by the FDA or other regulatory authorities resulting in the imposition of a clinical hold;
- unforeseen safety issues; and
- lack of adequate funding to continue the clinical trial.

If we experience delays in completion of, or if we terminate, any of our clinical trials, the commercial prospects for our electroporation equipment and our product candidates may be harmed and our ability to generate product revenues will be delayed. In addition, many of the factors that cause, or lead to, a delay in the commencement or completion of clinical trials may also ultimately lead to the denial of regulatory approval of a product candidate. Further, delays in the commencement or completion of clinical trials may adversely affect the trading price of our common stock.

We and our collaborators rely on third parties to conduct our clinical trials. If these third parties do not successfully carry out their contractual duties or meet expected deadlines, we and our collaborators may not be able to obtain regulatory approval for or commercialize our product candidates.

We and our collaborators have entered into agreements with CROs to provide monitors for and to manage data for our on-going clinical programs. We and the CROs conducting clinical trials for our electroporation equipment and product candidates are required to comply with current good clinical practices, or GCPs, regulations and guidelines enforced by the FDA for all of our products in clinical development. The FDA enforces GCPs through periodic inspections of trial sponsors, principal investigators and trial sites. If we or the CROs conducting clinical trials of our product candidates fail to comply with applicable GCPs, the clinical data generated in the clinical trials may be deemed unreliable and the FDA may require additional clinical trials before approving any marketing applications.

If any relationships with CROs terminate, we or our collaborators may not be able to enter into arrangements with alternative CROs. In addition, these third-party CROs are not our employees, and we cannot control whether or not they devote sufficient time and resources to our on-going clinical programs or perform trials efficiently. These CROs may also have relationships with other commercial entities, including our competitors, for whom they may also be conducting clinical studies or other drug development activities, which could harm our competitive position. If CROs do not successfully carry out their contractual duties or obligations or meet expected deadlines, if they need to be replaced, or if the quality or accuracy of the clinical data they obtain is compromised due to the failure to adhere to our clinical protocols, regulatory requirements, or for other reasons, our clinical trials may be extended, delayed or terminated, and we may not be able to obtain regulatory approval for or successfully commercialize our product candidates. As a result, our financial results and the commercial prospects for our product candidates would be harmed, our costs could increase and our ability to generate revenues could be delayed. Cost overruns by or disputes with our CROs may significantly increase our expenses.

Even if our products receive regulatory approval, they may still face future development and regulatory difficulties.

Even if United States 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 post-approval studies. This governmental oversight may be particularly strict with respect to gene based therapies. Our products will also be subject to ongoing FDA requirements governing the labeling, packaging, storage, advertising, promotion, record keeping and submission 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 current good manufacturing practices, or cGMP, regulations. If we or a regulatory agency 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, a regulatory agency may impose restrictions on that

product, the manufacturer or us, including requiring withdrawal of the product from the market or suspension of manufacturing. If we, our product candidates or the manufacturing facilities for our product candidates fail to comply with applicable regulatory requirements, a regulatory agency may:

- issue Warning Letters or untitled letters;

- impose civil or criminal penalties;
- suspend regulatory approval;
- suspend any ongoing clinical trials;
- refuse to approve pending applications or supplements to applications filed by us;
- impose restrictions on operations, including costly new manufacturing requirements; or
- seize or detain products or require us to initiate a product recall.

Even if our products receive regulatory approval in the United States, we may never receive approval or commercialize our products outside of the United States.

In order to market any electroporation equipment and product candidates outside of the United States, we must establish and comply with numerous and varying regulatory requirements of other countries regarding safety and efficacy. Approval procedures vary among countries and can involve additional product testing and additional administrative review periods. The time required to obtain approval in other countries might differ from that required to obtain FDA approval. The regulatory approval process in other countries may include all of the risks detailed above regarding FDA approval in the United States as well as other risks. Regulatory approval in one country does not ensure regulatory approval in another, but a failure or delay in obtaining regulatory approval in one country may have a negative effect on the regulatory process in others. Failure to obtain regulatory approval in other countries or any delay or setback in obtaining such approval could have the same adverse effects detailed above regarding FDA approval in the United States. Such effects include the risks that our product candidates may not be approved for all indications requested, which could limit the uses of our product candidates and have an adverse effect on their commercial potential or require costly, post-marketing follow-up studies.

We face potential product liability exposure and, if successful claims are brought against us, we may incur substantial liability.

The use of our electroporation equipment and synthetic vaccine candidates in clinical trials and the sale of any products for which we obtain marketing approval expose us to the risk of product liability claims. Product liability claims might be brought against us by consumers, health care providers, pharmaceutical companies or others selling or otherwise coming into contact with our products. For example, pharmaceutical companies have been subject to claims that the use of some pediatric vaccines has caused personal injuries, including brain damage, central nervous system damage and autism, and these companies have incurred material costs to defend these claims. If we cannot successfully defend ourselves against product liability claims, we could incur substantial liabilities. In addition, regardless of merit or eventual outcome, product liability claims may result in:

- decreased demand for our product candidates;
- impairment of our business reputation;
- withdrawal of clinical trial participants;
- costs of related litigation;
- distraction of management's attention from our primary business;
- substantial monetary awards to patients or other claimants;
- loss of revenues; and
- inability to commercialize our products.

We have obtained product liability insurance coverage for our clinical trials, but our insurance coverage may not be sufficient to reimburse us for any expenses or losses we may suffer. Moreover, insurance coverage is becoming increasingly expensive, and, in the future, we may not be able to maintain insurance coverage at a reasonable cost or in sufficient amounts to protect us against losses due to liability. On occasion, large judgments have been awarded in class action lawsuits based on products that had unanticipated side effects. A successful product liability claim or series of claims brought against us could cause our stock price to decline and, if judgments exceed our insurance coverage, could adversely affect our business.

We currently have no marketing and sales organization. If we are unable to establish marketing and sales capabilities or enter into agreements with third parties to market and sell our products, we may not be able to generate product revenues.

We currently do not have a sales organization for the marketing, sales and distribution of our electroporation equipment and product candidates. In order to commercialize any products, we must build our marketing, sales, distribution, managerial and other non-technical capabilities or make arrangements with third parties to perform these services. We contemplate establishing our own sales force or seeking third-party partners to sell our products. The establishment and development of our

own sales force to market any products we may develop will be expensive and time consuming and could delay any product launch, and we may not be able to successfully develop this capability. We will also have to compete with other pharmaceutical and biotechnology companies to recruit, hire, train and retain marketing and sales personnel. To the extent we rely on third parties to commercialize our approved products, if any, we will receive lower revenues than if we commercialized these products ourselves. In addition, we may have little or no control over the sales efforts of third parties involved in our commercialization efforts. In the event we are unable to develop our own marketing and sales force or collaborate with a third-party marketing and sales organization, we would not be able to commercialize our product candidates which would negatively impact our ability to generate product revenues.

If any of our products for which we receive regulatory approval does not achieve broad market acceptance, the revenues that we generate from their sales will be limited.

The commercial success of our electroporation equipment and product candidates for which we obtain marketing approval from the FDA or other regulatory authorities will depend upon the acceptance of these products by both the medical community and patient population. Coverage and reimbursement of our product candidates by third-party payors, including government payors, generally is also necessary for optimal commercial success. The degree of market acceptance of any of our approved products will depend on a number of factors, including:

- our ability to provide acceptable evidence of safety and efficacy;
- the relative convenience and ease of administration;
- the prevalence and severity of any actual or perceived adverse side effects;
- limitations or warnings contained in a product's FDA-approved labeling, including, for example, potential “black box” warnings
- availability of alternative treatments;
- pricing and cost effectiveness;
- the effectiveness of our or any future collaborators' sales and marketing strategies;
- our ability to obtain sufficient third-party coverage or reimbursement; and
- the willingness of patients to pay out of pocket in the absence of third-party coverage.

If our electroporation equipment and product candidates are approved but do not achieve an adequate level of acceptance by physicians, health care payors and patients, we may not generate sufficient revenue from these products, and we may not become or remain profitable. In addition, 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.

We are subject to uncertainty relating to reimbursement policies which, if not favorable to our product candidates, could hinder or prevent our products' commercial success.

Our ability to commercialize our electroporation equipment and product candidates successfully will depend in part on the extent to which governmental authorities, private health insurers and other third-party payors establish appropriate coverage and reimbursement levels for our product candidates and related treatments. As a threshold for coverage and reimbursement, third-party payors generally require that drug products have been approved for marketing by the FDA. Third-party payors also are increasingly challenging the effectiveness of and prices charged for medical products and services. We may not be able to obtain third-party coverage or reimbursement for our products in whole or in part.

Healthcare reform measures could hinder or prevent our products' commercial success.

In both the United States and certain foreign jurisdictions there have been, and we anticipate there will continue to be, a number of legislative and regulatory changes to the healthcare system that could impact our ability to sell any of our products profitably. In the United States, the Federal government enacted healthcare reform legislation, the Patient Protection and Affordable Care Act, or the ACA. We believe there could be continuing trends towards expanding coverage to more individuals, containing health care costs and improving quality. At the same time, the rebates, discounts, taxes and other costs associated with the ACA are expected to be a significant cost to the pharmaceutical industry.

The continuing efforts of the government, insurance companies, managed care organizations and other payors of healthcare services to make and implement healthcare reforms may adversely affect:

- our ability to set a price we believe is fair for our products;

- our ability to generate revenues and achieve or maintain profitability;
- the availability of capital; and

- our ability to obtain timely approval of our products.

If we fail to comply with applicable healthcare regulations, we could face substantial penalties and our business, operations and financial condition could be adversely affected.

Certain federal and state healthcare laws and regulations pertaining to fraud and abuse and patients' rights may be applicable to our business. We could be subject to healthcare fraud and abuse and patient privacy regulation by both the federal government and the states in which we conduct our business, without limitation. The laws that may affect our ability to operate include:

- the federal healthcare program Anti-Kickback Statute, which prohibits, among other things, people from soliciting, receiving or providing remuneration, directly or indirectly, to induce either the referral of an individual, for an item or service or the purchasing or ordering of a good or service, for which payment may be made under federal healthcare programs such as the Medicare and Medicaid programs;
- federal false claims laws which prohibit, 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;
- the ACA expands the government's investigative and enforcement authority and increases the penalties for fraud and abuse, including amendments to both the False Claims Act and the Anti-Kickback Statute to make it easier to bring suit under those statutes;
- 
- the federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, which prohibits executing a scheme to defraud any healthcare benefit program or making false statements relating to healthcare matters and which also imposes certain requirements relating to the privacy, security and transmission of individually identifiable health information;
- the Federal Food, Drug, and Cosmetic Act, which among other things, strictly regulates drug product marketing, prohibits manufacturers from marketing drug products for off-label use and regulates the distribution of drug samples;
- the U.S. Foreign Corrupt Practices Act, which, among other things, prohibits companies issuing stock in the U.S. from bribing foreign officials for government contracts and other business; and
- state 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, 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 often are not preempted by HIPAA, thus complicating compliance efforts.

Additionally, the compliance environment is changing, with more states, such as California and Massachusetts, mandating implementation of compliance programs, compliance with industry ethics codes, and spending limits, and other states, such as Vermont, Maine, and Minnesota requiring reporting to state governments of gifts, compensation, and other remuneration to physicians. Under the ACA, pharmaceutical companies are required to record any transfers of value made to doctors and teaching hospitals and to disclose such data to HHS. These laws all provide for penalties for non-compliance. The shifting regulatory environment, along with the requirement to comply with multiple jurisdictions with different compliance and/or reporting requirements, increases the possibility that a company may run afoul of one or more laws.

If our operations are found to be in violation of any of the laws described above or any other governmental regulations that apply to us, we may be subject to penalties, including civil and criminal penalties, damages, fines and the curtailment or restructuring of our operations. Any penalties, damages, fines, curtailment or restructuring of our operations could adversely affect our ability to operate our business and our financial results. Any action against us for violation of these laws, even if we successfully defend against it, could cause us to incur significant legal expenses and divert our management's attention from the operation of our business. Moreover, achieving and sustaining compliance with applicable federal and state privacy, security and fraud laws may prove costly.

If we and the contract manufacturers upon whom we rely fail to produce our systems and product candidates in the volumes that we require on a timely basis, or fail to comply with stringent regulations, we may face delays in the development and commercialization of our electroporation equipment and product candidates.

We manufacture some components of our electroporation systems and utilize the services of contract manufacturers to manufacture the remaining components of these systems and our product supplies for clinical trials. The manufacture

of our systems and product supplies requires significant expertise and capital investment, including the development of advanced manufacturing techniques and process controls. Manufacturers often encounter difficulties in production, particularly in scaling

up for commercial production. These problems include difficulties with production costs and yields, quality control, including stability of the equipment and product candidates and quality assurance testing, shortages of qualified personnel, as well as compliance with strictly enforced federal, state and foreign regulations. If we or our manufacturers were to encounter any of these difficulties or our manufacturers otherwise fail to comply with their obligations to us, our ability to provide our electroporation equipment to our partners and products to patients in our clinical trials or to commercially launch a product would be jeopardized. Any delay or interruption in the supply of clinical trial supplies could delay the completion of our clinical trials, increase the costs associated with maintaining our clinical trial program and, depending upon the period of delay, require us to commence new trials at significant additional expense or terminate the trials completely.

In addition, all manufacturers of our products must comply with cGMP requirements enforced by the FDA through its facilities inspection program. These requirements include, among other things, quality control, quality assurance and the generation and maintenance of records and documentation. Manufacturers of our products may be unable to comply with these cGMP requirements and with other FDA, state and foreign regulatory requirements. We have little control over our manufacturers' compliance with these regulations and standards. A failure to comply with these requirements may result in fines and civil penalties, suspension of production, suspension or delay in product approval, product seizure or recall, or withdrawal of product approval. If the safety of any product is compromised due to our or our manufacturers' failure to adhere to applicable laws or for other reasons, we may not be able to obtain regulatory approval for or successfully commercialize our products, and we may be held liable for any injuries sustained as a result. Any of these factors could cause a delay of clinical trials, regulatory submissions, approvals or commercialization of our products, entail higher costs or result in our being unable to effectively commercialize our products. Furthermore, if our manufacturers fail to deliver the required commercial quantities on a timely basis, pursuant to provided specifications and at commercially reasonable prices, we may be unable to meet demand for our products and would lose potential revenues.

Our failure to successfully acquire, develop and market additional product candidates or approved products would impair our ability to grow.

We may acquire, in-license, develop and/or market additional products and product candidates. The success of these actions depends partly upon our ability to identify, select and acquire promising product candidates and products. The process of proposing, negotiating and implementing a license or acquisition of a product candidate or approved product is lengthy and complex. Other companies, including some with substantially greater financial, marketing and sales resources, may compete with us for the license or acquisition of product candidates and approved products. We have limited resources to identify and execute the acquisition or in-licensing of third-party products, businesses and technologies and integrate them into our current infrastructure. Moreover, we may devote resources to potential acquisitions or in-licensing opportunities that are never completed, or we may fail to realize the anticipated benefits of such efforts. We may not be able to acquire the rights to additional product candidates on terms that we find acceptable, or at all.

In addition, future acquisitions may entail numerous operational and financial risks, including:

- exposure to unknown liabilities;
- disruption of our business and diversion of our management's time and attention to develop acquired products or technologies;
- incurrence of substantial debt or dilutive issuances of securities to pay for acquisitions;
- higher than expected acquisition and integration costs;
- increased amortization expenses;
- difficulty and cost in combining the operations and personnel of any acquired businesses with our operations and personnel;
- impairment of relationships with key suppliers or customers of any acquired businesses due to changes in management and ownership; and
- inability to retain key employees of any acquired businesses.

Further, any product candidate that we acquire may require additional development efforts prior to commercial sale, including extensive clinical testing and approval by the FDA and applicable foreign regulatory authorities. All product candidates are prone to risks of failure typical of product development, including the possibility that a product

candidate will not be shown to be sufficiently safe and effective for approval by regulatory authorities.

Our business involves the use of hazardous materials and we and our third-party manufacturers must comply with environmental laws and regulations, which can be expensive and restrict how we do business.

Our and our third-party manufacturers' activities involve the controlled storage, use and disposal of hazardous materials, including the components of our product candidates and other hazardous compounds. We and our manufacturers are subject to federal, state and local laws and regulations governing the use, manufacture, storage, handling and disposal of these hazardous materials. In the event of an accident, state or federal authorities may curtail the use of these materials and interrupt our business operations. If we are subject to any liability as a result of our or our third-party manufacturers' activities involving hazardous materials, our business and financial condition may be adversely affected.

We may be subject to stockholder litigation, which would harm our business and financial condition.

We may have actions brought against us by stockholders relating to past transactions, changes in our stock price or other matters. Any such actions could give rise to substantial damages, and thereby have a material adverse effect on our consolidated financial position, liquidity, or results of operations. Even if an action is not resolved against us, the uncertainty and expense associated with stockholder actions could harm our business, financial condition and reputation. Litigation can be costly, time-consuming and disruptive to business operations. The defense of lawsuits could also result in diversion of our management's time and attention away from business operations, which could harm our business.

Our results of operations and liquidity needs could be materially affected by market fluctuations and general economic conditions.

Our results of operations could be materially affected by economic conditions generally, both in the United States and elsewhere around the world. Concerns over inflation, energy costs, geopolitical issues and the availability and cost of credit have in the past and may continue to contribute to increased volatility and diminished expectations for the economy and the markets going forward. Market upheavals may have an adverse effect on us. In the event of a market downturn, our results of operations could be adversely affected. Our future cost of equity or debt capital and access to the capital markets could be adversely affected, and our stock price could decline. There may be disruption in or delay in the performance of our third-party contractors and suppliers. If our contractors, suppliers and partners are unable to satisfy their contractual commitments, our business could suffer. In addition, we maintain significant amounts of cash and cash equivalents at one or more financial institutions that are in excess of federally insured limits, and we may experience losses on these deposits.

We are dependent on information technology and our systems and infrastructure face certain risks, including from cybersecurity breaches and data leakage.

We rely to a large extent upon sophisticated information technology systems to operate our businesses, some of which are managed, hosted provided and/or used for third-parties or their vendors. We collect, store and transmit large amounts of confidential information, and we deploy and operate an array of technical and procedural controls to maintain the confidentiality and integrity of such confidential information. A significant breakdown, invasion, corruption, destruction or interruption of critical information technology systems or infrastructure, by our workforce, others with authorized access to our systems or unauthorized persons could negatively impact operations. The ever-increasing use and evolution of technology, including cloud-based computing, creates opportunities for the unintentional dissemination or intentional destruction of confidential information stored in our or our third-party providers' systems, portable media or storage devices. We could also experience a business interruption, theft of confidential information or reputational damage from industrial espionage attacks, malware or other cyber-attacks, which may compromise our system infrastructure or lead to data leakage, either internally or at our third-party providers. While we have invested in the protection of data and information technology, there can be no assurance that our efforts will prevent service interruptions or security breaches. Any such interruption or breach of our systems could adversely affect our business operations and/or result in the loss of critical or sensitive confidential information or intellectual property, and could result in financial, legal, business and reputational harm to us.

The recently passed comprehensive tax reform bill could adversely affect our business and financial condition.

On December 22, 2017, President Trump signed into law new legislation that significantly revises the Internal Revenue Code of 1986, as amended, or the Code. The newly enacted federal income tax law, among other things,

contains significant changes to corporate taxation, including reduction of the corporate tax rate from a top marginal rate of 35 percent to a flat rate of 21 percent, limitation of the tax deduction for interest expense to 30 percent of adjusted earnings (except for certain small businesses), limitation of the deduction for net operating losses to 80 percent of current-year taxable income and elimination of net operating loss carrybacks, one time taxation of offshore earnings at reduced rates regardless of whether they are repatriated, immediate deductions for certain new investments instead of deductions for depreciation expense over time, and modifying or repealing many business deductions and credits (including reducing the business tax credit for certain clinical testing expenses

incurred in the testing of certain drugs for rare diseases or conditions). Notwithstanding the reduction in the corporate income tax rate, the overall impact of the new federal tax law is uncertain and our business and financial condition could be adversely affected. In addition, it is uncertain if and to what extent various states will conform to the newly enacted federal tax law.

Risks Related to Our Intellectual Property

It is difficult and costly to generate and protect our intellectual property and our proprietary technologies, and we may not be able to ensure their protection.

Our commercial success will depend in part on obtaining and maintaining patent, trademark, trade secret, and other intellectual property protection relating to our electroporation equipment and product candidates, as well as successfully defending these intellectual property rights against third-party challenges.

The patent positions of pharmaceutical and biotechnology companies can be highly uncertain and involve complex legal and factual questions for which important legal principles remain unresolved. The laws and regulations regarding the breadth of claims allowed in biotechnology patents have evolved over recent years and continues to undergo review and revision, both in the United States and abroad. The biotechnology patent situation outside the United States can be even more uncertain depending on the country. Changes in either the patent laws or in interpretations of patent laws in the United States and other countries may diminish the value of our intellectual property. Accordingly, we cannot predict the breadth of claims that may be allowed or enforced in our licensed patents, our patents or in third-party patents, nor can we predict the likelihood of our patents surviving a patent validity challenge.

The degree of future protection for our intellectual property rights is uncertain, because legal decision-making can be unpredictable, thereby often times resulting in limited protection, which may not adequately protect our rights or permit us to gain or keep our competitive advantage, or resulting in an invalid or unenforceable patent. For example:

- we, or the parties from whom we have acquired or licensed patent rights, may not have been the first to file the underlying patent applications or the first to make the inventions covered by such patents;
- the named inventors or co-inventors of patents or patent applications that we have licensed or acquired may be incorrect, which may give rise to inventorship and ownership challenges;
- others may develop similar or alternative technologies, or duplicate any of our products or technologies that may not be covered by our patents, including design-arounds;
- pending patent applications may not result in issued patents;
- the issued patents covering our products and technologies may not provide us with any competitive advantages or have any commercial value;
- the issued patents may be challenged and invalidated, or rendered unenforceable;
- the issued patents may be subject to reexamination, which could result in a narrowing of the scope of claims or cancellation of claims found unpatentable;
- we may not develop or acquire additional proprietary technologies that are patentable;
- our trademarks may be invalid or subject to a third party's prior use; or
- our ability to enforce our patent rights will depend on our ability to detect infringement, and litigation to enforce patent rights may not be pursued due to significant financial costs, diversion of resources, and unpredictability of a favorable result or ruling.

We depend, in part, on our licensors and collaborators to protect a portion of our intellectual property rights. In such cases, our licensors and collaborators may be primarily or wholly responsible for the maintenance of patents and prosecution of patent applications relating to important areas of our business. If any of these parties fail to adequately protect these products with issued patents, our business and prospects would be harmed significantly.

We also may rely on trade secrets to protect our technology, especially where we do not believe patent protection is appropriate or obtainable. However, trade secrets are difficult to protect. Although we use reasonable efforts to protect our trade secrets, our employees, consultants, contractors, outside scientific collaborators and other advisors may unintentionally or willfully disclose our trade secrets to competitors. Enforcing a claim that a third-party entity illegally obtained and is using any of our trade secrets is expensive and time consuming, and the outcome is unpredictable. In addition, courts outside the United States are sometimes less willing to protect trade secrets. Moreover, our competitors may independently develop equivalent knowledge, methods and know-how.

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If we or our licensors fail to obtain or maintain patent protection or trade secret protection for our product candidates or our technologies, third parties could use our proprietary information, which could impair our ability to compete in the market and adversely affect our ability to generate revenues and attain profitability.

From time to time, U.S. and other policymakers have proposed reforming the patent laws and regulations of their countries. In September 2011 the America Invents Act (the Act) was signed into law. The Act changed the current "first-to-invent" system to a system that awards a patent to the "first-inventor-to-file" for an application for a patentable invention. The Act also created a procedure to challenge newly issued patents in the patent office via post-grant proceedings and new inter parties reexamination proceedings. These changes may make it easier for competitors to challenge our patents, which could result in increased competition and have a material adverse effect on our product sales, business and results of operations. The changes may also make it harder to challenge third-party patents and place greater importance on being the first inventor to file a patent application on an invention.

If we are sued for infringing intellectual property rights of third parties, it will be costly and time consuming, and an unfavorable outcome in that litigation would have a material adverse effect on our business.

Other companies may have or may acquire intellectual property rights that could be enforced against us. If they do so, we may be required to alter our technologies, pay licensing fees or cease activities. If our products or technologies infringe the intellectual property rights of others, they could bring legal action against us or our licensors or collaborators claiming damages and seeking to enjoin any activities that they believe infringe their intellectual property rights.

Because patent applications can take many years to issue, and there is a period when the application remains undisclosed to the public, there may be currently pending applications unknown to us or reissue applications that may later result in issued patents upon which our products or technologies may infringe. There could also be existing patents of which we are unaware that our products or technologies may infringe. In addition, if third parties file patent applications or obtain patents claiming products or technologies also claimed by us in pending applications or issued patents, we may have to participate in interference or derivation proceedings in the United States Patent and Trademark Office to determine priority or derivation of the invention. If third parties file oppositions in foreign countries, we may also have to participate in opposition proceedings in foreign tribunals to defend the patentability of our filed foreign patent applications.

If a third party claims that we infringe its intellectual property rights, it could cause our business to suffer in a number of ways, including:

- we may become involved in time-consuming and expensive litigation, even if the claim is without merit, the third party's patent is invalid or we have not infringed;
- we may become liable for substantial damages for past infringement if a court decides that our technologies infringe upon a third party's patent;
- we may be enjoined by a court to stop making, selling or licensing our products or technologies without a license from a patent holder, which may not be available on commercially acceptable terms, if at all, or which may require us to pay substantial royalties or grant cross-licenses to our patents; and
- we may have to redesign our products so that they do not infringe upon others' patent rights, which may not be possible or could require substantial investment or time.

If any of these events occur, our business could suffer and the market price of our common stock may decline.

Risks Related to Our Common Stock

The price of our common stock may be volatile, and an investment in our common stock could decline substantially in value.

In light of our small size and limited resources, as well as the uncertainties and risks that can affect our business and industry, our stock price may be highly volatile and can be subject to substantial drops, with or even in the absence of news affecting our business. Period to period comparisons are not indicative of future performance. The following factors, in addition to the other risk factors described in this annual report, and the potentially low volume of trades in our common stock, may have a significant impact on the market price of our common stock, some of which are beyond our control:

- developments concerning any research and development, clinical trials, manufacturing, and marketing efforts or collaborations;

- fluctuating public or scientific interest in the potential for influenza pandemic or other applications for our vaccine or other product candidates;
- our announcement of significant acquisitions, strategic collaborations, joint ventures or capital commitments;

- fluctuations in our operating results;
- announcements of technological innovations;
- new products or services that we or our competitors offer;
- the initiation, conduct and/or outcome of intellectual property and/or litigation matters;
- changes in financial or other estimates by securities analysts or other reviewers or evaluators of our business;
- conditions or trends in bio-pharmaceutical or other healthcare industries;
- regulatory developments in the United States and other countries;
- negative perception of gene based therapy;
- changes in the economic performance and/or market valuations of other biotechnology and medical device companies;
- additions or departures of key personnel;
- sales or other transactions involving our common stock;
- changes in our capital structure;
- sales or other transactions by executive officers or directors involving our common stock;
- changes in accounting principles;
- global unrest, terrorist activities, and economic and other external factors; and
- catastrophic weather and/or global disease pandemics.

The stock market in general has recently experienced relatively large price and volume fluctuations. In particular, the market prices of securities of smaller biotechnology and medical device companies have experienced dramatic fluctuations that often have been unrelated or disproportionate to the operating results of these companies. Continued market fluctuations could result in extreme volatility in the price of the common stock, which could cause a decline in the value of the common stock. In addition, price volatility may increase if the trading volume of our common stock remains limited or declines.

Anti-takeover provisions under our charter documents and Delaware law could delay or prevent a change of control which could limit the market price of our common stock.

Our amended and restated certificate of incorporation contains provisions that could delay or prevent a change of control of our company or changes in our board of directors that our stockholders might consider favorable. Some of these provisions include:

- the authority of our board of directors to issue shares of undesignated preferred stock and to determine the rights, preferences and privileges of these shares, without stockholder approval;
- all stockholder actions must be effected at a duly called meeting of stockholders and not by written consent; and
- the elimination of cumulative voting.

In addition, we are governed by the provisions of Section 203 of the Delaware General Corporate Law, which may prohibit certain business combinations with stockholders owning 15% or more of our outstanding voting stock. These and other provisions in our amended and restated certificate of incorporation, amended and restated bylaws and Delaware law could make it more difficult for stockholders or potential acquirers to obtain control of our board of directors or initiate actions that are opposed by the then-current board of directors, including to delay or impede a merger, tender offer or proxy contest involving our company. Any delay or prevention of a change of control transaction or changes in our board of directors could cause the market price of our common stock to decline.

We have never paid cash dividends on our common stock and we do not anticipate paying dividends in the foreseeable future.

We have paid no cash dividends on our common stock to date, and we currently intend to retain our future earnings, if any, to fund the development and growth of our business. In addition, the terms of any future debt or credit facility may preclude or limit our ability to pay any dividends. As a result, capital appreciation, if any, of our common stock will be your sole source of potential gain for the foreseeable future.

Risks Related to our License and Collaboration Agreement with ApolloBio

Consummation of the ApolloBio License and Collaboration Agreement is contingent upon the satisfaction of several closing conditions that may not occur. If these closing conditions do not occur, we would not be able to license these products in China, Hong Kong, Macau, Taiwan and Korea without a new licensing partner and we would not receive the proceeds and royalties expected from the agreements.

Satisfaction of the closing conditions for the ApolloBio License and Collaboration Agreement requires ApolloBio shareholder approval and currency and regulatory approvals in China. Although ApolloBio has submitted much of the required information to the relevant regulatory bodies, it has not yet received currency or regulatory approval, nor has it attained shareholder approval for the transactions. If ApolloBio is not able to secure such shareholder or currency and regulatory approvals, the transactions contemplated by the ApolloBio License and Collaboration Agreement will not be consummated, in which case, we will not be entitled to receive the $23.0 million in upfront payments or the up to $20.0 million in milestone payments under the ApolloBio License and Collaboration Agreement. The failure to receive such payments could harm our business prospects or require us to raise additional capital through other means. Additionally, if the closing conditions for the ApolloBio License and Collaboration Agreement are not satisfied, we may not be able to market VGX-3100 in China, Hong Kong, Macau, Taiwan or Korea without finding a new licensing partner, which may be costly and time-consuming.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

We own no real property and have no plans to acquire any real property in the future.

San Diego Leases

In April 2013, we entered into a lease, or the Lease, for office space in San Diego, California. The term of the Lease commenced on December 1, 2013. The initial term of the Lease is ten years, with a right to terminate on December 1, 2019, subject to specified conditions. In June 2015, we amended the Lease to increase the total leased space to 31,207 square feet and occupy the entire building. The commencement of the amended Lease was in January 2016 and increased monthly lease payments to range from free rent to $99,000.

In October 2016, we entered into an office lease, or the new Lease, for a second property in San Diego, California. The total space under the new Lease is approximately 51,000 square feet. We are using the facility for office, manufacturing and research and development purposes. The term of the new Lease commenced on June 1, 2017. The initial term of the new Lease is ten years, with a right to terminate on November 30, 2023, subject to specified conditions.

The base rent adjusts periodically throughout the term of the new Lease, with monthly payments ranging from free rent to $95,000, with a portion of the rent abated for certain periods during the first two years of the initial term. In addition, we are
obligated to reimburse the landlord for our share of its operating and other expenses, and have paid a security deposit of
$95,000.

Plymouth Meeting Lease and Sublease

In March 2014, we entered into a lease, or the Lease, for our corporate headquarters in Plymouth Meeting, Pennsylvania. We occupied the space in June 2014. The initial term of the Lease was 11.5 years, and we use the space for office purposes.

The base rent adjusts periodically throughout the term of the Lease, with monthly payments ranging from free rent to $58,000. In addition, we are obligated to reimburse the landlord for our share of its operating and other expenses and a property management fee, and have paid a security deposit of $49,000. In July 2015, we amended the Lease to increase the total leased space to approximately 28,000 square feet. The commencement of the amended Lease was in the first quarter of 2016 and increased monthly lease payments to range between free rent to $80,000.

In June 2017, we entered into a sublease, or the Sublease, for additional space in our current office in Plymouth Meeting, Pennsylvania. The total additional space subject to the Sublease is approximately 30,000 square feet, which we are using for office purposes. The Sublease commenced on October 1, 2017 and was scheduled to end on June 30, 2027. The base rent adjusts periodically throughout the term of the Sublease, with monthly payments ranging from $75,000 to $90,000. In addition, we are obligated to reimburse the sub-landlord for our share of its operating and other expenses. In December 2017, the Sublease was reassigned by the sub-landlord back to the landlord, with no change in the underlying terms of the Sublease.

In June 2017, we entered into a second amendment to the Lease to extend the lease term and term of the Sublease through December 31, 2029. In connection with the second amendment, we have paid the landlord an additional security deposit of $75,000. Total monthly rent payments for the additional term will range between $173,000 and $179,000.

We believe our current and future planned facilities will be adequate to meet our operating needs for the foreseeable future. Should we need additional space, we believe we will be able to secure additional space at commercially reasonable rates.

ITEM 3. LEGAL PROCEEDINGS

From time to time, we are subject to litigation and claims arising in the ordinary course of business. We are not currently a party to any material legal proceedings and we are not aware of any pending or threatened legal proceeding against us that we believe could have a material adverse effect on our business, operating results, cash flows or financial condition.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

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

Market Information

Our common stock, par value $0.001 per share, began trading on the Nasdaq Global Select Market on September 15, 2014 under the symbol "INO," having previously traded on the NYSE MKT exchange. The following table sets forth the quarterly high and low per share sale prices of our common stock for the two most recent fiscal years.

| | Year Ended December 31, | | | |
|---|---|---|---|---|
| | 2017 | | 2016 | |
| Period: | High | Low | High | Low |
| First Quarter | $7.38 | $5.86 | $8.71 | $4.92 |
| Second Quarter | $8.68 | $6.04 | $11.39 | $8.29 |
| Third Quarter | $8.06 | $5.36 | $10.42 | $8.52 |
| Fourth Quarter | $6.68 | $4.13 | $9.52 | $5.98 |

As of February 28, 2018, we had approximately 479 common stockholders of record. The actual number of stockholders is greater than this number of record holders and includes stockholders who are beneficial owners but whose shares are held in street name by brokers and other nominees. This number of holders of record also does not include stockholders whose shares may be held in trust by other entities.

The closing price per share of our common stock on March 12, 2018 was $4.68, as reported on the Nasdaq Global Select Market.

Dividends

The payment of any dividends on our common stock is within the discretion of our board of directors. We have never paid cash dividends on our common stock and the board of directors does not expect to declare cash dividends on the common stock in the foreseeable future.

Performance Graph

The graph below compares the performance of our common stock with the performance of the NYSE American Index, the S&P SuperCap Biotechnology index and the NASDAQ Composite Index for the five years ended December 31, 2017. The graph assumes a $100 investment on December 31, 2012 in our common stock and in each index, with the reinvestment of all dividends, if any.

| | 12/12 | 12/13 | 12/14 | 12/15 | 12/16 | 12/17 |
|---|---|---|---|---|---|---|
| Inovio Pharmaceuticals, Inc. | 100.00 | 580.58 | 459.46 | 336.34 | 347.35 | 206.71 |
| NYSE American | 100.00 | 104.47 | 105.23 | 75.69 | 89.97 | 91.27 |
| NASDAQ Composite | 100.00 | 141.63 | 162.09 | 173.33 | 187.19 | 242.29 |
| S&P SuperCap Biotechnology | 100.00 | 172.84 | 228.98 | 240.86 | 206.64 | 247.59 |

The stock price performance included in this graph is not necessarily indicative of future stock price performance. The performance graph is furnished solely to accompany this Form 10-K annual report and shall not be deemed to be incorporated by reference by means of any general statement incorporating by reference this Form 10-K into any filing under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, except to the extent that we specifically incorporate such information by reference, and shall not otherwise be deemed filed under such acts.

Recent Sales of Unregistered Securities

None.

Purchases of Equity Securities by the Issuer and Affiliated Parties

None.

ITEM 6. SELECTED FINANCIAL DATA

The following selected consolidated financial data should be read together with “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and our consolidated financial statements and related notes included elsewhere in this report. The selected consolidated balance sheet data at December 31, 2017 and 2016 and the selected consolidated statements of operations data for the years ended December 31, 2017, 2016 and 2015 have been derived from our audited consolidated financial statements that are included elsewhere in this report. The selected consolidated balance sheet data at December 31, 2015, 2014, and 2013 and the selected consolidated statements of operations data for the years ended December 31, 2014 and 2013 have been derived from our audited consolidated financial statements not included in this report. Historical results are not necessarily indicative of the results to be expected in the future.

| | Year Ended December 31, 2017 | Year Ended December 31, 2016 | Year Ended December 31, 2015 | Year Ended December 31, 2014 | Year Ended December 31, 2013 |
|---|---|---|---|---|---|
| Statement of Operations Data: | | | | | |
| Revenue under collaborative research and development arrangements, including from affiliated entity | 29,173,216 | $7,891,341 | $27,655,700 | $7,896,032 | $9,664,547 |
| Grants and miscellaneous revenue, including from affiliated entity | 13,046,870 | 27,477,020 | 12,916,411 | 2,560,734 | 3,802,799 |
| Total revenues | 42,220,086 | 35,368,361 | 40,572,111 | 10,456,766 | 13,467,346 |
| Loss from operations | (83,642,901) | (76,235,937) | (34,283,702) | (39,495,961) | (19,544,332) |
| Interest and other income, net | 1,612,974 | 1,257,257 | 305,071 | 331,461 | 132,214 |
| Change in fair value of common stock warrants | 806,819 | 127,554 | 177,561 | 348,143 | (45,632,669) |
| Gain (Loss) on investment in affiliated entity | (6,982,664) | 1,110,787 | 2,600,467 | 2,676,224 | (1,038,745) |
| Income tax benefit | — | — | 2,097,766 | — | — |
| Net loss | (88,205,772) | (73,740,339) | (29,102,837) | (36,140,133) | (66,083,532) |
| Net (income) loss attributable to non-controlling interest | — | — | (84,769) | 18,420 | 55,084 |
| Net loss attributable to Inovio Pharmaceuticals, Inc. | $(88,205,772) | $(73,740,339) | $(29,187,606) | $(36,121,713) | $(66,028,448) |
| Net loss per common share attributable to common stockholders | | | | | |
| Basic | $(1.08) | $(1.01) | $(0.43) | $(0.61) | $(1.43) |
| Diluted | $(1.09) | $(1.01) | $(0.44) | $(0.64) | $(1.43) |

| | Year Ended December 31, 2017 | Year Ended December 31, 2016 | Year Ended December 31, 2015 | Year Ended December 31, 2014 | Year Ended December 31, 2013 |
|---|---|---|---|---|---|
| Balance Sheet Data: | | | | | |
| Cash and cash equivalents | $23,786,579 | $19,136,472 | $57,632,693 | $40,543,982 | $33,719,796 |
| Short-term investments | 103,638,844 | 85,629,412 | 105,357,277 | 53,075,974 | 18,905,608 |
| Total assets | 187,239,270 | 173,707,166 | 213,840,859 | 131,785,097 | 88,287,207 |
| Current liabilities | 35,405,426 | 43,823,027 | 31,466,406 | 14,085,294 | 28,966,456 |
| Noncurrent liabilities | 9,345,035 | 6,505,719 | 6,441,400 | 6,162,209 | 6,418,068 |
| Accumulated deficit | (523,356,317) | (434,838,235) | (361,097,896) | (331,910,290) | (295,788,577) |
| Total stockholders' equity | 142,488,809 | 123,378,420 | 175,933,053 | 111,537,594 | 52,902,683 |

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

This report contains forward-looking statements. These statements relate to future events or our future financial performance. In some cases, you can identify forward-looking statements by terminology such as "may," "will," "should," "expect," "plan," "anticipate," "believe," "estimate," "predict," "potential" or "continue," the negative of such terms or other comparable terminology. These statements are only predictions. Actual events or results may differ materially. Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee future results, levels of activity, performance or achievements. Moreover, neither we, nor any other person, assume responsibility for the accuracy and completeness of the forward-looking statements. We are under no obligation to update any of the forward-looking statements after the filing of this Annual Report to conform such statements to actual results or to changes in our expectations.

The following discussion of our financial condition and results of operations should be read in conjunction with our consolidated financial statements and the related notes and other financial information appearing elsewhere in this Annual Report. Readers are also urged to carefully review and consider the various disclosures made by us which attempt to advise interested parties of the factors which affect our business, including without limitation the disclosures made in Item 1A of Part I of this Annual Report under the Caption "Risk Factors."

Risk factors that could cause actual results to differ from those contained in the forward-looking statements include but are not limited to: our history of losses; our lack of products that have received regulatory approval; uncertainties inherent in clinical trials and product development programs, including but not limited to the fact that pre-clinical and clinical results may not be indicative of results achievable in other trials or for other indications, that results from one study may not necessarily be reflected or supported by the results of other similar studies, that results from an animal study may not be indicative of results achievable in human studies, that clinical testing is expensive and can take many years to complete, that the outcome of any clinical trial is uncertain and failure can occur at any time during the clinical trial process, and that our electroporation technology and DNA vaccines may fail to show the desired safety and efficacy traits in clinical trials; the availability of funding; the ability to manufacture vaccine candidates; the availability or potential availability of alternative therapies or treatments for the conditions targeted by us or our collaborators, including alternatives that may be more efficacious or cost-effective than any therapy or treatment that we and our collaborators hope to develop; whether our proprietary rights are enforceable or defensible or infringe or allegedly infringe on rights of others or can withstand claims of invalidity; and the impact of recently enacted and proposed laws and regulations.

Overview

Inovio is developing active SynCon® DNA immunotherapies and vaccines focused on treating and preventing cancers and infectious diseases. SynCon® immunotherapies, in combination with our proprietary CELLECTRA® delivery devices, are intended to generate optimal antigen production in vivo, in particular functional CD8+ killer T cell and antibody responses, to fight target diseases. We seek to become the "go-to" immunotherapeutic solution provider for all diseases caused by human papillomavirus, or HPV, including for pre-cancer diseases like cervical intra-epithelial neoplasia, or CIN, vulvar intraepithelial neoplasia, or VIN, and anal intraepithelial neoplasia, or AIN, as well as cancers caused by HPV, such as head and neck cancer and cervical cancer. We believe that we are a leader in T cell-generating immunotherapy with our product candidate INO-3112, also known as MEDI0457, being developed in collaboration with MedImmune as a combination therapy with MedImmune's PD-1/PDL-1 checkpoint inhibitor candidate for the potential treatment of multiple cancers and an innovator in vaccine development for rapidly combating emerging infectious diseases.

In September 2015, proof of concept data was published in the medical journal The Lancet from a controlled Phase 2b clinical trial in which we generated significant, functional antigen-specific T cells that correlated to clinically relevant efficacy against HPV-associated cervical dysplasia (precancer). In June 2017, we began a Phase 3 clinical trial of our product candidate VGX-3100 for the treatment of cervical dysplasia.

Our novel SynCon® immunotherapy design can help break the immune system's tolerance of cancerous cells and is also intended to facilitate cross-strain protection against known and new unmatched strains of pathogens, such as influenza. Given the recognized role of CD8+ killer T cells in eliminating cancerous or infected cells from the body

and the published results from our Phase 2b clinical trial, we believe that our active immunotherapies may play an important role in helping fight multiple cancers and infectious diseases. Human data to date have shown a favorable safety profile of our DNA immunotherapies delivered using electroporation.

We or our collaborators are currently conducting or planning clinical studies of our proprietary SynCon® immunotherapies for CIN, VIN and AIN; head and neck and cervical cancer caused by HPV; prostate cancer; bladder cancer; glioblastoma, or GBM; breast, lung and pancreatic cancers; hepatitis C virus, or HCV;, hepatitis B virus, or HBV; human immunodeficiency virus, or HIV; Ebola virus; Middle East Respiratory Syndrome, or MERS; and Zika virus.

Our corporate strategy is to advance and protect our differentiated immunotherapy platform and use its unique capabilities to design and develop an array of cancer and infectious disease immunotherapy and vaccine products. We aim to advance products through to commercialization. We continue to leverage third-party resources through collaborations and partnerships, including product license agreements. Our partners and collaborators include MedImmune, LLC, The Wistar Institute, University of Pennsylvania, GeneOne Life Science Inc., Regeneron Pharmaceuticals, Inc., Genentech, Inc., Plumbline Life Sciences, Inc., the Parker Institute for Cancer Immunotherapy, Drexel University, National Microbiology Laboratory of the Public Health Agency of Canada, National Institute of Allergy and Infectious Diseases (“NIAID”), United States Military HIV Research Program (“USMHRP”), U.S. Army Medical Research Institute of Infectious Diseases (“USAMRIID”), National Institutes of Health ("NIH"), HIV Vaccines Trial Network (“HVTN”) and Defense Advanced Research Projects Agency (“DARPA”).

All of our product candidates are in the research and development phase. We have not generated any revenues from the sale of any products, and we do not expect to generate any such revenues for at least the next several years. We earn revenue from license fees and milestone revenue, collaborative research and development agreements, grants and government contracts. Our product candidates will require significant additional research and development efforts, including extensive preclinical and clinical testing. All product candidates that we advance to clinical testing will require regulatory approval prior to commercial use, and will require significant costs for commercialization. We may not be successful in our research and development efforts, and we may never generate sufficient product revenue to be profitable.

Recent Developments

On December 29, 2017, we entered into an Amended and Restated License and Collaboration Agreement, or the ApolloBio Agreement, with ApolloBio Corporation, or ApolloBio. Under the terms of the ApolloBio Agreement, we have granted to ApolloBio the exclusive right to develop and commercialize VGX-3100, our DNA immunotherapy product designed to treat pre-cancers caused by HPV, within the territories of China, Hong Kong, Macao and Taiwan. The territory may be expanded to include Korea in the event that no patent covering VGX-3100 issues in China within the three years following the Effective Date of the ApolloBio Agreement, as defined below.

Under the ApolloBio Agreement, ApolloBio will pay us an upfront payment of $23.0 million, and such payment is to be made within three business days following the date of approval of the ApolloBio Agreement by ApolloBio’s board of directors and shareholders, or the Effective Date, which we expect to occur in the first quarter of 2018. In the event that such upfront payment is not made on or before April 7, 2018, we have the right to terminate the Agreement in its entirety.

In addition to the upfront payment, we are entitled to receive up to an aggregate of $20.0 million upon the achievement of specified milestones related to the regulatory approval of VGX-3100 in the United States, China and Korea. In the event that VGX-3100 is approved for marketing, we will be entitled to receive royalty payments based on a tiered percentage of annual net sales, with such percentage being in the low- to mid-teens, subject to reduction in the event of generic competition in a particular territory. ApolloBio’s obligation to pay royalties will continue for 10 years after the first commercial sale in a particular territory or, if later, until the expiration of the last-to-expire patent covering the licensed products in the specified territory.

As of December 31, 2017, we had an accumulated deficit of $523.4 million. We expect to continue to incur substantial operating losses in the future due to our commitment to our research and development programs, the funding of preclinical studies, clinical trials and regulatory activities and the costs of general and administrative activities.

Critical Accounting Policies

The SEC defines critical accounting policies as those that are, in management’s view, important to the portrayal of our financial condition and results of operations and require management’s judgment. Our discussion and analysis of our financial condition and results of operations are based on our audited consolidated financial statements, which have been prepared in accordance with U.S. GAAP. The preparation of these financial statements requires us to make estimates and judgments that affect the reported amounts of assets, liabilities, revenue and expenses. We base our estimates on experience and on various assumptions that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from those estimates. Our critical accounting policies

include:

Revenue Recognition

We recognize revenues when all four of the following criteria are met: (1) persuasive evidence of an arrangement exists; (2) delivery of the products and/or services has occurred; (3) the selling price is fixed or determinable; and (4) collectability is reasonably assured. For additional information on the new accounting standard for revenues from contracts with customers please read Note 2, Summary of Significant Accounting Policies: Recent Accounting Pronouncements, to our consolidated financial statements included in this report.

Grant revenue

We receive non-refundable grants under available government programs. Government grants towards current expenditures are recorded as revenue when there is reasonable assurance that we have complied with all conditions necessary to receive the grants, collectability is reasonably assured and the related expenditures are incurred.

License fee and milestone revenue

We have adopted a strategy of co-developing or licensing our gene delivery technology for specific genes or specific medical indications. Accordingly, we have entered into collaborative research and development agreements and have received third-party funding for pre-clinical research and clinical trials. Agreements that contain multiple elements are analyzed to determine whether the deliverables within the agreement can be separated or whether they must be accounted for as a single unit of accounting in accordance with the FASB's Accounting Standards Update, or ASU, No. 2009-13, Revenue Recognition (Topic 605): Multiple-Deliverable Revenue Arrangements. Analyzing the arrangement to identify deliverables requires the use of judgment, and each deliverable may be an obligation to deliver services, a right or license to use an asset, or another performance obligation. The delivered item(s) were considered a separate unit of accounting if all of the following criteria were met: (1) the delivered item(s) has value to the customer on a standalone basis; (2) there is objective and reliable evidence of the fair value of the undelivered item(s); and (3) if the arrangement includes a general right of return relative to the delivered item, delivery or performance of the undelivered item(s) is considered probable and substantially in our control. If these criteria were not met, the deliverable was combined with other deliverables in the arrangement and accounted for as a combined unit of accounting.

Arrangement consideration is allocated at the inception of the agreement to all identified units of accounting based on their relative selling price. The relative selling price for each deliverable is determined using vendor specific objective evidence (“VSOE”) of selling price or third-party evidence of selling price if VSOE does not exist. If neither VSOE nor third-party evidence of selling price exists, we use our best estimate of the selling price for the deliverable. The amount of allocable arrangement consideration is limited to amounts that are fixed or determinable. The consideration received is allocated among the separate units of accounting, and the applicable revenue recognition criteria are applied to each of the separate units. Changes in the allocation of the sales price between delivered and undelivered elements can impact revenue recognition but do not change the total revenue recognized under any agreement.

Upfront license fee payments are recognized upon delivery of the license if facts and circumstances dictate that the license has standalone value from the undelivered items, the relative selling price allocation of the license is equal to or exceeds the upfront license fee, persuasive evidence of an arrangement exists, the price to the collaborator is fixed or determinable, and collectability is reasonably assured. Upfront license fee payments are deferred if facts and circumstances dictate that the license does not have standalone value. The determination of the length of the period over which to defer revenue is subject to judgment and estimation and can have an impact on the amount of revenue recognized in a given period.

We apply ASU No. 2010-17, Revenue Recognition (Topic 605): Milestone Method of Revenue Recognition, or the Milestone Method. Under the Milestone Method, we recognize consideration that is contingent upon the achievement of a milestone in its entirety as revenue in the period in which the milestone is achieved only if the milestone is substantive in its entirety. A milestone is considered substantive when it meets all of the following criteria:

1. The consideration is commensurate with either the entity's performance to achieve the milestone or the enhancement of the value of the delivered item(s) as a result of a specific outcome resulting from the entity's performance to achieve the milestone,
2. The consideration relates solely to past performance, and
3. The consideration is reasonable relative to all of the deliverables and payment terms within the arrangement.

A milestone is defined as an event (i) that can only be achieved based in whole or in part on either the entity's performance or on the occurrence of a specific outcome resulting from the entity's performance, (ii) for which there is substantive uncertainty at the date the arrangement is entered into that the event will be achieved and (iii) that would result in additional payments being due to us.

Valuation of Intangible Assets and Goodwill

Intangible assets are amortized over their estimated useful lives ranging from 2 to 18 years. Acquired intangible assets are continuously being developed for the future economic viability contemplated at the time of acquisition. We are concurrently conducting preclinical studies and clinical trials using the acquired intangibles and have entered into licensing agreements for the use of these acquired intangibles.

Historically, we have recorded patents at cost and amortized these costs using the straight-line method over the expected useful lives of the patents or 17 years, whichever is less. Patent cost consists of the consideration paid for patents and related legal costs. Effective as of the acquisition of VGX in 2009, all new patent costs are expensed as incurred, with patent costs

capitalized as of that date continuing to be amortized over the expected life of the patent. License costs are recorded based on the fair value of consideration paid and are amortized using the straight-line method over the shorter of the expected useful life of the underlying patents or the term of the related license agreement to the extent the license has an alternative future use. As of December 31, 2017 and 2016, our intangible assets resulting from the acquisition of VGX, Inovio AS and Bioject, and additional intangibles including previously capitalized patent costs and license costs, net of accumulated amortization, totaled $6.0 million and $7.6 million, respectively.

The determination of the value of intangible assets requires management to make estimates and assumptions that affect our consolidated financial statements. We assess potential impairments to intangible assets when there is evidence that events or changes in circumstances indicate that the carrying amount of an asset may not be recovered. Our judgments regarding the existence of impairment indicators and future cash flows related to intangible assets are based on operational performance of our acquired businesses, market conditions and other factors. If impairment is indicated, we will reduce the carrying value of the intangible asset to fair value. While current and historical operating and cash flow losses are potential indicators of impairment, we believe the future cash flows to be received from our intangible assets will exceed the intangible assets' carrying value, and accordingly, we have not recognized any impairment losses through December 31, 2017.

Goodwill represents the excess of acquisition cost over the fair value of the net assets of acquired businesses. Goodwill is reviewed for impairment at least annually at November 30, or more frequently if an event occurs indicating the potential for impairment. During our goodwill impairment review, we may assess qualitative factors to determine whether it is more likely than not that the fair value of our reporting unit is less than its carrying amount, including goodwill. The qualitative factors include, but are not limited to, macroeconomic conditions, industry and market considerations, and our overall financial performance. If, after assessing the totality of these qualitative factors, we determine that it is not more likely than not that the fair value of our reporting unit is less than its carrying amount, then no additional assessment is deemed necessary. Otherwise, we will proceed to perform the two-step test for goodwill impairment. The first step involves comparing the estimated fair value of the reporting unit with its carrying value, including goodwill. If the carrying amount of the reporting unit exceeds its fair value, we will perform the second step of the goodwill impairment test to determine the amount of loss, which involves comparing the implied fair value of the goodwill to the carrying value of the goodwill. We may also elect to bypass the qualitative assessment in a period and elect to proceed to perform the first step of the goodwill impairment test. We performed our annual assessment for goodwill impairment as of November 30, 2017, identifying no impairment.

Although there are inherent uncertainties in this assessment process, the estimates and assumptions we are using are consistent with our internal planning. If these estimates or their related assumptions change in the future, we may be required to record an impairment charge on all or a portion of its goodwill and intangible assets. Furthermore, we cannot predict the occurrence of future impairment triggering events nor the impact such events might have on its reported asset values. Future events could cause us to conclude that impairment indicators exist and that goodwill or other intangible assets associated with our acquired businesses are impaired. Any resulting impairment loss could have an adverse impact on our results of operations. See Note 8 to our consolidated financial statements included in this annual report for further discussion of our goodwill and intangible assets.

Research and Development Expenses

Our activities have largely consisted of research and development efforts related to developing electroporation delivery technologies and DNA immunotherapies and vaccines. Research and development expenses consist of expenses incurred in performing research and development activities including salaries and benefits, facilities and other overhead expenses, clinical trials, contract services and other outside expenses. Research and development expenses are charged to operations as they are incurred. These expenses result from our independent research and development efforts as well as efforts associated with collaborations and licensing arrangements. We review and accrue clinical trial expense based on work performed, relying on estimates of total costs incurred based on patient enrollment, completion of studies and other events. We follow this method since reasonably dependable estimates of the costs applicable to various stages of a research agreement or clinical trial can be made. Accrued clinical trial costs are subject to revisions as trials progress. Revisions are charged to expense in the period in which the facts that give rise to the revision become known. Historically, revisions have not resulted in material changes to research and

development expense; however a modification in the protocol of a clinical trial or cancellation of a trial could result in a charge to our results of operations.

Recent Accounting Pronouncements

Information regarding recent accounting pronouncements is contained in Note 2 to the Consolidated Financial Statements, included elsewhere in this report.

Results of Operations

Comparison of Years Ended December 31, 2017 and 2016

The consolidated financial data for the years ended December 31, 2017 and 2016 is presented in the following table and the results of these two periods are used in the discussion thereafter.

| | Year Ended December 31, 2017 | Year Ended December 31, 2016 | Increase/ (Decrease) $ | Increase/ (Decrease) % |
|---|---|---|---|---|
| Revenues: | | | | |
| Revenue under collaborative research and development arrangements, including from affiliated entity | $29,173,216 | $7,891,341 | $21,281,875 | 270 % |
| Grants and miscellaneous revenue, including from affiliated entity | 13,046,870 | 27,477,020 | (14,430,150) | (53) |
| Total revenues | 42,220,086 | 35,368,361 | 6,851,725 | 19 |
| Operating expenses: | | | | |
| Research and development | 98,572,618 | 88,712,035 | 9,860,583 | 11 |
| General and administrative | 28,290,369 | 23,892,263 | 4,398,106 | 18 |
| Gain on sale of assets | (1,000,000) | (1,000,000) | — | — |
| Total operating expenses | 125,862,987 | 111,604,298 | 14,258,689 | 13 |
| Loss from operations | (83,642,901) | (76,235,937) | (7,406,964) | (10) |
| Interest and other income, net | 1,612,974 | 1,257,257 | 355,717 | 28 |
| Change in fair value of common stock warrants | 806,819 | 127,554 | 679,265 | 533 |
| Gain (loss) on investment in affiliated entity | (6,982,664) | 1,110,787 | (8,093,451) | (729) |
| Net loss attributable to Inovio Pharmaceuticals, Inc. | $(88,205,772) | $(73,740,339) | $(14,465,433) | (20)% |

Revenue

Revenue primarily consists of revenue under collaborative research and development arrangements and grants and government contracts. Our total revenue increased $6.9 million, or 19%, for the year ended December 31, 2017 as compared to 2016.

The $21.3 million increase in revenue under collaborative research and development arrangements for the year ended December 31, 2017 as compared to 2016 was primarily due to an increase in revenue recognized from MedImmune, as the up-front payment received in September 2015 and other deferred amounts totaling $13.8 million were recognized in June 2017 upon MedImmune's selection of the first cancer research collaboration product candidate, as well as a $7.0 milestone payment recognized in December 2017 for the initiation of the Phase 2 portion on an ongoing clinical trial. The increase was also due to an increase in revenue recognized from Roche of $1.2 million, as all remaining revenue was recognized upon termination of that collaboration agreement in 2017.

The $14.4 million decrease in grants and miscellaneous revenue for the year ended December 31, 2017 as compared to 2016 was primarily due to a decrease in revenue recognized from our nearly completed DARPA Ebola grant and completed DARPA sub-contract for the treatment of infectious diseases of $12.6 million and $4.1 million, respectively, partially offset by an increase in revenue recognized from our two sub-contracts with Wistar totaling $2.2 million. We expect that beginning in 2018, due to the nature of the grant agreements, contributions received will be recorded as a contra-expense as opposed to revenue on the consolidated statement of operations. For additional information on the new accounting standard for revenues from contracts with customers please read Note 2, Summary of Significant Accounting Policies: Recent Accounting Pronouncements, to our consolidated financial statements included in this report.

Research and Development Expenses

The $9.9 million increase in research and development expenses for the year ended December 31, 2017 as compared to 2016 was primarily due to an increase of $9.1 million in employee headcount to support clinical trials and partnerships and an increase of $1.0 million in non-cash stock-based compensation. These increases were offset by a decrease of $3.9 million in expenses related to our DARPA Ebola grant, among other variances.

General and Administrative Expenses

The $4.4 million increase in general and administrative expenses for the year ended December 31, 2017 as compared to 2016 was primarily due to increases in employee headcount, non-cash stock based compensation, rent expense and depreciation expense of $1.9 million, $1.7 million, $769,000 and $661,000 respectively. These increases were partially offset by a decrease in employee recruitment and training expenses of $623,000, among other variances.

Stock-based Compensation

Employee stock-based compensation cost is measured at the grant date, based on the fair value of the award, and is recognized as expense over the employee's requisite service period. Total employee stock-based compensation cost for the years ended December 31, 2017 and 2016 was $12.9 million and $10.2 million, of which $5.8 million and $4.8 million was included in research and development expenses and $7.1 million and $5.4 million was included in general and administrative expenses, respectively. A portion of the year over year increase resulted from a change in accounting policy as of January 1, 2017 to recognize forfeitures as they occur rather than estimating forfeitures at the time of grant. The increase was also due to increased headcount, which resulted in an increase in the number of employee stock options and restricted stock units (RSUs) granted. At December 31, 2017, there was $5.9 million of total unrecognized compensation cost related to unvested stock options, which we expect to recognize over a weighted-average period of 1.8 years, as compared to $5.8 million for the year ended December 31, 2016 expected to be recognized over a weighted-average period of 1.9 years. At December 31, 2017, there was $5.3 million of total unrecognized compensation cost related to unvested restricted stock units, which is expected to be recognized over a weighted-average period of 1.8 years, as compared to $4.0 million for the year ended December 31, 2016 expected to be recognized over a weighted-average period of 2.0 years. Total stock-based compensation for options granted to non-employees for the years ended December 31, 2017 and 2016 was $201,000 and $321,000, respectively.

Gain on sale of assets

In December 2017, we sold assets related to our compound VGX-1027 to GeneOne for a purchase price of $1.0 million. These assets had a carrying value of zero, resulting in the full proceeds being recognized as a gain on sale. The gain on sale of assets for the year ended December 31, 2016 related to our May 2014 sale of animal health assets to Plumbline Life Sciences, or PLS, for which we received proceeds of $1.0 million in 2015 and $1.0 million in 2016.

Interest and Other Income, net

Interest and other income, net, increased by $356,000 for the year ended December 31, 2017 as compared to 2016 primarily due to higher interest earned on short-term investments during the year.

Change in fair value of common stock warrants

The change in fair value of common stock warrants for the years ended December 31, 2017 and 2016 was $807,000 and $128,000, respectively. The variance is primarily due to the revaluation of the liability associated with the registered common stock warrants that we issued in March 2013. We revalue those warrants at each balance sheet date to their fair value. If unexercised, the remaining warrants will expire in September 2018.

Gain (loss) on investment in affiliated entity

We held 1,644,155 common shares, representing a 7.8% and 10.2% ownership interest in GeneOne, as of December 31, 2017 and 2016, respectively. Our investment in GeneOne is measured at fair value on a recurring basis, with changes in the fair value of the investment reflected as other income (expense) in the consolidated statements of operations. The fair market value of our interest in GeneOne is determined using the closing price of GeneOne's shares of common stock as listed on the Korean Stock Exchange as of December 31, 2017 and 2016.

Income Taxes

Since inception, we have incurred operating losses and accordingly have not recorded a provision for income taxes for any of the periods presented. Utilization of net operating losses and tax credits are subject to a substantial annual limitation due to ownership change limitations provided by the Internal Revenue Code of 1986, as amended, or IRC. As of December 31, 2017, we had net operating loss carry forwards for federal, California and Pennsylvania income tax purposes of approximately $298.9 million, $68.6 million and $75.6 million, respectively, net of the net operating losses that will expire due to IRC Section 382 limitations. We also had federal and state research and development tax credits of approximately $11.1 million and $2.1 million, respectively, net of the federal research and development credits that will expire due to IRC Section 383 limitations. If not utilized, the net operating losses and credits will begin to expire in 2018.

Comparison of Years Ended December 31, 2016 and 2015

The consolidated financial data for the years ended December 31, 2016 and 2015 is presented in the following table and the results of these two periods are used in the discussion thereafter.

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| | Year Ended December 31, 2016 | Year Ended December 31, 2015 | Increase/ (Decrease) $ | Increase/ (Decrease) % |
|---|---|---|---|---|
| Revenues: | | | | |
| Revenue under collaborative research and development arrangements, including from affiliated entity | 7,891,341 | $27,655,700 | $(19,764,359) | (71)% |
| Grants and miscellaneous revenue | 27,477,020 | 12,916,411 | 14,560,609 | 113 |
| Total revenues | 35,368,361 | 40,572,111 | (5,203,750) | (13) |
| Operating expenses: | | | | |
| Research and development | 88,712,035 | 57,791,923 | 30,920,112 | 54 |
| General and administrative | 23,892,263 | 18,063,890 | 5,828,373 | 32 |
| Gain on sale of assets | (1,000,000) | (1,000,000) | — | — |
| Total operating expenses | 111,604,298 | 74,855,813 | 36,748,485 | 49 |
| Loss from operations | (76,235,937) | (34,283,702) | (41,952,235) | (122) |
| Interest and other income, net | 1,257,257 | 305,071 | 952,186 | 312 |
| Change in fair value of common stock warrants | 127,554 | 177,561 | (50,007) | (28) |
| Gain on investment in affiliated entity | 1,110,787 | 2,600,467 | (1,489,680) | (57) |
| Net loss before income tax benefit | (73,740,339) | (31,200,603) | (42,539,736) | (136) |
| Income tax benefit | — | 2,097,766 | (2,097,766) | 100 |
| Net loss | (73,740,339) | (29,102,837) | (44,637,502) | (153) |
| Net (income) loss attributable to non-controlling interest | — | (84,769) | 84,769 | (100) |
| Net loss attributable to Inovio Pharmaceuticals, Inc. | $(73,740,339) | $(29,187,606) | $(44,552,733) | (153)% |

Revenue

Our total revenue decreased $5.2 million or 13% for the year ended December 31, 2016 as compared to 2015.

The $19.8 million decrease in revenue under collaborative research and development arrangements for the year ended December 31, 2016 as compared to 2015 was primarily due to a decrease of $14.5 million in revenue recognized from our product licensed to MedImmune under the agreement entered into in August 2015, as well as a decrease of $5.9 million in revenue recognized from the Roche Agreement which include revenues previously deferred related to the partial termination of the Agreement in February 2015 as well as the $3.0 million milestone earned during 2015.

The $14.6 million increase in grants and miscellaneous revenue for the year ended December 31, 2016 as compared to 2015 was primarily due to the increase of $11.6 million in revenue recognized from our DARPA Ebola grant as well as an increase of $3.4 million in revenue from our DARPA subcontract for the treatment of infectious diseases, offset by less revenue recognized from various grants due to the timing of work performed.

Research and Development Expenses

The $30.9 million increase in research and development expenses for the year ended December 31, 2016 as compared to 2015 was primarily due to an increase in headcount during the year to support clinical trials and partnerships, an increase in expenses related to our DARPA Ebola grant, an increase in clinical study costs related to our upcoming Phase 3 trial, an increase in expenses related to our Hepatitis B program and employee non-cash stock based compensation of $9.0 million, $8.6 million, $3.4 million, $2.7 million and $1.6 million, respectively. These were offset by a decrease in sub-license fee expense of $2.6 million based on the up-front payment received from MedImmune and Roche milestone achievement in 2015, among other variances.

General and Administrative Expenses

The $5.8 million increase in general and administrative expenses for the year ended December 31, 2016 as compared to 2015 was primarily due to an increase in employee non-cash stock-based compensation, increase in headcount, employee training, recruitment and related expenses and amortization of intangible assets of $2.8 million, $1.3 million, $688,000 and $562,000, respectively, among other variances.

Stock-based Compensation

Total employee compensation cost for our stock plans for the years ended December 31, 2016 and 2015 was $10.2 million and $5.8 million, of which $4.8 million and $3.2 million was included in research and development expenses

and $5.4 million and $2.6 million was included in general and administrative expenses, respectively. The increase for the annual period

year over year was primarily due to an increase in the number of employee and director stock options and restricted stock units granted.

Gain on sale of assets

The gain on sale of assets for each of the years ended December 31, 2016 and 2015 was related to our May 2014 sale of animal health assets to PLS.

Interest and Other Income, net

Interest and other income, net, increased by $952,000 for the year ended December 31, 2016 as compared to 2015 primarily due to higher interest earned on short-term investments as well as the impairments considered to be other-than-temporary recorded on our short-term investments in 2015 which were sold in 2016.

Change in fair value of common stock warrants

The change in fair value of common stock warrants for the years ended December 31, 2016 and 2015 was $128,000 and $178,000, respectively. The variance is primarily due to the revaluation of the common stock warrants of OncoSec Medical Incorporated that we previously held, and which expired unexercised in 2016, and the revaluation of the liability associated with the registered common stock warrants that we issued in March 2013. We revalue these warrants at each balance sheet date to fair value. If unexercised, the remaining warrants will expire in September 2018.

Gain on investment in affiliated entity

The gain is a result of the change in the fair market value of the investment in GeneOne for the year ended December 31, 2016.

Income Tax Benefit

In 2015, we recorded a tax benefit of $2.1 million, which reflected our application of the intraperiod tax allocation rules under which we are required to record a tax benefit in continuing operations to offset the tax provision we recorded directly to other comprehensive income primarily related to unrealized gain on our equity investment in our affiliated entity PLS.

Liquidity and Capital Resources

Historically, our primary uses of cash have been to finance research and development activities including clinical trial activities in the oncology, DNA vaccines and other immunotherapy areas of our business. Since inception, we have satisfied our cash requirements principally from proceeds from the sale of equity securities.

Working Capital and Liquidity

As of December 31, 2017 we had cash and short-term investments of $127.4 million and working capital of $103.0 million, as compared to $104.8 million and $80.8 million, respectively, as of December 31, 2016. The increase in cash and short-term investments during the year ended December 31, 2017 was primarily due to proceeds from our July 2017 public offering of common stock, as well as sales of common stock under our ATM sales agreement during the period, partially offset by our operating expenses and capital expenditures.

Net cash used in operating activities for the year ended December 31, 2017 of $63.2 million consisted of net loss of ($88.2) million less changes in net operating assets and liabilities of ($713,000), partially offset by net non-cash adjustments of $25.7 million. The primary non-cash income (expenses) added back to net loss included gain on sale of intangible assets of $1.0 million, offset by stock-based compensation of $13.1 million, depreciation and amortization of $3.5 million and loss on investment in affiliated entity of $7.0 million.

Net cash used in operating activities for the year ended December 31, 2016 of $62.6 million consisted of net loss of ($73.7) million less changes in net operating assets and liabilities of ($529,000), partially offset by net non-cash adjustments of $11.7 million. The primary non-cash income (expense) added back to net loss included gain on investment in affiliated entity of $1.1 million and gain on sale of intangible assets of $1.0 million, offset by stock-based compensation of $10.5 million and depreciation and amortization of $3.1 million.

Net cash (used in) provided by investing activities was ($27.8 million) and $16.3 million for the years ended December 31, 2017 and 2016, respectively. The variance was primarily the result of timing differences in short-term investment purchases, sales and maturities as well as an increase in capital expenditures for our new facilities.

Net cash provided by financing activities was $95.7 million and $7.8 million for the years ended December 31, 2017 and 2016, respectively. The increase in cash provided from financing activities was primarily due to proceeds from the July 2017 financing and the sale of common stock under our ATM sales agreement during the period.

In July 2017, we closed an underwritten public offering of 12,500,000 shares of our common stock at a public offering price of $6.00 per share. The net proceeds, after deducting the underwriters' discounts and commissions and other offering expenses payable by us, were $70.1 million.

In June 2016, we entered into an at-the-market, or ATM, sales agreement with an outside placement agent, or the Placement Agent, to sell shares of our common stock with aggregate gross proceeds of up to $50.0 million from time to time, through an ATM equity offering program under which the Placement Agent will act as sales agent. During the year ended December 31, 2017, we sold 2,937,406 shares of common stock under the ATM sales agreement for net proceeds of $24.2 million. During the year ended December 31, 2016, we sold 658,748 shares of common stock under the ATM sales agreement for net proceeds of $6.3 million. As of December 31, 2017, we have availability under the ATM sales agreement to sell up to an additional $18.9 million in shares of our common stock.

During the year ended December 31, 2017, stock options to purchase 452,973 shares of common stock were exercised for net proceeds to us of $2.3 million.

During the year ended December 31, 2016, stock options to purchase 631,065 shares of common stock were exercised for net proceeds to us of $1.8 million.

As of December 31, 2017, we had an accumulated deficit of $523.4 million and we expect to continue to operate at a loss for some time. The amount of the accumulated deficit will continue to increase, as it will be expensive to continue research and development efforts. These activities will require additional financing. If these activities are successful and if we receive approval from the FDA to market our DNA vaccine products, then we will need to raise additional funding to market and sell the approved vaccine products and equipment. We cannot predict the outcome of the above matters at this time. We are evaluating potential collaborations as an additional way to fund operations. We believe that current cash and short-term investments are sufficient to meet planned working capital requirements for at least the next twelve months.

Off-Balance Sheet Arrangements

We do not have any off-balance sheet arrangements that have or are reasonably likely to have a current or future effect on our financial condition, changes in financial condition, revenue, expenses, and results of operations, liquidity, capital expenditures or capital resources.

Contractual Obligations

As of December 31, 2017, we did not have any other material long-term debt or other known contractual obligations, except for the operating leases for our facilities, which expire in 2018 through 2029, and operating leases for copiers, which expire in 2018 through 2022.

We are contractually obligated to make the following operating lease payments as of December 31, 2017:

| | Total | Less than 1 year | 1 – 3 years | 3 – 5 years | More than 5 years |
|---|---|---|---|---|---|
| Operating lease obligations | $38,904,000 | $3,251,000 | $7,647,000 | $8,031,000 | $19,975,000 |

In the normal course of business, we are a party to a variety of agreements pursuant to which we may be obligated to indemnify the other party. It is not possible to predict the maximum potential amount of future payments under these types of agreements due to the conditional nature of our obligations and the unique facts and circumstances involved in each particular agreement. Historically, payments made by us under these types of agreements have not had a material effect on our business, consolidated results of operations or financial condition.

## ITEM 7A. QUALITATIVE AND QUANTITATIVE DISCLOSURES ABOUT MARKET RISK

Interest Rate Risk

Market risk represents the risk of loss that may impact our consolidated financial position, results of operations or cash flows due to adverse changes in financial and commodity market prices and rates. We are exposed to market risk primarily in the area of changes in United States interest rates and conditions in the credit markets, and the recent fluctuations in interest rates and availability of funding in the credit markets primarily impact the performance of our investments. We do not have any material foreign currency or other derivative financial instruments. Under our

current policies, we do not use interest rate derivative instruments to manage exposure to interest rate changes. We attempt to increase the safety and preservation of our invested principal funds by limiting default risk, market risk and reinvestment risk. We mitigate default risk by investing in investment grade securities. Due to the short-term maturities of our cash equivalents and the low risk profile of our

investments at December 31, 2017, an immediate 100 basis point change in interest rates would not have a material effect on the fair market value of our cash equivalents.

Fair Value Measurements

We account for our common stock warrants pursuant to the authoritative guidance on accounting for derivative financial instruments indexed to, and potentially settled in, a company's own stock, on the understanding that in compliance with applicable securities laws, the registered warrants require the issuance of registered securities upon exercise and do not sufficiently preclude an implied right to net cash settlement. We classify registered warrants on the consolidated balance sheet as a current liability that is revalued at each balance sheet date subsequent to the initial issuance.

The investment in affiliated entities represents our ownership interest in the Korean-based companies, GeneOne and PLS. We report these investments at fair value on the consolidated balance sheet using the closing price of GeneOne and PLS shares of common stock as reported on the date of determination on the Korean Stock Exchange and Korea New Exchange Market, respectively.

Foreign Currency Risk

We have operated primarily in the United States and most transactions during the year ended December 31, 2017 were made in United States dollars. Accordingly, we have not had any material exposure to foreign currency rate fluctuations, with the exception of the valuation of our equity investments in GeneOne and PLS which are denominated in South Korean Won and then translated into United States dollars. We do not have any foreign currency hedging instruments in place.

Certain transactions related to us are denominated primarily in foreign currencies, including Euros, British Pounds, Canadian Dollars and South Korean Won. As a result, our financial results could be affected by factors such as changes in foreign currency exchange rates or weak economic conditions in foreign markets where we conduct business.

We do not use derivative financial instruments for speculative purposes. We do not engage in exchange rate hedging or hold or issue foreign exchange contracts for trading purposes. Currently, we do not expect the impact of fluctuations in the relative fair value of other currencies to be material in 2018.

## ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

The information required by this Item 8 is incorporated by reference to our Consolidated Financial Statements and the Report of Independent Registered Public Accounting Firm beginning at page F-1 of this report.

## ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE

None.

## ITEM 9A. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

As of December 31, 2017, we carried out an evaluation, with the participation of our Chief Executive Officer and Chief Financial Officer, of the effectiveness of our disclosure controls and procedures (as defined in Rule 13a-15(e) under the Exchange Act). Based upon that evaluation, our Chief Executive Officer and Chief Financial Officer concluded that our disclosure controls and procedures were effective as of the end of the period covered by this report in recording, processing, summarizing and reporting, on a timely basis, information required to be disclosed in reports that we file or submit under the Exchange Act and our disclosure controls and procedures were also effective to ensure that information we disclose in the reports we file or submit under the Exchange Act is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer, to allow timely decisions regarding required disclosure.

Internal Control Over Financial Reporting

Management’s Report on Internal Control Over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting, as defined in Rules 13a-15(f) and 15d-15(f) under the Securities Exchange Act of 1934. Our internal control over

financial reporting is a process designed under the supervision of our Chief Executive Officer and Chief Financial Officer to provide reasonable assurance regarding the reliability of financial reporting and the preparation of our financial statements for external purposes in accordance with United States generally accepted accounting principles. As of December 31, 2017, management, with the participation of the Chief Executive Officer and Chief Financial Officer, assessed the effectiveness of our internal control over financial reporting based on the criteria for effective internal

control over financial reporting established in “Internal Control—Integrated Framework,” issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework). Based on the assessment, management determined that we maintained effective internal control over financial reporting as of December 31, 2017.

Changes in Internal Control over Financial Reporting

There have not been any changes in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) that occurred during the fourth quarter of our fiscal year ended December 31, 2017, that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Attestation Report of Independent Registered Public Accounting Firm

The independent registered public accounting firm that audited the consolidated financial statements that are included in this Annual Report on Form 10-K has issued an audit report on the effectiveness of our internal control over financial reporting as of December 31, 2017. The report appears below.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

The Board of Directors and Stockholders of Inovio Pharmaceuticals, Inc.

Opinion on Internal Control over Financial Reporting

We have audited Inovio Pharmaceuticals, Inc.'s internal control over financial reporting as of December 31, 2017, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission 2013 framework (the COSO criteria). In our opinion, Inovio Pharmaceuticals, Inc. (the Company) maintained, in all material respects, effective internal control over financial reporting as of December 31, 2017, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets of the Company as of December 31, 2017 and 2016, the related consolidated statements of operations, comprehensive loss, stockholders' equity, and cash flows, for each of the three years in the period ended December 31, 2017 and related notes and our report dated March 14, 2018 expressed an unqualified opinion thereon.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying Management's Report on Internal Control over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects.

Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ Ernst & Young LLP

San Diego, California
March 14, 2018

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

The information required by this Item 10 is hereby incorporated by reference from our definitive proxy statement, to be filed pursuant to Regulation 14A within 120 days after the end of our 2017 fiscal year.

ITEM 11. EXECUTIVE COMPENSATION

The information required by this Item 11 is hereby incorporated by reference from our definitive proxy statement, to be filed pursuant to Regulation 14A within 120 days after the end of our 2017 fiscal year.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

The information required by this Item 12 is hereby incorporated by reference from our definitive proxy statement, to be filed pursuant to Regulation 14A within 120 days after the end of our 2017 fiscal year.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

Director independence and other information required by this Item 13 is hereby incorporated by reference from our definitive proxy statement, to be filed pursuant to Regulation 14A within 120 days after the end of our 2017 fiscal year.

ITEM 14. PRINCIPAL ACCOUNTING FEES AND SERVICES

The information required by this Item 14 is hereby incorporated by reference from our definitive proxy statement, to be filed pursuant to Regulation 14A within 120 days after the end of our 2017 fiscal year.

PART IV

ITEM 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULES

1. Financial Statements

Consolidated financial statements required to be filed hereunder are indexed on Page F-1 hereof.

2. Financial Statement Schedules

Schedules not listed herein have been omitted because the information required to be set forth therein is not applicable or is included in the Financial Statements or notes thereto.

3. Exhibits

The following exhibits are filed as part of this annual report on Form 10-K:

| Exhibit Number | Description of Document |
|---|---|
| 3.1 | Certificate of Incorporation with all amendments (incorporated by reference to Exhibit 3.1 of the registrant's Form S-3 registration statement, filed on July 23, 2014). |
| 3.2 | Amended and Restated Bylaws of Inovio Pharmaceuticals, Inc. dated August 10, 2011 (incorporated by reference to Exhibit 3.2 to the registrant's Form 8-K current report filed on August 12, 2011). |
| 4.1 | Form of Warrant to Purchase Common Stock issued by Inovio Pharmaceuticals, Inc. (incorporated by reference to Exhibit 4.1 to the registrant's Form 8-K current report filed March 7, 2013). |
| 10.1† | R&D Alliance Agreement dated December 19, 2005 by and between Ganial Immunotherapeutics, Inc. and VGX Pharmaceuticals, Inc., as amended by Novation and Amendment Agreement by and between VGX Pharmaceuticals, Inc., Ganial Immunotherapeutics, Inc., and Onconox (incorporated by reference to Exhibit 10.31 as filed with the registrant's Registration Statement on Form S-4 (File No. 333-156035) on April 27, 2009). |
| 10.2† | R&D Collaboration and License Agreement dated December 18, 2006 by and between VGX International, Inc. and VGX Pharmaceuticals, Inc., as amended by First Amendment dated October 31, 2007 and as amended by Second Amendment dated August 4, 2008 (incorporated by reference to Exhibit 10.39 as filed with the registrant's Registration Statement on Form S-4 (File No. 333-156035) on April 27, 2009). |
| 10.3† | Patent License Agreement dated April 27, 2007 by and between The Trustees of the University of Pennsylvania and VGX Pharmaceuticals, Inc., as amended by First Amendment dated June 12, 2008 (incorporated by reference to Exhibit 10.50 as filed with the registrant's Registration Statement on Form S-4 (File No. 333-156035) on April 27, 2009). |
| 10.4† | License Agreement dated May 9, 2007 by and between Baylor University and VGX Pharmaceuticals, Inc. (incorporated by reference to Exhibit 10.34 as filed with the registrant's registration statement on Form S-4 (File No. 333-156035) on April 27, 2009). |

| Exhibit Number | Description of Document |
|---|---|
| 10.5† | CELLECTRA® Device License Agreement dated April 16, 2008 by and between VGX International and VGX Pharmaceuticals, Inc. (incorporated by reference to Exhibit 10.44 as filed with the registrant's Registration Statement on Form S-4 (File No. 333-156035) on April 27, 2009). |
| 10.6+ | 2001 Equity Compensation Plan for VGX Pharmaceuticals, Inc., as amended (incorporated by reference to Exhibit 10.62 as filed with the registrant's Registration Statement on Form S-4 (File No. 333-156035) on April 27, 2009). |
| 10.7† | License and Collaboration Agreement dated March 24, 2010 between Inovio Pharmaceuticals, Inc. and VGX International, Inc. (incorporated by reference to Exhibit 10.2 as filed with the registrant's Form 10-Q quarterly report for the quarter ended March 31, 2010 filed on May 17, 2010). |
| 10.8† | Collaborative Development and License Agreement dated October 7, 2011 between VGX International, Inc. and Inovio Pharmaceuticals, Inc., as amended by First Amendment dated August 21, 2013, and Second Amendment dated October 7, 2013 (incorporated by reference to Exhibit 10.1 as filed with the registrant's Form 10-Q quarterly report for the quarter ended September 30, 2011 filed on November 7, 2011). |
| 10.9† | DNA Cancer Vaccine Collaboration and License Agreement dated August 7, 2015 by and between MedImmune, Limited and Inovio Pharmaceuticals, Inc. (incorporated by reference to Exhibit 10.1 of the registrant's Form 10-Q quarterly report for the quarter ended September 30, 2015 filed on November 9, 2015). |
| 10.10 | Collaborative Research Agreement dated March 14, 2016 by and between The Wistar Institute of Anatomy and Biology, a Commonwealth of Pennsylvania nonprofit corporation, and Inovio Pharmaceuticals, Inc. (incorporated by reference to Exhibit 10.1 as filed with the registrant's Form 10-Q quarterly report for the quarter ended March 31, 2016 filed on May 9, 2016). |
| 10.11 | Collaborative Research Agreement dated March 14, 2016 by and between The Wistar Institute of Anatomy and Biology, a Commonwealth of Pennsylvania nonprofit corporation, and Inovio Pharmaceuticals, Inc. (incorporated by reference to Exhibit 10.2 as filed with the registrant's Form 10-Q quarterly report for the quarter ended March 31, 2016 filed on May 9, 2016). |
| 10.12†† | Amended and Restated License and Collaboration Agreement, dated December 29, 2017, by and between Inovio Pharmaceuticals, Inc. and Beijing Apollo Saturn Biological Technology Limited (filed herewith). |
| 10.13 | At-the-Market Equity Offering Sales Agreement dated June 17, 2016 between Inovio Pharmaceuticals, Inc. and Stifel, Nicolaus & Company, Incorporated (incorporated by reference to Exhibit 1.1 of the registrant's Form 8-K filed on June 17, 2016). |
| 10.14 | Lease dated April 9, 2013 by and between BMR-Wateridge LP and Inovio Pharmaceuticals, Inc. (incorporated by reference to Exhibit 10.1 to registrant's quarterly report for the quarter ended March 31, 2013, filed on May 10, 2013). |
| 10.15 | Office Lease Agreement dated October 10, 2016 by and between 6759 Mesa Ridge Road Holdings, LLC and Inovio Pharmaceuticals, Inc. (incorporated by reference to Exhibit 10.1 as filed with the registrant's Form 10-Q quarterly report for the quarter ended September 30, 2016 filed on November 9, 2016). |

| | |
|---|---|
| 10.16 | Lease Agreement dated as of March 5, 2014 between Brandywine Operating Partnership L.P. and Inovio Pharmaceuticals, Inc. (incorporated by reference to Exhibit 10.36 as filed with the registrant's Form 10-K annual report for the year ended December 31, 2014 filed on March 17, 2014). |

| Exhibit Number | Description of Document |
|---|---|
| 10.17 | Second Amendment to the Lease Agreement dated June 22, 2017 between Brandywine Operating Partnership, L.P. and Inovio Pharmaceuticals, Inc. (incorporated by reference to Exhibit 10.1 as filed with the registrant's Form 10-Q quarterly report for the quarter ended June 30, 2017 filed on August 8, 2017). |
| 10.18 | Sublease dated June 21, 2017 between Accolade, Inc. and Inovio Pharmaceuticals, Inc. (incorporated by reference to Exhibit 10.2 as filed with the registrant's Form 10-Q quarterly report for the quarter ended June 30, 2017 filed on August 8, 2017). |
| 10.19+ | Employment Agreement dated March 31, 2008 by and between J. Joseph Kim, Ph.D. and VGX Pharmaceuticals, Inc., as amended by First Amendment of Employment Agreement dated March 31, 2008 (incorporated by reference to Exhibit 10.43 as filed with the registrant’s Registration Statement on Form S-4 (File No. 333-156035) on April 27, 2009). |
| 10.20+ | First Amendment to Employment Agreement dated as of December 31, 2012 between Inovio Pharmaceuticals, Inc. and J. Joseph Kim, PhD. (incorporated by reference to Exhibit 10.41 of the registrant’s Form 10-K annual report for the year ended December 31, 2012 filed on March 18, 2013). |
| 10.21+ | Employment Agreement dated December 10, 2009 between Inovio Pharmaceuticals, Inc. and Mark L. Bagarazzi (incorporated by reference to Exhibit 10.39 to the registrant’s Form 10-K report for the year ended December 31, 2011 filed on March 15, 2012). |
| 10.22+ | First Amendment to Employment Agreement dated as of December 31, 2012 between Inovio Pharmaceuticals, Inc. and Mark L. Bagarazzi (incorporated by reference to Exhibit 10.43 of the registrant’s Form 10-K annual report for the year ended December 31, 2012 filed on March 18, 2013). |
| 10.23+ | Second Amendment to Employment Agreement dated November 7, 2014 by and between Inovio Pharmaceuticals, Inc. and Dr. Mark Bagarazzi (incorporated by reference to Exhibit 10.1 of the registrant's Form 10-Q quarterly report for the quarter ended September 30, 2014 filed on November 10, 2014). |
| 10.24+ | Employment Agreement dated as of December 27, 2010 between Inovio Pharmaceuticals, Inc. and Peter Kies (incorporated by reference to Exhibit 10.5 to the registrant’s Form 10-K report for the year ended December 31, 2010 filed on March 16, 2011). |
| 10.25+ | First Amendment to Employment Agreement dated as of December 31, 2012 between Inovio Pharmaceuticals, Inc. and Peter Kies (incorporated by reference to Exhibit 10.42 of the registrant’s Form 10-K annual report for the year ended December 31, 2012 filed on March 18, 2013). |
| 10.26+ | Second Amendment to Employment Agreement dated November 7, 2014 by and between Inovio Pharmaceuticals, Inc. and Peter Kies (incorporated by reference to Exhibit 10.2 of the registrant's Form 10-Q quarterly report for the quarter ended September 30, 2014 filed on November 10, 2014). |
| 10.27+ | Employment Agreement dated December 27, 2010 between Inovio Pharmaceuticals, Inc. and Niranjan Y. Sardesai (incorporated by reference to Exhibit 10.7 to the registrant’s Form 10-K report for the year ended December 31, 2011 filed on March 15, 2012). |
| 10.28+ | First Amendment to Employment Agreement dated as of December 31, 2012 between Inovio Pharmaceuticals, Inc. and Niranjan Sardesai (incorporated by reference to Exhibit 10.44 of the registrant’s |

| | |
|---|---|
| | Form 10-K annual report for the year ended December 31, 2012 filed on March 18, 2013). |
| 10.29+ | Second Amendment to Employment Agreement dated November 7, 2014 by and between Inovio Pharmaceuticals, Inc. and Dr. Niranjan Sardesai (incorporated by reference to Exhibit 10.3 of the registrant's Form 10-Q quarterly report for the quarter ended September 30, 2014 filed on November 10, 2014). |
| 10.30 | Form of Indemnification Agreement for Directors and Officers of Inovio Pharmaceuticals, Inc. (incorporated by reference to Exhibit 10.1 to the registrant’s Form 10-Q quarterly report for the quarterly period ended June 30, 2009, filed on August 19, 2009). |

| Exhibit Number | Description of Document |
|---|---|
| 10.31+ | Amended and Restated 2007 Omnibus Incentive Plan, as amended (incorporated by reference to Exhibit 10.12 to the registrant's Form 10-K report for the year ended December 31, 2015 filed on March 14, 2016). |
| 10.32+ | Form of Restricted Stock Award Grants under the 2007 Omnibus Stock Incentive Plan (incorporated by reference to Exhibit 4.3 to the registrant's Registration Statement on Form S-8 filed on May 14, 2007). |
| 10.33+ | Form of Incentive and Non-Qualified Stock Option Grants under the 2007 Omnibus Stock Incentive Plan (incorporated by reference to Exhibit 4.4 to the registrant's Registration Statement on Form S-8 filed on May 14, 2007). |
| 10.34+ | GENEOS Therapeutics, Inc. 2016 Equity Incentive Plan (incorporated by reference to Exhibit 10.2 as filed with the registrant's Form 10-Q quarterly report for the quarter ended September 30, 2016 filed on November 9, 2016). |
| 10.35+ | Form of Incentive Stock Option Agreement under the GENEOS Therapeutics, Inc. 2016 Equity Incentive Plan (incorporated by reference to Exhibit 10.3 as filed with the registrant's Form 10-Q quarterly report for the quarter ended September 30, 2016 filed on November 9, 2016). |
| 10.36+ | Form of Employee Non-Qualified Stock Option Agreement under the GENEOS Therapeutics, Inc. 2016 Equity Incentive Plan (incorporated by reference to Exhibit 10.4 as filed with the registrant's Form 10-Q quarterly report for the quarter ended September 30, 2016 filed on November 9, 2016). |
| 10.37+ | Form of Outside Director Non-Qualified Stock Option Agreement under the GENEOS Therapeutics, Inc. 2016 Equity Incentive Plan (incorporated by reference to Exhibit 10.5 as filed with the registrant's Form 10-Q quarterly report for the quarter ended September 30, 2016 filed on November 9, 2016). |
| 10.38+ | Form of Restricted Stock Agreement under the GENEOS Therapeutics, Inc. 2016 Equity Incentive Plan (incorporated by reference to Exhibit 10.6 as filed with the registrant's Form 10-Q quarterly report for the quarter ended September 30, 2016 filed on November 9, 2016). |
| 10.39+ | Inovio Pharmaceuticals, Inc. 2016 Omnibus Incentive Plan (incorporated by reference to the registrant's Definitive Proxy Statement on Schedule 14A filed on March 25, 2016). |
| 10.40+ | Form of Incentive Stock Option Agreement under 2016 Omnibus Incentive Plan. (incorporated by reference to Exhibit 10.55 as filed with the registrant's Form 10-K annual report for the year ended December 31, 2016 filed on March 15, 2017.) |
| 10.41+ | Form of Nonqualified Stock Option Agreement under 2016 Omnibus Incentive Plan. (incorporated by reference to Exhibit 10.56 as filed with the registrant's Form 10-K annual report for the year ended December 31, 2016 filed on March 15, 2017.) |
| 10.42+ | Form of Restricted Stock Units Award Agreement under 2016 Omnibus Incentive Plan. (incorporated by reference to Exhibit 10.54 as filed with the registrant's Form 10-K annual report for the year ended December 31, 2016 filed on March 15, 2017.) |
| 21.1 | Subsidiaries of the registrant. |

| | |
|---|---|
| 23.1 | Consent of Independent Registered Public Accounting Firm. |
| 24.1 | Power of Attorney (included on signature page). |
| 31.1 | Certification of the Principal Executive Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002. |
| 31.2 | Certification of the Principal Financial Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002. |

| Exhibit Number | Description of Document |
|---|---|
| 32.1^ | Certification of the Principal Executive Officer and Principal Financial Officer pursuant to 18 U.S.C. 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002. |
| 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. |

+ Designates management contract, compensatory plan or arrangement.

† Confidential treatment has been granted for certain portions omitted from this exhibit (indicated by asterisks) pursuant to Rule 24b-2 under the Securities Exchange Act of 1934, as amended. The confidential portions of this exhibit have been separately filed with the Securities and Exchange Commission..

†† Confidential treatment has been requested for certain portions omitted from this exhibit (indicated by asterisks) pursuant to Rule 24b-2 under the Securities Exchange Act of 1934, as amended. The confidential portions of this exhibit have been separately filed with the Securities and Exchange Commission.

^ These certifications are being furnished solely to accompany this Annual Report pursuant to 18 U.S.C. Section 1350, and are not being filed for purposes of Section 18 of the Securities Exchange Act of 1934, as amended, and are not to be incorporated by reference into any filing of the registrant, whether made before or after the date hereof, regardless of any general incorporation language in such filing.

ITEM 16. FORM 10-K SUMMARY

Not applicable.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized on March 14, 2018.

Inovio Pharmaceuticals, Inc.

By: /s/ J. JOSEPH KIM
J. Joseph Kim
President, Chief Executive Officer and Director

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints J. Joseph Kim and Peter Kies, and each of them severally, his or her true and lawful attorney-in-fact with power of substitution and resubstitution to sign in his or her name, place and stead, in any and all capacities, to do any and all things and execute any and all instruments that such attorney may deem necessary or advisable under the Securities Exchange Act of 1934 and any rules, regulations and requirements of the United States Securities and Exchange Commission in connection with the Annual Report on Form 10-K and any and all amendments hereto, as fully for all intents and purposes as he or she might or could do in person, and hereby ratifies and confirms all said attorneys-in-fact and agents, each acting alone, and his or her substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Exchange Act of 1934, this report 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/ J. JOSEPH KIM<br>J. Joseph Kim | President, Chief Executive Officer and Director (Principal Executive Officer) | March 14, 2018 |
| /s/ AVTAR DHILLON<br>Avtar Dhillon | Chairman of the Board of Directors | March 14, 2018 |
| /s/ PETER KIES<br>Peter Kies | Chief Financial Officer (Principal Accounting Officer and Principal Financial Officer) | March 14, 2018 |
| /s/ SIMON X. BENITO<br>Simon X. Benito | Director | March 14, 2018 |
| /s/ GEORGE BICKERSTAFF<br>George Bickerstaff | Director | March 14, 2018 |
| /s/ ANGEL CABRERA<br>Angel Cabrera | Director | March 14, 2018 |
| /s/ MORTON COLLINS<br>Morton Collins | Director | March 14, 2018 |
| /s/ ADEL MAHMOUD<br>Adel Mahmoud | Director | March 14, 2018 |
| /s/ DAVID WEINER<br>David Weiner | Director | March 14, 2018 |
| /s/ WENDY YARNO<br>Wendy Yarno | Director | March 14, 2018 |

INOVIO PHARMACEUTICALS, INC.
Index to Consolidated Financial Statements


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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

The Board of Directors and Stockholders of Inovio Pharmaceuticals, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Inovio Pharmaceuticals, Inc. (the "Company") as of December 31, 2017 and 2016, the related consolidated statements of operations, comprehensive loss, stockholders' equity, and cash flows, for each of the three years in the period ended December 31, 2017, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2017 and 2016, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2017, in conformity with US generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company's internal control over financial reporting as of December 31, 2017, based on criteria established in Internal Control-Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 Framework) and our report dated March 14, 2018 expressed an unqualified opinion thereon.

Basis for Opinion

These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the US federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Ernst & Young LLP

We have served as the Company's auditor since 2002.

San Diego, California

March 14, 2018

Inovio Pharmaceuticals, Inc.
CONSOLIDATED BALANCE SHEETS

| | December 31, 2017 | 2016 |
|---|---|---|
| ASSETS | | |
| Current assets: | | |
| Cash and cash equivalents | $23,786,579 | $19,136,472 |
| Short-term investments | 103,638,844 | 85,629,412 |
| Accounts receivable | 6,003,205 | 15,821,511 |
| Accounts receivable from affiliated entities | 486,619 | 748,355 |
| Prepaid expenses and other current assets | 2,600,906 | 1,749,059 |
| Prepaid expenses and other current assets from affiliated entities | 1,846,007 | 1,512,424 |
| Total current assets | 138,362,160 | 124,597,233 |
| Fixed assets, net | 18,320,176 | 9,025,446 |
| Investment in affiliated entity - GeneOne | 9,069,401 | 16,052,065 |
| Investment in affiliated entity - PLS | 2,325,079 | 3,777,510 |
| Intangible assets, net | 6,009,729 | 7,628,394 |
| Goodwill | 10,513,371 | 10,513,371 |
| Other assets | 2,639,354 | 2,113,147 |
| Total assets | $187,239,270 | $173,707,166 |
| LIABILITIES AND STOCKHOLDERS' EQUITY | | |
| Current liabilities: | | |
| Accounts payable and accrued expenses | $23,278,798 | $19,597,787 |
| Accounts payable and accrued expenses due to affiliated entities | 926,943 | 1,072,579 |
| Accrued clinical trial expenses | 8,611,892 | 6,368,389 |
| Common stock warrants | 360,795 | 1,167,614 |
| Deferred revenue | 1,175,353 | 14,762,720 |
| Deferred revenue from affiliated entities | 174,110 | 407,292 |
| Deferred rent | 877,535 | 446,646 |
| Total current liabilities | 35,405,426 | 43,823,027 |
| Deferred revenue, net of current portion | 215,853 | 317,808 |
| Deferred revenue from affiliated entities, net of current portion | — | 86,694 |
| Deferred rent, net of current portion | 9,104,416 | 5,926,424 |
| Deferred tax liabilities | 24,766 | 174,793 |
| Total liabilities | 44,750,461 | 50,328,746 |
| Commitments and contingencies | | |
| Inovio Pharmaceuticals, Inc. stockholders' equity: | | |
| Preferred stock—par value $0.001; Authorized shares: 10,000,000, issued and outstanding shares: 23 at December 31, 2017 and December 31, 2016 | — | — |
| Common stock—par value $0.001; Authorized shares: 600,000,000 at December 31, 2017 and December 31, 2016, issued and outstanding: 90,357,644 at December 31, 2017 and 74,062,370 at December 31, 2016 | 90,358 | 74,062 |
| Additional paid-in capital | 665,775,504 | 556,718,356 |
| Accumulated deficit | (523,356,317) | (434,838,235) |
| Accumulated other comprehensive income (loss) | (117,005) | 1,327,968 |
| Total Inovio Pharmaceuticals, Inc. stockholders' equity | 142,392,540 | 123,282,151 |
| Non-controlling interest | 96,269 | 96,269 |
| Total stockholders' equity | 142,488,809 | 123,378,420 |
| Total liabilities and stockholders' equity | $187,239,270 | $173,707,166 |

The accompanying notes are an integral part of these consolidated financial statements.

Inovio Pharmaceuticals, Inc.
CONSOLIDATED STATEMENTS OF OPERATIONS

| | For the Year ended December 31, | | |
|---|---|---|---|
| | 2017 | 2016 | 2015 |
| Revenues: | | | |
| Revenue under collaborative research and development arrangements | $28,407,388 | $6,490,747 | $26,876,533 |
| Revenue under collaborative research and development arrangements with affiliated entities | 765,828 | 1,400,594 | 779,167 |
| Grants and miscellaneous revenue | 10,474,539 | 27,136,457 | 12,916,411 |
| Grants and miscellaneous revenue from affiliated entity | 2,572,331 | 340,563 | — |
| Total revenues | 42,220,086 | 35,368,361 | 40,572,111 |
| Operating expenses: | | | |
| Research and development | 98,572,618 | 88,712,035 | 57,791,923 |
| General and administrative | 28,290,369 | 23,892,263 | 18,063,890 |
| Gain on sale of assets | (1,000,000) | (1,000,000) | (1,000,000) |
| Total operating expenses | 125,862,987 | 111,604,298 | 74,855,813 |
| Loss from operations | (83,642,901) | (76,235,937) | (34,283,702) |
| Other income (expense): | | | |
| Interest and other income, net | 1,612,974 | 1,257,257 | 305,071 |
| Change in fair value of common stock warrants | 806,819 | 127,554 | 177,561 |
| Gain (loss) on investment in affiliated entity | (6,982,664) | 1,110,787 | 2,600,467 |
| Net loss before income tax benefit | (88,205,772) | (73,740,339) | (31,200,603) |
| Income tax benefit | — | — | 2,097,766 |
| Net loss | (88,205,772) | (73,740,339) | (29,102,837) |
| Net income attributable to non-controlling interest | — | — | (84,769) |
| Net loss attributable to Inovio Pharmaceuticals, Inc. | $(88,205,772) | $(73,740,339) | $(29,187,606) |
| Net loss per common share attributable to Inovio Pharmaceuticals, Inc. stockholders | | | |
| Basic | $(1.08) | $(1.01) | $(0.43) |
| Diluted | $(1.09) | $(1.01) | $(0.44) |
| Weighted average number of common shares outstanding used in per share calculations: | | | |
| Basic | 81,777,493 | 73,214,766 | 68,198,142 |
| Diluted | 81,918,022 | 73,214,766 | 68,365,265 |

The accompanying notes are an integral part of these consolidated financial statements.

Inovio Pharmaceuticals, Inc.
CONSOLIDATED STATEMENTS OF COMPREHENSIVE LOSS

| | For the Year ended December 31, | | |
|---|---|---|---|
| | 2017 | 2016 | 2015 |
| Net loss | (88,205,772) | $(73,740,339) | $(29,102,837) |
| Other comprehensive income (loss): | | | |
| Unrealized gain (loss) on investment in affiliated entity, net of tax | (1,452,431) | (1,268,404) | 2,952,201 |
| Unrealized gain (loss) on short-term investments, net of tax | 7,458 | (111,967) | 7,528 |
| Comprehensive loss | $(89,650,745) | $(75,120,710) | $(26,143,108) |
| Comprehensive income attributable to non-controlling interest | — | — | (84,769) |
| Comprehensive loss attributable to Inovio Pharmaceuticals, Inc. | $(89,650,745) | $(75,120,710) | $(26,227,877) |

The accompanying notes are an integral part of these consolidated financial statements.

Inovio Pharmaceuticals, Inc.
CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY

| | Preferred stock | | Common stock | | Additional paid-in capital | Accumulated deficit | Accumulated other comprehensive income (loss) | Non-controlling interest | Total stockholders' equity |
|---|---|---|---|---|---|---|---|---|---|
| | Number of shares | Amount | Number of shares | Amount | | | | | |
| Balance at December 31, 2014 | 23 | — | 60,741,082 | $60,741 | $443,327,915 | $(331,910,290) | $(251,390) | $310,618 | $111,537,594 |
| Issuance of common stock for cash, net of financing costs of $4.0 million | — | — | 10,925,000 | 10,925 | 81,891,438 | — | — | — | 81,902,363 |
| Payment to minority stockholders | — | — | — | — | — | — | — | (149,559) | (149,559) |
| Exercise of stock options and warrants for cash | — | — | 551,883 | 552 | 2,598,363 | — | — | — | 2,598,915 |
| Stock-based compensation | — | — | — | — | 6,186,848 | — | — | — | 6,186,848 |
| Net loss attributable to common stockholders | — | — | — | — | — | (29,187,606) | — | 84,769 | (29,102,837) |
| Unrealized gain on short-term investments, net of tax | — | — | — | — | — | — | 7,528 | — | 7,528 |
| Unrealized gain on investment in affiliated entity, net of tax | — | — | — | — | — | — | 2,952,201 | — | 2,952,201 |
| Balance at December 31, 2015 | 23 | — | 72,217,965 | $72,218 | $534,004,564 | $(361,097,896) | $2,708,339 | $245,828 | $175,933,053 |
| Issuance of common stock for cash, net of financing costs of $128,000 | — | — | 658,748 | 659 | 6,295,102 | — | — | — | 6,295,761 |
| Issuance of common stock for Bioject | — | — | 440,122 | 440 | 4,299,560 | — | — | — | 4,300,000 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| acquisition | | | | | | | | |
| Payment to minority stockholders | — | — | — | — | — | — | (149,559) | (149,559) |
| Exercise of stock options and warrants for cash and vesting of RSUs, net of tax payments | — | — | 450,045 | 449 | 1,640,291 | — | — | — | 1,640,740 |
| Cashless exercise of stock options and warrants | — | — | 295,490 | 296 | (296) | — | — | — | — |
| Stock-based compensation | — | — | — | — | 10,479,135 | — | — | — | 10,479,135 |
| Net loss attributable to common stockholders | — | — | — | — | — | (73,740,339) | — | — | (73,740,339) |
| Unrealized loss on short-term investments, net of tax | — | — | — | — | — | — | (111,967) | — | (111,967) |
| Unrealized loss on investment in affiliated entity, net of tax | — | — | — | — | — | — | (1,268,404) | — | (1,268,404) |
| Balance at December 31, 2016 | 23 | — | 74,062,370 | $74,062 | $556,718,356 | $(434,838,235) | $1,327,968 | $96,269 | $123,378,420 |
| Cumulative effect of accounting change | — | — | — | — | 312,310 | (312,310) | — | — | — |
| Issuance of common stock for cash, net of financing costs of $4.9 million | — | — | 15,437,406 | 15,437 | 94,332,485 | — | — | — | 94,347,922 |
| Exercise of stock options for cash and vesting of RSUs, net of tax payments | — | — | 857,868 | 859 | 1,341,391 | — | — | — | 1,342,250 |
| Stock-based compensation | — | — | — | — | 13,070,962 | — | — | — | 13,070,962 |
| | — | — | — | — | — | (88,205,772) | — | — | (88,205,772) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Net loss attributable to common stockholders | | | | | | | | | |
| Unrealized gain on short-term investments, net of tax | — | — | — | — | — | — | 7,458 | — | 7,458 |
| Unrealized loss on investment in affiliated entity, net of tax | — | — | — | — | — | — | (1,452,431) | — | (1,452,431) |
| Balance at December 31, 2017 | 23 | — | 90,357,644 | $90,358 | $665,775,504 | $(523,356,317) | $(117,005) | $96,269 | $142,488,809 |

The accompanying notes are an integral part of these consolidated financial statements.

Inovio Pharmaceuticals, Inc.
CONSOLIDATED STATEMENTS OF CASH FLOWS

| | For the Year ended December 31, | | |
|---|---|---|---|
| | 2017 | 2016 | 2015 |
| Cash flows from operating activities: | | | |
| Net loss | $(88,205,772) | $(73,740,339) | $(29,102,837) |
| Adjustments to reconcile net loss to net cash used in operating activities: | | | |
| Depreciation | 1,850,376 | 1,708,498 | 1,048,431 |
| Amortization of intangible assets | 1,618,665 | 1,377,466 | 870,199 |
| Change in value of common stock warrants | (806,819) | (127,554) | (177,561) |
| Stock-based compensation | 13,070,962 | 10,479,135 | 6,186,848 |
| Amortization of premiums on investments | 319,845 | 266,290 | 348,566 |
| Deferred taxes | (150,027) | (849) | 14,166 |
| Deferred rent | 3,608,881 | (16,728) | 383,584 |
| Loss on short-term investments | 215,423 | 139,249 | 432,174 |
| Gain on investment in affiliated entity | 6,982,664 | (1,110,787) | (2,600,467) |
| Gain on sale of intangible assets | (1,000,000) | (1,000,000) | (1,000,000) |
| Income tax benefit from other unrealized gains on securities | — | — | (2,097,766) |
| Changes in operating assets and liabilities: | | | |
| Accounts receivable | 9,818,306 | (8,521,899) | (4,497,225) |
| Accounts receivable from affiliated entity | 261,736 | (714,908) | (31,627) |
| Prepaid expenses and other current assets | (851,847) | (831,802) | (119,284) |
| Prepaid expenses and other current assets from affiliated entity | (333,583) | (901,772) | 771,723 |
| Other assets | (526,207) | (1,442,314) | (196,265) |
| Accounts payable and accrued expenses | 2,829,807 | 6,367,965 | 6,456,581 |
| Accrued clinical trial expenses | 2,243,503 | 3,767,906 | 593,051 |
| Accounts payable and accrued expenses due to affiliated entity | (145,636) | 907,532 | 136,640 |
| Deferred revenue | (13,689,322) | 1,527,686 | 10,191,840 |
| Deferred revenue from affiliated entity | (319,876) | (687,827) | (49,672) |
| Net cash used in operating activities | (63,208,921) | (62,555,052) | (12,438,901) |
| Cash flows from investing activities: | | | |
| Purchases of investments | (95,700,144) | (57,317,671) | (63,526,830) |
| Maturities of investments | 77,162,902 | 76,528,030 | 10,484,267 |
| Purchases of capital assets | (10,293,902) | (2,738,470) | (2,781,544) |
| Proceeds from sale of intangible assets | 1,000,000 | 1,000,000 | 1,000,000 |
| Purchase of intangible and other assets | — | (1,200,000) | — |
| Net cash provided by (used in) investing activities | (27,831,144) | 16,271,889 | (54,824,107) |
| Cash flows from financing activities: | | | |
| Proceeds from issuance of common stock and warrants, net of issuance costs | 94,347,922 | 6,295,761 | 81,902,363 |
| Proceeds from stock option and warrant exercises, net of tax payments | 1,342,250 | 1,640,740 | 2,598,915 |
| Expenses from other financing activities | — | (149,559) | (149,559) |
| Net cash provided by financing activities | 95,690,172 | 7,786,942 | 84,351,719 |
| Increase (Decrease) in cash and cash equivalents | 4,650,107 | (38,496,221) | 17,088,711 |
| Cash and cash equivalents, beginning of period | 19,136,472 | 57,632,693 | 40,543,982 |
| Cash and cash equivalents, end of period | $23,786,579 | $19,136,472 | $57,632,693 |
| | | | |
| Supplemental disclosure of non-cash activities | | | |
| Common stock issued for purchase of Bioject | $— | $4,300,000 | $— |

| | | | |
|---|---|---|---|
| Change in amounts accrued for purchases of property and equipment | $851,204 | $164,923 | $225,148 |
| Lease incentive recorded as fixed assets and deferred rent | $— | $523,856 | $773,000 |

The accompanying notes are an integral part of these consolidated financial statements.

Inovio Pharmaceuticals, Inc.
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
1. The Company

Inovio Pharmaceuticals, Inc. (the “Company” or “Inovio”), a clinical stage biopharmaceutical company, develops active SynCon® DNA immunotherapies and vaccines focused on preventing and treating cancers and infectious diseases. Inovio’s DNA-based immunotherapies, in combination with proprietary CELLECTRA® delivery devices, are intended to generate optimal antigen production in vivo, in particular functional CD8+ killer T cell and antibody responses, to fight target diseases. Inovio’s synthetic products are based on its SynCon® immunotherapy design. The Company and its collaborators are currently conducting or planning clinical programs of its proprietary SynCon® immunotherapies for HPV-caused pre-cancers and cancers; prostate, breast, lung and pancreatic cancers; hepatitis B virus ("HBV"); HIV; Ebola; Middle East Respiratory Syndrome ("MERS"); and Zika virus.
The Company's partners and collaborators include MedImmune, LLC, The Wistar Institute, University of Pennsylvania, GeneOne Life Science Inc. ("GeneOne"), Regeneron Pharmaceuticals, Inc., Genentech, Inc., Plumbline Life Sciences, Inc., the Parker Institute for Cancer Immunotherapy, Drexel University, National Microbiology Laboratory of the Public Health Agency of Canada, National Institute of Allergy and Infectious Diseases (“NIAID”), United States Military HIV Research Program (“USMHRP”), U.S. Army Medical Research Institute of Infectious Diseases (“USAMRIID”), National Institutes of Health ("NIH"), HIV Vaccines Trial Network (“HVTN”) and Defense Advanced Research Projects Agency (“DARPA”).
Inovio was incorporated in Delaware in June 2001 and has its principal executive offices in Plymouth Meeting, Pennsylvania.

2. Summary of Significant Accounting Policies

Basis of Presentation
Inovio incurred a net loss attributable to common stockholders of $88.2 million for the year ended December 31, 2017. Inovio had working capital of $103.0 million and an accumulated deficit of $523.4 million as of December 31, 2017. The Company’s ability to continue its operations is dependent upon its ability to obtain additional capital in the future and achieve profitable operations. The Company expects to continue to rely on outside sources of financing to meet its capital needs and the Company may never achieve positive cash flow. These consolidated financial statements do not include any adjustments to the specific amounts and classifications of assets and liabilities, which might be necessary should Inovio be unable to continue as a going concern. Inovio’s consolidated financial statements as of and for the year ended December 31, 2017 have been prepared on a going concern basis, which contemplates the realization of assets and the settlement of liabilities and commitments in the normal course of business for the foreseeable future. The Company has evaluated subsequent events after the balance sheet date through the date it issued these financial statements.
Consolidation
These consolidated financial statements include the accounts of Inovio Pharmaceuticals, Inc. and its subsidiaries. In conjunction with the acquisition in June 2009 of VGX Pharmaceuticals, the Company acquired a majority interest in VGX Animal Health and an equity interest in GeneOne, a publicly-traded company in South Korea. In addition to VGX Pharmaceuticals and VGX Animal Health, the Company consolidates its wholly owned subsidiaries Genetronics, Inc. and GENEOS Therapeutics, Inc., and recorded a non-controlling interest for the 15% of VGX Animal Health it did not own as of December 31, 2017 and 2016. The Company's investment in GeneOne is recorded as investment in affiliated entity within the consolidated balance sheets and is accounted for at fair value at each reporting date, with changes in fair value recorded on the consolidated statements of operations within gain (loss) on investment in affiliated entity. All intercompany accounts and transactions have been eliminated upon consolidation.
Segment Reporting
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 in making decisions regarding resource allocation and assessing performance. The Company views its operations and manages its business as one segment operating

primarily within the United States.

Use of Estimates

The preparation of consolidated financial statements in accordance with United States generally accepted accounting principles requires the Company to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses, and related disclosure of contingent assets and liabilities. Inovio bases its estimates on historical

experience and on various other assumptions that are believed to be reasonable under the circumstances, the results of which form the basis for making judgments about the carrying values of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions. On an ongoing basis, the Company reviews its estimates to ensure that these estimates appropriately reflect changes in the business or as new information becomes available.

Concentration of Credit Risk

Financial instruments, that potentially subject the Company to concentrations of credit risk, consist primarily of cash and short-term investments. The Company limits its exposure to credit loss by placing its cash and investments with high credit quality financial institutions. Additionally, the Company has established guidelines regarding diversification of its investments and their maturities which are designed to maintain principal and maximize liquidity. The Company has contracts with certain of its customers that have represented more than 10% of the Company's total revenues, as discussed in Note 6.

Fair value of Financial Instruments

The Company’s financial instruments consist principally of cash equivalents, short-term investments and investments in affiliated entities. The carrying amounts of cash equivalents approximate the related fair values due to the short-term maturities of these instruments. Investments consist of available-for-sale securities that are reported at fair value with the related unrealized gains and losses included in accumulated other comprehensive income (loss), a component of consolidated stockholders’ equity. The Company's investment in Plumbline Life Sciences, Inc. (“PLS”), an affiliated entity, is accounted for as an available-for sale security. The Company’s investment in GeneOne, an affiliated entity, is accounted for at fair value on a recurring basis, with changes in fair value recorded on the consolidated statements of operations within gain (loss) from investment in affiliated entity.

Cash and Cash Equivalents

Cash equivalents are considered by the Company to be highly liquid investments purchased with original maturities of three months or less from the date of purchase. Cash and cash equivalents include certain money market accounts at December 31, 2017 and 2016.

Investments

The Company defines investments as income-yielding securities that can be readily converted into cash or equity investments classified as available-for-sale. Investments include mutual funds, United States corporate debt securities and an equity investment in the Company's affiliated entity PLS at December 31, 2017 and 2016.

Accounts Receivable

Accounts receivable are recorded at invoiced amounts and do not bear interest. The Company performs ongoing credit evaluations of its customers’ financial condition. Credit is extended to customers as deemed necessary and generally does not require collateral. Management believes that the risk of loss is significantly reduced due to the quality and financial position of the Company's customers. No allowance for doubtful accounts was deemed necessary at December 31, 2017 and 2016.

Fixed Assets

Property and equipment are stated at cost and depreciated using the straight-line method over the estimated useful life of the assets, generally three to five years. Leasehold improvements are amortized over the shorter of the remaining term of the related leases or the estimated economic useful lives of the improvements. Repairs and maintenance are expensed as incurred.

Long-Lived Assets

All long-lived assets are reviewed for impairment in value when changes in circumstances dictate, based upon undiscounted future operating cash flows, and appropriate losses are recognized and reflected in current earnings, to the extent the carrying amount of an asset exceeds its estimated fair value determined by the use of appraisals, discounted cash flow analyses or comparable fair values of similar assets. The Company has not recognized any losses on long-lived assets through December 31, 2017.

Valuation of Intangible Assets and Goodwill

Intangible assets are amortized over their estimated useful lives ranging from 2 to 18 years. Acquired intangible assets are continuously being developed for the future economic viability contemplated at the time of acquisition. The Company is concurrently conducting preclinical studies and clinical trials using the acquired intangibles and has entered into licensing agreements for the use of these acquired intangibles.

Historically, the Company has recorded patents at cost and amortized these costs using the straight-line method over the expected useful lives of the patents or 17 years, whichever is less. Patent cost consists of the consideration paid for patents and related legal costs. Effective as of the acquisition of VGX in 2009, all new patent costs are being expensed as incurred, with patent costs capitalized as of that date continuing to be amortized over the expected life of the patent. License costs are recorded based on the fair value of consideration paid and are amortized using the straight-line method over the shorter of the expected useful life of the underlying patents or the term of the related license agreement to the extent the license has an alternative future use. As of December 31, 2017 and 2016, the Company's intangible assets resulting from the acquisition of VGX, Inovio AS and Bioject, and additional intangibles including previously capitalized patent costs and license costs, net of accumulated amortization, totaled $6.0 million and $7.6 million, respectively.

The determination of the value of intangible assets requires management to make estimates and assumptions that affect the Company's consolidated financial statements. The Company assesses potential impairments to intangible assets when there is evidence that events or changes in circumstances indicate that the carrying amount of an asset may not be recovered. The Company's judgments regarding the existence of impairment indicators and future cash flows related to intangible assets are based on operational performance of its acquired businesses, market conditions and other factors. If impairment is indicated, the Company will reduce the carrying value of the intangible asset to fair value. While current and historical operating and cash flow losses are potential indicators of impairment, the Company believes the future cash flows to be received from its intangible assets will exceed the intangible assets' carrying value, and accordingly, the Company has not recognized any impairment losses through December 31, 2017.

Goodwill represents the excess of acquisition cost over the fair value of the net assets of acquired businesses. Goodwill is reviewed for impairment at least annually at November 30, or more frequently if an event occurs indicating the potential for impairment. During its goodwill impairment review, the Company may assess qualitative factors to determine whether it is more likely than not that the fair value of its reporting unit is less than its carrying amount, including goodwill. The qualitative factors include, but are not limited to, macroeconomic conditions, industry and market considerations, and the overall financial performance of the Company. If, after assessing the totality of these qualitative factors, the Company determines that it is not more likely than not that the fair value of its reporting unit is less than its carrying amount, then no additional assessment is deemed necessary. Otherwise, the Company proceeds to perform the two-step test for goodwill impairment. The first step involves comparing the estimated fair value of the reporting unit with its carrying value, including goodwill. If the carrying amount of the reporting unit exceeds its fair value, the Company performs the second step of the goodwill impairment test to determine the amount of loss, which involves comparing the implied fair value of the goodwill to the carrying value of the goodwill. The Company may also elect to bypass the qualitative assessment in a period and elect to proceed to perform the first step of the goodwill impairment test. The Company performed its annual assessment for goodwill impairment as of November 30, 2017, identifying no impairment.

Although there are inherent uncertainties in this assessment process, the estimates and assumptions the Company is using are consistent with its internal planning. If these estimates or their related assumptions change in the future, the Company may be required to record an impairment charge on all or a portion of its goodwill and intangible assets. Furthermore, the Company cannot predict the occurrence of future impairment triggering events nor the impact such events might have on its reported asset values. Future events could cause the Company to conclude that impairment indicators exist and that goodwill or other intangible assets associated with its acquired businesses are impaired. Any resulting impairment loss could have an adverse impact on the Company's results of operations. See Note 8 for further discussion of the Company's goodwill and intangible assets.

Income Taxes

The Company recognizes deferred tax assets and liabilities for temporary differences between the financial reporting basis and the tax basis of the Company's assets and liabilities along with net operating loss and tax credit carry forwards. The Company records a valuation allowance against its deferred tax assets to reduce the net carrying value

to an amount that it believes is more likely than not to be realized. When the Company establishes or reduces the valuation allowance against its deferred tax assets, its provision for income taxes will increase or decrease, respectively, in the period such determination is made.

Valuation allowances against the Company's deferred tax assets were $94.0 million and $113.4 million at December 31, 2017 and 2016, respectively. Changes in the valuation allowances, when they are recognized in the provision for income taxes, are included as a component of the estimated annual effective tax rate.

Revenue Recognition

The Company recognizes revenues when all four of the following criteria are met: (1) persuasive evidence of an arrangement exists; (2) delivery of the products and/or services has occurred; (3) the selling price is fixed or determinable; and (4) collectability is reasonably assured.

Grant revenue

The Company receives non-refundable grants under available government programs. Government grants towards current expenditures are recorded as revenue when there is reasonable assurance that the Company has complied with all conditions necessary to receive the grants, collectability is reasonably assured and the related expenditures are incurred.

License fee and milestone revenue

The Company has adopted a strategy of co-developing or licensing its gene delivery technology for specific genes or specific medical indications. Accordingly, the Company has entered into collaborative research and development agreements and has received third-party funding for pre-clinical research and clinical trials. Agreements that contain multiple elements are analyzed to determine whether the deliverables within the agreement can be separated or whether they must be accounted for as a single unit of accounting in accordance with the FASB's Accounting Standards Update (“ASU”) No. 2009-13, Revenue Recognition (Topic 605): Multiple-Deliverable Revenue Arrangements. Analyzing the arrangement to identify deliverables requires the use of judgment, and each deliverable may be an obligation to deliver services, a right or license to use an asset, or another performance obligation. The delivered item(s) were considered a separate unit of accounting if all of the following criteria were met: (1) the delivered item(s) has value to the customer on a standalone basis; (2) there is objective and reliable evidence of the fair value of the undelivered item(s); and (3) if the arrangement includes a general right of return relative to the delivered item, delivery or performance of the undelivered item(s) is considered probable and substantially in the Company's control. If these criteria were not met, the deliverable was combined with other deliverables in the arrangement and accounted for as a combined unit of accounting.

Arrangement consideration is allocated at the inception of the agreement to all identified units of accounting based on their relative selling price. The relative selling price for each deliverable is determined using vendor specific objective evidence (“VSOE”) of selling price or third-party evidence of selling price if VSOE does not exist. If neither VSOE nor third-party evidence of selling price exists, the Company uses its best estimate of the selling price for the deliverable. The amount of allocable arrangement consideration is limited to amounts that are fixed or determinable. The consideration received is allocated among the separate units of accounting, and the applicable revenue recognition criteria are applied to each of the separate units. Changes in the allocation of the sales price between delivered and undelivered elements can impact revenue recognition but do not change the total revenue recognized under any agreement.

Upfront license fee payments are recognized upon delivery of the license if facts and circumstances dictate that the license has standalone value from the undelivered items, the relative selling price allocation of the license is equal to or exceeds the upfront license fee, persuasive evidence of an arrangement exists, the price to the collaborator is fixed or determinable, and collectability is reasonably assured. Upfront license fee payments are deferred if facts and circumstances dictate that the license does not have standalone value. The determination of the length of the period over which to defer revenue is subject to judgment and estimation and can have an impact on the amount of revenue recognized in a given period.

The Company applies ASU No. 2010-17, Revenue Recognition (Topic 605): Milestone Method of Revenue Recognition (“Milestone Method”). Under the Milestone Method, the Company will recognize consideration that is contingent upon the achievement of a milestone in its entirety as revenue in the period in which the milestone is achieved only if the milestone is substantive in its entirety. A milestone is considered substantive when it meets all of the following criteria:

1. The consideration is commensurate with either the entity's performance to achieve the milestone or the enhancement of the value of the delivered item(s) as a result of a specific outcome resulting from the entity's performance to achieve the milestone,
2. The consideration relates solely to past performance, and
3. The consideration is reasonable relative to all of the deliverables and payment terms within the arrangement.

A milestone is defined as an event (i) that can only be achieved based in whole or in part on either the entity's performance or on the occurrence of a specific outcome resulting from the entity's performance, (ii) for which there is substantive uncertainty at the date the arrangement is entered into that the event will be achieved and (iii) that would result in additional payments being due to the Company.

Business Combinations

The cost of an acquired business is assigned to the tangible and identifiable intangible assets acquired and liabilities assumed on the basis of the estimated fair values at the date of acquisition. The Company assesses fair value, which is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date, using a variety of methods including, but not limited to, an income approach and a market approach such as the estimation of future cash flows of acquired business and current selling prices of similar assets. Fair value of the assets acquired and liabilities assumed, including intangible assets, are measured based on the assumptions and estimations with regards to the variable factors such as the amount and timing of future cash flows for the asset or liability being measured, appropriate risk-adjusted discount rates, nonperformance risk, or other factors that market participants would consider. Upon acquisition, the Company determines the estimated economic lives of the acquired intangible assets for amortization purposes, which are based on the underlying expected cash flows of such assets. Goodwill is an asset representing the future economic benefits arising from other assets acquired in a business combination that is not individually identified and separately recognized. Actual results may vary from projected results and assumptions used in the fair value assessments.

Research and Development Expenses

The Company’s activities have largely consisted of research and development efforts related to developing electroporation delivery technologies and DNA immunotherapies and vaccines. Research and development expenses consist of expenses incurred in performing research and development activities including salaries and benefits, facilities and other overhead expenses, clinical trials, contract services and other outside expenses. Research and development expenses are charged to operations as they are incurred. These expenses result from the Company's independent research and development efforts as well as efforts associated with collaborations and licensing arrangements. The Company reviews and accrues clinical trial expense based on work performed, which relies on estimates of total costs incurred based on patient enrollment, completion of studies and other events. The Company follows this method since reasonably dependable estimates of the costs applicable to various stages of a research agreement or clinical trial can be made. Accrued clinical trial costs are subject to revisions as trials progress. Revisions are charged to expense in the period in which the facts that give rise to the revision become known. Historically, revisions have not resulted in material changes to research and development expense; however, a modification in the protocol of a clinical trial or cancellation of a trial could result in a charge to the Company's results of operations.

Net Loss Per Share

Basic net loss per share is computed by dividing the net loss for the year by the weighted average number of common shares outstanding during the year. Diluted net loss per share is calculated in accordance with the treasury stock method and reflects the potential dilution that would occur if securities or other contracts to issue common stock were exercised or converted to common stock. The calculation of diluted net loss per share requires that, to the extent the average market price of the underlying shares for the reporting period exceeds the exercise price of the warrants and the presumed exercise of such securities are dilutive to net loss per share for the period, an adjustment to net loss used in the calculation is required to remove the change in fair value of the warrants from the numerator for the period. Likewise, an adjustment to the denominator is required to reflect the related dilutive shares, if any, under the treasury stock method.

The following tables reconcile the components of the numerator and denominator included in the calculations of diluted net loss per share:

| | Year Ended December 31, | | |
|---|---|---|---|
| | 2017 | 2016 | 2015 |
| Numerator | | | |
| Net loss attributable to Inovio Pharmaceuticals, Inc. | $(88,205,772) | $(73,740,339) | $(29,187,606) |
| Adjustment for decrease in fair value of warrant liability | (806,819) | — | (721,591) |
| Numerator for use in diluted net loss per share | $(89,012,591) | $(73,740,339) | $(29,909,197) |
| | | | |
| Denominator | | | |
| Weighted average number of common shares outstanding | 81,777,493 | 73,214,766 | 68,198,142 |
| Effect of dilutive potential common shares from warrants | 140,529 | — | 167,123 |

| | | | |
|---|---|---|---|
| Denominator for use in diluted net loss per share | 81,918,022 | 73,214,766 | 68,365,265 |
| Net loss per share, diluted | $(1.09) | $(1.01) | $(0.44) |

The following table summarizes potential shares of common stock that were excluded from diluted net loss per share calculation because of their anti-dilutive effect:

| | Year Ended December 31, | | |
|---|---|---|---|
| | 2017 | 2016 | 2015 |
| Options to purchase common stock | 7,694,870 | 6,806,183 | 5,862,364 |
| Warrants to purchase common stock | — | 284,091 | 276,813 |
| Restricted stock units | 1,234,168 | 798,834 | 230,000 |
| Convertible preferred stock | 8,456 | 8,456 | 8,456 |
| Total | 8,937,494 | 7,897,564 | 6,377,633 |

Leases

Leases are classified as either capital or operating leases. Leases which transfer substantially all of the benefits and risks incidental to the ownership of assets are accounted for as if there was an acquisition of an asset and incurrence of an obligation at the inception of the lease. All other leases are accounted for as operating leases. Inovio's Plymouth Meeting, PA headquarters and San Diego, CA facility leases, which have escalating payments, are expensed on a straight-line basis over the term of the lease. The allowance provided by the lessor for non-structural, normal leasehold improvements are considered tenant incentives and are amortized on a straight-line basis over the term of the lease. These leases represent the primary expense and commitment as indicated in Note 11, "Commitments". Other leases exist for office machinery, such as copiers, wherein lease expense is recorded as incurred.

Stock-Based Compensation

The Company incurs stock-based compensation expense related to restricted stock units and stock options. The fair value of restricted stock units is determined by the closing price of the Company's common stock reported on the NASDAQ Global Select Market on the date of grant. The Company estimates the fair value of stock options granted using the Black-Scholes option pricing model. The Black-Scholes option pricing model was developed for use in estimating the fair value of traded options, which have no vesting restrictions and are fully transferable. In addition, option valuation models require the input of highly subjective assumptions, including the expected stock price volatility and expected option life. The Company amortizes the fair value of the awards on a straight-line basis over the requisite vesting period of the awards. Expected volatility is based on historical volatility. The expected life of options granted is based on historical expected life. The risk-free interest rate is based on the U.S. Treasury yield in effect at the time of grant. The dividend yield of zero is based on the fact that no dividends have been paid historically and none are currently expected to be paid in the foreseeable future. Upon adoption of ASU 2016-09 on January 1, 2017, the Company elected to remove the forfeiture rate from the calculation and recorded a cumulative catch-up adjustment to accumulated deficit with a corresponding offset to additional paid-in-capital of $312,000. Previously, the forfeiture rate was based on historical data and the Company recorded stock-based compensation expense only for those awards that were expected to vest.

The weighted average assumptions used in the Black-Scholes model for option grants to employees and directors are presented below:

| | Year Ended December 31, | | |
|---|---|---|---|
| | 2017 | 2016 | 2015 |
| Risk-free interest rate | 2.20% | 0.91% | 0.99% |
| Expected volatility | 73% | 76% | 74% |
| Expected life in years | 6 | 5 | 5 |
| Dividend yield | — | — | — |
| Forfeiture rate | N/A | 7% | 7% |

Stock based compensation expense related to stock options granted to non employees is recognized based on the fair value of the stock options, determined using the Black Scholes option pricing model, as they are earned. The fair value of the non-employee options is remeasured at each reporting period.

Assumptions used in the Black-Scholes model for non-employees are presented below:

| | Year Ended December 31, | | |
|---|---|---|---|
| | 2017 | 2016 | 2015 |
| Risk-free interest rate | 2.4%-2.6% | 2.3%-2.5% | 2.1%-2.3% |
| Expected volatility | 97%-102% | 71%-104% | 105%-108% |
| Expected life in years | 9-10 | 7-10 | 7-10 |
| Dividend yield | — | — | — |

Recent Accounting Pronouncements - Recently Adopted

ASU No. 2016-09. In March 2016, the FASB issued ASU No. 2016-09, Compensation-Stock Compensation-Improvements to Employee Share-Based Payment Accounting. The new guidance simplifies several aspects of the accounting for share-based payment transactions, including the income tax consequences, classification of awards as either equity or liabilities, and classification on the statement of cash flows. The amendments in this standard were effective for the Company's annual year and first fiscal quarter beginning on January 1, 2017 with early adoption permitted. The Company adopted this guidance as of January 1, 2017 using a modified retrospective transition method. As a result of the adoption of this standard, the Company elected to change its policy from estimating forfeitures to recognizing forfeitures when they occur. The Company recorded an adjustment of $312,000 to accumulated deficit with a corresponding offset to additional paid-in-capital at January 1, 2017. The Company also reversed a deferred tax asset related to the balance of unrecognized excess tax benefits of $1.1 million, with an offsetting adjustment to the valuation allowance.

Recent Accounting Pronouncements

The recent accounting pronouncements below may have a significant effect on the Company's financial statements. Recent accounting pronouncements that are not anticipated to have an impact on or are unrelated to the Company's financial condition, results of operations, or related disclosures are not discussed.

ASU No. 2014-09. In May 2014, the FASB issued ASU No. 2014-09, Revenue from Contracts with Customers ("Topic 606”), which amended the existing accounting standards for revenue recognition, outlines a comprehensive revenue recognition model and supersedes most current revenue recognition guidance. The new standard requires a company to recognize revenue upon transfer of goods or services to a customer at an amount that reflects the expected consideration to be received in exchange for those goods or services. The amended guidance defines a five-step approach for recognizing revenue, which will require a company to use more judgment and make more estimates than under the current guidance. The Company adopted this new standard effective January 1, 2018, using the modified retrospective transition method. Under this method, the Company’s results will remain as reported and starting in 2018 will be under the new method. The Company has completed its preliminary evaluation of the impact of adoption of Topic 606 on certain of its existing agreements as follows:

Collaboration Agreement with MedImmune

The Company has determined that no cumulative catch-up adjustment is required.

The Company expects the accounting for contingent milestone payments to be a significant change in accounting for its license and collaboration agreements. Topic 605 provides guidance specific to the accounting for milestone payments, including the ability to defer the recognition of any milestones until received and, if certain criteria are met, the ability to recognize milestone payments as revenue when received. However, Topic 606 does not contain guidance specific to milestone payments, thereby requiring potential milestone payments to be considered in accordance with the overall model of Topic 606. As a result, revenues from contingent milestone payments may be recognized earlier under Topic 606 than under Topic 605, based on an assessment of the probability of achievement of the milestone and the likelihood of a significant reversal of such milestone revenue at each reporting date. This assessment may result in recognizing milestone revenue before the milestone event has been achieved. In addition, Topic 606 changes guidance regarding the accounting for variable consideration received from licensees, which may impact the estimation of, and determination of the timing of, the related revenue recognition

Grant Agreements

The Company has determined that as of January 1, 2018, accounting for the Company’s various grant agreements falls under the contributions guidance under Subtopic 958-605, Not-for-Profit Entities-Revenue Recognition, which is outside the scope of Topic 606, as the government agencies granting the Company funds are not receiving reciprocal value for their contributions. Beginning on January 1, 2018, all contributions received from current grant agreements

will be recorded as a contra-expense as opposed to revenue on the consolidated statement of operations. New grant agreements will be evaluated to determine if they represent contribution transactions or exchange transactions. If the Company performs research and development services with no performance obligations to provide the agency granting the funds reciprocal value for the contributions received, then the consideration received under the grant would result in amounts recognized as contra expense, as opposed to revenue.

ASU No. 2016-01. In January 2016, the FASB issued ASU No. 2016-01, Recognition and Measurement of Financial Assets and Financial Liabilities. The amended guidance requires the Company to measure and record equity investments, except those accounted for under the equity method of accounting that have a readily determinable fair value, at fair value and for the Company to recognize the changes in fair value in its consolidated statements of operations, instead of recognizing unrealized gains and losses through accumulated other comprehensive income (loss), as currently done under the existing guidance. The amended guidance also changes several disclosure requirements for financial instruments, including the methods and significant assumptions used to estimate fair value. The standard is effective for annual reporting periods beginning after December 15, 2017, including interim periods within those annual reporting periods. The Company will adopt this guidance on January 1, 2018 and will make any adjustments to beginning balances through a cumulative-effect adjustment to accumulated deficit on that date. The Company has evaluated the impact of the adoption of this accounting standard and expects it to have no impact on its financial statements and related disclosures.

ASU No. 2016-02. In February 2016, the FASB issued ASU No. 2016-02, Leases. Under the new guidance, lessees will be required to recognize the following for all leases (with the exception of short-term leases) at the commencement date: (a) a lease liability, which is a lessee’s obligation to make lease payments arising from a lease, measured on a discounted basis; and (b) a right-of-use asset, which is an asset that represents the lessee’s right to use, or control the use of, a specified asset for the lease term. The ASU will be effective for the Company beginning January 1, 2019 with early adoption permitted. The Company is currently evaluating the impact of the application of this accounting standard update on its financial statements and related disclosures.

3. Collaborative Agreements

MedImmune

On August 7, 2015, The Company entered into a license and collaboration agreement with MedImmune, the global biologics research and development arm of AstraZeneca. Under the agreement, MedImmune acquired exclusive rights to the Company's INO-3112 immunotherapy, renamed as MEDI0457, which targets cancers caused by human papillomavirus (HPV) types 16 and 18. MedImmune made an upfront payment of $27.5 million to the Company in September 2015 and has agreed to make additional future development, regulatory and commercial event based payments totaling up to $700 million. MedImmune will fund all development costs associated with INO-3112 immunotherapy. The Company is entitled to receive up to mid-single to double-digit tiered royalties on INO-3112 product sales. Within the broader collaboration, the Company and MedImunne will attempt to develop up to two additional DNA-based cancer vaccine products not included in the Company's current product pipeline, which MedImmune will have the exclusive rights to develop and commercialize. The Company has assessed event-based payments under the authoritative guidance for research and development milestones and determined that none of the event- based payments represent a milestone under the milestone method of accounting.

The Company identified the deliverables at the inception of the agreement. The Company has determined that the license to INO-3112, the license for the research collaboration products with related research and development services and the product development services for INO-3112 individually represent separate units of accounting because each deliverable has standalone basis. The Company considered the provisions of the multiple-element arrangement guidance in determining whether the deliverables outlined above have standalone basis and thus should be treated as separate units of accounting. The Company determined that the license for INO-3112, the license for the research collaboration products with related research and development services, and the product development services for INO-3112 have standalone basis and represent separate units of accounting because the rights conveyed permit MedImmune to perform all efforts necessary to complete development, commercialize and begin selling the product upon regulatory approval. In addition, MedImmune has the appropriate development, regulatory and commercial expertise with products similar to the product licensed under the agreement and has the ability to engage third parties to manufacture the product allowing MedImmune to realize the value of the license without receiving any of the remaining deliverables. MedImmune can also sublicense its license rights to third parties. Also, the Company determined that the product development services for INO-3112 represents an individual unit of accounting as MedImmune could perform such services and/or could acquire these on a separate basis. The best estimated selling prices for these units of accounting were determined based on market conditions, the terms of comparable

collaborative agreements for similar technology in the pharmaceutical and biotechnology industry, the Company's pricing practices and pricing objectives and the nature of the research and development services to be provided. While market data and the cost-to-recreate method under the cost approach were considered throughout the valuation process, ultimately, the estimated selling prices of the licenses were determined utilizing two forms of the relief from royalty method under the income approach. The arrangement consideration was allocated to the deliverables based on the relative selling price method.

The amount allocable to the delivered unit or units of accounting is limited to the amount that is considered fixed and determinable and is not contingent upon the delivery of additional items or meeting other specified performance conditions. Based on the results of the Company's analysis, the $27.5 million up-front payment was allocated as follows: $15.0 million to the product license to INO-3112 and $12.5 million for the license to the research collaboration products and related research and developments services. The amount allocated to the license for INO-3112 was recognized as revenue under collaborative

research and development arrangements during the year ended December 31, 2015 as this was determined to be earned upon the granting of the license and delivery of the related knowledge and data. The remaining amount related to the research collaboration products and related research and development services of $12.5 million was recognized as revenue under collaboration research and development arrangements during the quarter ended June 30, 2017, upon selection of the first research collaboration product candidate by MedImmune. The Company believes that no substantive value related to the research collaboration products license and research services was transferred to MedImmune prior to their selection of the first research collaboration product since there was no economic benefit from the research unless such product candidate was selected. Therefore, the Company believes the license for the research collaboration products was delivered and the research services were completed upon the selection of the product candidate by MedImmune in June 2017. The Company performs certain product development services for INO-3112 and is reimbursed by MedImmune for these services. The Company recognizes revenues associated with these services as revenues under collaborative arrangements as the related services are performed and according to the relative selling price method of the allocable arrangement consideration. In December 2017, the Company received a $7.0 million milestone payment from MedImmune triggered by the initiation of the Phase 2 portion of an ongoing clinical trial under the agreement. This amount was recognized in full as revenue for the year ended December 31, 2017. During the years ended December 31, 2017 and 2016, the Company recognized revenues of $22.3 million and $1.5 million from MedImmune, respectively. As of December 31, 2017 and 2016, the Company has a deferred revenue balance of $1.1 million and $13.7 million, respectively, related to the Agreement. As of December 31, 2017 and 2016, the Company had an accounts receivable balance of $1.7 million and $1.2 million, respectively, related to the collaboration agreement with MedImmune.

Roche

In September 2013, the Company entered into a Collaborative, License, and Option Agreement with Roche and received an upfront payment of $10.0 million. The parties agreed to co-develop multi-antigen DNA immunotherapies targeting prostate cancer and hepatitis B.

On November 14, 2014, Roche provided notice to the Company that it would be partially terminating the agreement with respect to the development of the Company’s DNA immunotherapy targeting prostate cancer. The termination was effective in February 2015. All of Roche’s rights to the Company’s DNA immunotherapy targeting prostate cancer, including the right to license the product to other parties, have been returned to the Company.

On July 28, 2016, Roche provided notice to the Company that it would be discontinuing the agreement and its development of INO-1800, the Company’s DNA immunotherapy against the hepatitis B virus. The termination was effective in October 2016. All of Roche’s rights to INO-1800, including the right to license the product to other parties, have been returned to the Company. In February 2017, the Company received full payment of $8.5 million from Roche for its past and future obligations associated with the termination of the agreement.

The Company identified the deliverables at the inception of the agreement. The Company determined that the license to the targets, the option right to license additional vaccines, research and development services, manufacturing and drug supply, and participation in the joint steering committee individually represented separate units of accounting because each deliverable had standalone value. The amount allocable to the delivered unit or units of accounting using the best estimated selling price was limited to the amount that was considered fixed and determinable and was not contingent upon the delivery of additional items or meeting other specified performance conditions.

Based on the results of the Company's analysis, the $10.0 million up-front payment was allocated as follows: $8.4 million to the license to the targets, $1.5 million to the option right and $155,000 to the joint steering committee obligation. The amounts allocated to the licenses for the targets was recognized as revenue in 2013 as these were determined to be earned upon the granting of the license and delivery of the related knowledge and data. The Company recognized revenues associated with research and development services and manufacturing and drug supply as revenues under collaborative arrangements as the related services were performed and according to the relative selling price method of the allocable arrangement consideration. During the years ended December 31, 2017 and 2016, the Company recognized revenues of $6.1 million and $4.9 million from Roche, respectively. As of December 31, 2017 and 2016, the Company has an accounts receivable balance of $0 and $2.4 million, respectively, related to the Roche Agreement.

DARPA- Ebola

In April 2015, the Company received a grant from the Defense Advanced Research Projects Agency ("DARPA") to lead a collaborative team to develop multiple treatment and prevention approaches against Ebola. The consortium, led by the Company, is taking a multi-faceted approach to develop products to prevent and treat Ebola infection. The award covers pre-clinical development costs as well as good manufacturing practice manufacturing costs and the Phase 1 clinical study costs. The funding period is over two years and covers a base award of $19.6 million and an option award of $24.6 million, which was exercised in September 2015. The development proposal includes a second option of $11.1 million to support additional product supply and clinical development activities. The options are contingent upon the successful completion of certain pre-

clinical development milestones. During the years ended December 31, 2017 and 2016, the Company recognized revenues of $9.8 million and $22.4 million, respectively, from DARPA related to the grant. As of December 31, 2017 and 2016, the Company had a deferred revenue balance of $149,000 and $1.2 million, respectively, related to the DARPA grant. As of December 31, 2017 and 2016, the Company had an accounts receivable balance of $4.1 million and $9.2 million, respectively, related to the DARPA grant.

ApolloBio Corporation

On December 29, 2017, the Company entered into an Amended and Restated License and Collaboration Agreement, or the ApolloBio Agreement, with ApolloBio Corporation, or ApolloBio. Under the terms of the ApolloBio Agreement, the Company has granted to ApolloBio the exclusive right to develop and commercialize VGX-3100, its DNA immunotherapy product designed to treat pre-cancers caused by HPV, within the territories of China, Hong Kong, Macao and Taiwan. The territory may be expanded to include Korea in the event that no patent covering VGX-3100 issues in China within the three years following the Effective Date of the ApolloBio Agreement, as defined below.

Under the ApolloBio Agreement, ApolloBio will pay the Company an upfront payment of $23.0 million, and such payment is to be made within three business days following the date of approval of the ApolloBio Agreement by ApolloBio’s board of directors and shareholders, or the Effective Date, which the Company expects to occur in the first quarter of 2018. In the event that such upfront payment is not made on or before April 7, 2018, the Company has the right to terminate the Agreement in its entirety.

In addition to the upfront payment, the Company is entitled to receive up to an aggregate of $20.0 million upon the achievement of specified milestones related to the regulatory approval of VGX-3100 in the United States, China and Korea. In the event that VGX-3100 is approved for marketing, the Company will be entitled to receive royalty payments based on a tiered percentage of annual net sales, with such percentage being in the low- to mid-teens, subject to reduction in the event of generic competition in a particular territory. ApolloBio’s obligation to pay royalties will continue for 10 years after the first commercial sale in a particular territory or, if later, until the expiration of the last-to-expire patent covering the licensed products in the specified territory.

4. Investments

Investments at December 31, 2017 and 2016 consisted of mutual funds, United States corporate debt securities and an equity investment in the Company's affiliated entity PLS. The Company classifies all investments as available-for-sale, as the sale of such investments may be required prior to maturity to implement management strategies. Available-for-sale securities are recorded at fair value, based on current market valuations. Unrealized gains and losses on available-for-sale securities are excluded from earnings and are reported as a separate component of other comprehensive loss until realized. Realized gains and losses are included in non-operating other income (expense) on the consolidated statement of operations and are derived using the specific identification method for determining the cost of the securities sold. During the years ended December 31, 2017 and 2016, net realized loss on investments of $215,000 and $139,000 was recorded, respectively. The Company assessed each of its investments on an individual basis to determine if any decline in fair value was other-than-temporary. There were no impairments considered to be other-than-temporary during the years ended December 31, 2017 and 2016. Interest and dividends on investments classified as available-for-sale are included in interest and other income, net, in the consolidated statements of operations. As of December 31, 2017, the Company had 42 available-for-sale securities in a gross unrealized loss position, of which 16 with an aggregate total unrealized loss of $108,000 were in such position for longer than 12 months.

The following is a summary of available-for-sale securities as of December 31, 2017 and 2016:

| | As of December 31, 2017 | | | |
|---|---|---|---|---|
| | Contractual Maturity (in years) | Cost | Gross Unrealized Gains | Gross Unrealized Losses | Fair Market Value |
| Mutual funds | --- | $68,776,165 | $ 42,097 | $ (252,373) | $ 68,565,889 |
| US corporate debt securities | Less than 2 | 35,210,121 | 3,032 | (140,198) | 35,072,955 |
| | --- | — | 2,325,079 | — | 2,325,079 |

| | | | | |
|---|---|---|---|---|
| Investment in affiliated entity (PLS) | | | | |
| Total investments | $103,986,286 | $ 2,370,208 | $ (392,571 ) | $ 105,963,923 |

| | As of December 31, 2016 | | | |
|---|---|---|---|---|
| | Contractual Maturity (in years) | Cost | Gross Unrealized Gains | Gross Unrealized Losses | Fair Market Value |
| Mutual funds | --- | $60,883,065 | $ 94,374 | $ (387,693) | $ 60,589,746 |
| US corporate debt securities | Less than 2 | 25,098,122 | 6,853 | (65,309) | 25,039,666 |
| Investment in affiliated entity (PLS) | --- | — | 3,777,510 | — | 3,777,510 |
| Total investments | | $85,981,187 | $ 3,878,737 | $ (453,002) | $ 89,406,922 |

5. Marketable Securities and Fair Value Measurements

The guidance regarding fair value measurements establishes a three-tier fair value hierarchy which prioritizes the inputs used in measuring fair value. These tiers include: Level 1, defined as observable inputs such as quoted prices in active markets that are accessible at the measurement date; Level 2, defined as inputs other than quoted prices in active markets that are either directly or indirectly observable; and Level 3, defined as unobservable inputs in which little or no market data exists, therefore requiring an entity to develop its own assumptions.

Assets and liabilities are classified based on the lowest level of input that is significant to the fair value measurements. The Company reviews the fair value hierarchy classification on a quarterly basis. Changes in the ability to observe valuation inputs may result in a reclassification of levels for certain securities within the fair value hierarchy. The Company did not have any transfer of assets and liabilities between Level 1, Level 2 and Level 3 of the fair value hierarchy during the years ended December 31, 2017 and 2016.

The following table presents the Company’s assets and liabilities that are measured at fair value on a recurring basis, and are determined using the following inputs as of December 31, 2017:

| | Fair Value Measurements at December 31, 2017 | | | |
|---|---|---|---|---|
| | Total | Quoted Prices in Active Markets (Level 1) | Significant Other Unobservable Inputs (Level 2) | Significant Unobservable Inputs (Level 3) |
| Assets: | | | | |
| Money market funds | $9,843,482 | $9,843,482 | $— | $ — |
| Mutual funds | 68,565,889 | — | 68,565,889 | — |
| US corporate debt securities | 35,072,955 | — | 35,072,955 | — |
| Investments in affiliated entities | 11,394,480 | 11,394,480 | — | — |
| Total assets | $124,876,806 | $21,237,962 | $103,638,844 | $ — |
| Liabilities: | | | | |
| Common stock warrants | $360,795 | | $— | $ 360,795 |
| Total liabilities | $360,795 | | $— | $ 360,795 |

The following table presents the Company’s assets and liabilities that are measured at fair value on a recurring basis, and are determined using the following inputs as of December 31, 2016:

| | Fair Value Measurements at December 31, 2016 | | | |
|---|---|---|---|---|
| | Total | Quoted Prices in Active Markets (Level 1) | Significant Other Unobservable Inputs (Level 2) | Significant Unobservable Inputs (Level 3) |
| Assets: | | | | |
| Money market funds | $10,300,813 | $10,300,813 | $— | $— |
| Mutual funds | 60,589,746 | — | 60,589,746 | — |
| US corporate debt securities | 25,039,666 | — | 25,039,666 | — |
| Investments in affiliated entities | 19,829,575 | 19,829,575 | — | — |
| Total assets | $115,759,800 | $30,130,388 | $85,629,412 | $— |
| Liabilities: | | | | |
| Common stock warrants | $1,167,614 | $— | $— | $1,167,614 |
| Total liabilities | $1,167,614 | $— | $— | $1,167,614 |

Level 1 assets at December 31, 2017 and 2016 consisted of money market funds held by the Company that are valued at quoted market prices, as well as the Company’s investments in GeneOne and PLS (see Note 12 for additional information about the Company’s investments in these affiliated entities).

Level 2 assets at December 31, 2017 and 2016 consisted of US corporate debt securities and mutual funds held by the Company that are initially valued at the transaction price and subsequently valued, at the end of each reporting period, typically utilizing market observable data. The Company obtains the fair value of its Level 2 assets from a professional pricing service, which may use quoted market prices for identical or comparable instruments, or inputs other than quoted prices that are observable either directly or indirectly. The professional pricing service gathers quoted market prices and observable inputs from a variety of industry data providers. The valuation techniques used to measure the fair value of the Company's Level 2 financial instruments were derived from non-binding market consensus prices that are corroborated by observable market data, quoted market prices for similar instruments, or pricing models such as discounted cash flow techniques. The Company validates the quoted market prices provided by the primary pricing service by comparing their assessment of the fair values of the Company's investment portfolio balance against the fair values of the Company's investment portfolio balance obtained from an independent source.

There were no Level 3 assets held as of December 31, 2017. Level 3 assets held at December 31, 2016 consisted of a warrant received by the Company in 2012 to purchase shares of common stock of OncoSec Medical Incorporated (“OncoSec”). This warrant expired unexercised in March 2017 and was considered to have zero value as of December 31, 2016. Another warrant to purchase shares of common stock of OncoSec held by the Company expired unexercised in September 2016.

The Company recorded a change in fair value of the OncoSec warrants of $0, $(6,000) and $(544,000) for the years ended December 31, 2017, 2016 and 2015, respectively. The change in fair value is reflected in the Company's consolidated statement of operations as a component of change in fair value of common stock warrants.

Level 3 liabilities held as of December 31, 2017 and 2016 consisted of common stock warrant liabilities associated with warrants to purchase the Company's common stock issued in March 2013. If unexercised, the warrants will expire in September 2018. During the years ended December 31, 2017 and 2016, none of these warrants were exercised. See Note 10 for additional information about the warrants.

As of December 31, 2017 the Company had a $361,000 common stock warrant liability. The Company reassesses the fair value of the common stock warrants at each reporting date utilizing a Black-Scholes pricing model. Inputs used in the pricing model include estimates of stock price volatility, expected warrant life and risk-free interest rate. The Company develops its estimates based on historical data. The assumptions used to estimate the fair value of common stock warrants at December 31, 2017 and 2016 are presented below:

| | Year Ended December 31, | |
|---|---|---|
| | 2017 | 2016 |
| Risk-free interest rate | 1.75% | 1.1% |
| Expected volatility | 55% | 61% |
| Expected life in years | 0.70 | 1.70 |
| Dividend yield | — | — |

Changes in these assumptions as well as fluctuations in the Company's stock price between the valuation dates can have a significant impact on the fair value of the common stock warrant liability. As a result of these calculations, the Company recorded a decrease in fair value of $(807,000), $(134,000) and $(722,000) for the years ended December 31, 2017, 2016 and 2015, respectively. The change in fair value is reflected in the Company's consolidated statement of operations as a component of change in fair value of common stock warrants.

The following table presents the changes in fair value of the Company’s total Level 3 financial liabilities for the years ended December 31, 2017 and 2016:

| | Year Ended December 31, | |
|---|---|---|
| | 2017 | 2016 |
| Balance at beginning of year | $1,167,614 | $1,301,138 |
| Decrease in fair value included in change in fair value of common stock warrants | (806,819) | (133,524) |
| Balance at end of year | $360,795 | $1,167,614 |

6. Major Customers and Concentration of Credit Risk

| Customer | 2017 Revenue | % of Total Revenue | 2016 Revenue | % of Total Revenue | 2015 Revenue | % of Total Revenue |
|---|---|---|---|---|---|---|
| MedImmune | $22,269,773 | 53 % | $1,518,639 | 4 % | $16,037,731 | 40 % |
| DARPA | 9,983,927 | 24 | 26,602,183 | 75 | 11,582,623 | 28 |
| Roche | 6,107,254 | 14 | 4,917,929 | 14 | 10,778,688 | 27 |
| NIAID | — | — | 118,171 | — | 901,475 | 2 |
| GeneOne (affiliated entity) | 551,208 | 1 | 1,188,432 | 4 | 450,000 | 1 |
| All other | 3,307,924 | 8 | 1,023,007 | 3 | 821,594 | 2 |
| Total revenue | $42,220,086 | 100 % | $35,368,361 | 100 % | $40,572,111 | 100 % |

During the years ended December 31, 2017, 2016 and 2015, the Company recognized revenue from various license fees, collaborative research and development agreements, grants and government contracts. As of December 31, 2017, $4.1 million, or 69%, and $1.7 million, or 28%, of the Company's accounts receivable was attributable to DARPA and MedImmune, respectively. As of December 31, 2016, $12.1 million, or 73%, $2.4 million, or 15%, and $1.2 million, or 7%, of accounts receivable was attributable to DARPA, Roche and MedImmune, respectively.

The Company’s accounts receivable from DARPA includes $1.6 million of amounts that are unbilled as of December 31, 2017. Unbilled amounts range from 1 to 9 months in age and are attributable to the fact that the Company is awaiting an invoice from its sub-contractor prior to submission of an aggregate invoice to DARPA. The Company believes that all criteria for revenue recognition under SAB 104 have been met, and also anticipates that all such amounts will be invoiced and collected within the next 12 months and has included these amounts as current assets in its consolidated balance sheet.

There is minimal credit risk with these customers based upon collection history, their size and financial condition. Accordingly, the Company does not consider it necessary to record a reserve for uncollectible accounts receivable.

7. Fixed Assets

Fixed assets at December 31, 2017 and 2016 consist of the following:

| | Cost | Accumulated Depreciation and Amortization | Net Book Value |
|---|---|---|---|
| As of December 31, 2017 | | | |
| Leasehold improvements | $14,553,993 | $(2,042,871) | $12,511,122 |
| Laboratory equipment | 3,787,578 | (1,724,946) | 2,062,632 |
| Office furniture and fixtures | 3,366,896 | (1,471,705) | 1,895,191 |
| Computer equipment and other | 3,718,266 | (1,867,035) | 1,851,231 |
| | $25,426,733 | $(7,106,557) | $18,320,176 |
| As of December 31, 2016 | | | |
| Leasehold improvements | $5,248,311 | $(1,199,415) | $4,048,896 |
| Laboratory equipment | 3,534,302 | (1,072,188) | 2,462,114 |
| Office furniture and fixtures | 1,814,493 | (1,108,187) | 706,306 |
| Computer equipment and other | 3,684,521 | (1,876,391) | 1,808,130 |
| | $14,281,627 | $(5,256,181) | $9,025,446 |

Depreciation expense for the years ended December 31, 2017, 2016 and 2015 was $1.9 million, $1.7 million and $1.0 million, respectively. The Company determined that the carrying value of these long-lived assets was not impaired during the periods presented.

8. Goodwill and Intangible Assets

The following sets forth goodwill and intangible assets by major asset class:

| | | December 31, 2017 | | | December 31, 2016 | | |
|---|---|---|---|---|---|---|---|
| | Useful Life (Yrs) | Gross | Accumulated Amortization | Net Book Value | Gross | Accumulated Amortization | Net Book Value |
| Indefinite lived: | | | | | | | |
| Goodwill(a) | | $10,513,371 | $— | $10,513,371 | $10,513,371 | $— | $10,513,371 |
| Definite lived: | | | | | | | |
| Patents | 8 – 17 | 5,802,528 | (5,681,673) | 120,855 | 5,802,528 | (5,618,854) | 183,674 |
| Licenses | 8 – 17 | 1,323,761 | (1,190,609) | 133,152 | 1,323,761 | (1,161,861) | 161,900 |
| CELLECTRA®(b) | 5 – 11 | 8,106,270 | (7,252,108) | 854,162 | 8,106,270 | (6,825,028) | 1,281,242 |
| GHRH(b) | 11 | 335,314 | (271,948) | 63,366 | 335,314 | (240,264) | 95,050 |
| Bioject (c) | 2 – 15 | 5,100,000 | (1,405,556) | 3,694,444 | 5,100,000 | (562,222) | 4,537,778 |
| Other(d) | 18 | 4,050,000 | (2,906,250) | 1,143,750 | 4,050,000 | (2,681,250) | 1,368,750 |
| Total intangible assets | | 24,717,873 | (18,708,144) | 6,009,729 | 24,717,873 | (17,089,479) | 7,628,394 |
| Total goodwill and intangible assets | | $35,231,244 | $(18,708,144) | $16,523,100 | $35,231,244 | $(17,089,479) | $18,141,765 |

(a) Goodwill was recorded from the Inovio AS acquisition in January 2005, the acquisition of VGX Pharmaceuticals in June 2009 and the acquisition of Bioject in April 2016 for $3.9 million, $6.2 million and $400,000, respectively.

(b) CELLECTRA® and GHRH are developed technologies which were recorded from the acquisition of VGX Pharmaceuticals.

(c) Bioject intangible assets represent the estimated fair value of developed technology and intellectual property which were recorded from the acquisition of Bioject.

(d) Other intangible assets represent the estimated fair value of acquired intellectual property from the Inovio AS acquisition.

Aggregate amortization expense on intangible assets was $1.6 million, $1.4 million and $870,000 for the years ended December 31, 2017, 2016 and 2015, respectively. Amortization expense related to intangible assets at December 31, 2017 is expected to be incurred as follows:

| Year ending December 31, | |
|---|---|
| 2018 | $1,249,584 |
| 2019 | 1,066,251 |
| 2020 | 547,081 |
| 2021 | 520,414 |
| 2022 | 492,818 |
| Thereafter | 2,133,581 |
| | $6,009,729 |

There were no impairment or impairment indicators present and no losses were recorded during the years ended December 31, 2017, 2016 and 2015, respectively.

9. Accounts Payable and Accrued Expenses

Accounts payable and accrued expenses at December 31, 2017 and 2016 consist of the following:

| | As of December 31, | |
|---|---|---|
| | 2017 | 2016 |
| Trade accounts payable, including from affiliated entity | $7,564,830 | $5,920,642 |
| Accrued compensation | 7,997,152 | 6,531,983 |
| Accrued subcontract costs | 3,746,937 | 5,475,359 |
| Other accrued expenses | 3,969,879 | 1,669,803 |
| | $23,278,798 | $19,597,787 |

10. Stockholders' Equity

Preferred Stock

| | | | Shares Outstanding as of December 31, | |
|---|---|---|---|---|
| | Shares Authorized | Shares Issued | 2017 | 2016 |
| Series C Preferred Stock, par $0.001 | 1,091 | 1,091 | 23 | 23 |

The shares of the Company's Series C Preferred Stock have the following pertinent rights and privileges, as set forth in the Company's Amended and Restated Certificate of Incorporation and its Certificates of Designations, Rights and Preferences related to the various series of preferred stock.

Rights on Liquidation

In the event of any voluntary or involuntary liquidation, dissolution or winding up of the Company (a "liquidation event"), before any distribution of assets of the Company shall be made to or set apart for the holders of common stock, the holders of Series C Preferred Stock, pari passu, are entitled to receive payment of such assets of the Company in an amount equal to $10,000 per share of such series of preferred stock, plus any accumulated and unpaid dividends thereon (whether or not earned or declared).

If the assets of the Company available for distribution to stockholders exceed the aggregate amount of the liquidation preferences payable with respect to all shares of each series of preferred stock then outstanding, then, after the payment of such preferences is made or irrevocably set aside, the holders of the Company's common stock are entitled to receive a pro rata portion of such assets based on the aggregate number of shares of common stock held by each

such holder. The holders of the Company's outstanding preferred stock shall participate in such a distribution on a pro-rata basis, computed based on the number of shares of common stock which would be held by such preferred holders if immediately prior to the liquidation

event all of the outstanding shares of the preferred stock had been converted into shares of common stock at the then current conversion value applicable to each series.

A Change of Control of the Company (as defined in the Certificates of Designations, Rights and Preferences) is not a liquidation event triggering the preferences described above, and is instead addressed by separate terms in the Series C Certificates of Designations, Rights, and Preferences.

Although the liquidation preferences are in excess of the par value of $0.001 per share of the Company's preferred stock, these preferences are equal to or less than the stated value of such shares based on their original purchase price.

Voting Rights

The holders of Series C Preferred Stock have full voting rights and powers equal to the voting rights and powers of holders of the Company's common stock and are entitled to notice of any stockholders' meeting in accordance with the Company's Bylaws. Holders are entitled to vote on any matter upon which holders of the Company's common stock have the right to vote, including, without limitation, the right to vote for the election of directors together with the holders of common stock as one class. Series C Preferred holders are entitled to 368 votes for each share of Series C Preferred Stock held.

Holder Optional Conversion Right

The holder of any share or shares of Series C Preferred Stock has the right at any time, at such holder's option, to convert all or any lesser portion of such holder's shares of the Preferred Stock into such number of fully paid and non-assessable shares of Common Stock as is determined by dividing (i) the aggregate Liquidation Preference applicable to the particular series of preferred shares, plus accrued and unpaid dividends thereon by (ii) the applicable Conversion Value (as defined in the relevant series' Certificate of Designations, Rights and Preferences) then in effect for such series of preferred shares. As of December 31, 2017, the Conversion Value was $27.20, such that the outstanding shares of Series C Preferred Stock were convertible into 8,456 shares of common stock. The Company is not obligated to issue any fractional shares or scrip representing fractional shares upon such conversion and instead shall pay the holder an amount in cash equal to such fraction multiplied by the current market price per share of the Company's common stock.

Company Mandatory Conversion Option

The Company has the option upon thirty (30) days prior written notice, to convert all of the outstanding shares of the Series C Preferred Stock into such number of fully paid and non-assessable shares of common stock as is determined by dividing (i) the aggregate Liquidation Preference of the shares of the relevant series of preferred stock to be converted, plus accrued and unpaid dividends thereon by (ii) the applicable Conversion Value (as defined in the relevant series' Certificate of Designations, Rights and Preferences) then in effect, if the following triggering events have occurred:

(i) the price of the Company's common stock exceeds $72.00 per share for 20 out of 30 consecutive trading days; and (ii) the average daily trading volume (subject to adjustment for stock dividends, subdivisions and combinations) of the common stock exceeds 6,250 shares for at least 20 out of 30 consecutive trading days.

Common Stock

On July 25, 2017, the Company closed an underwritten public offering of 12,500,000 shares of common stock at a public offering price of $6.00 per share. The net proceeds to the Company, after deducting the underwriters' discounts and commissions and other offering expenses, were $70.1 million.

In June 2016, the Company entered into an At-the-Market Equity Offering Sales Agreement (the "Sales Agreement") with an outside placement agent (the "Placement Agent") to sell shares of its common stock with aggregate gross proceeds of up to $50.0 million, from time to time, through an "at-the-market" equity offering program under which the Placement Agent will act as sales agent. Under the Sales Agreement, the Company will set the parameters for the sale of shares, including the number of shares to be issued, the time period during which sales are requested to be made, limitation on the number of shares that may be sold in any one trading day and any minimum price below which sales may not be made. The Sales Agreement provides that the Placement Agent will be entitled to compensation for its services in an amount equal to 2.0% of the gross proceeds from the sales of shares sold through the Placement Agent under the Sales Agreement. The Company has no obligation to sell any shares under the Sales Agreement, and may at any time suspend solicitation and offers under the Sales Agreement.

During the year ended December 31, 2017, the Company sold a total of 2,937,406 shares of common stock under the Sales Agreement. The sales were made at a weighted average price of $8.41 per share with net proceeds to the Company of $24.2 million. As of December 31, 2017, the Company has sold an aggregate of 3,596,154 shares of common stock under the Sales Agreement for net proceeds of $30.5 million. Accordingly, as of December 31, 2017 the Company may sell up to an additional $18.9 million in shares of its common stock under the Sales Agreement.

Warrants

The Company accounts for registered common stock warrants issued in March 2013 under the authoritative guidance on accounting for derivative financial instruments indexed to, and potentially settled in, a company's own stock, on the understanding that in compliance with applicable securities laws, the registered warrants require the issuance of registered securities upon exercise and do not sufficiently preclude an implied right to net cash settlement. The Company classifies registered warrants on the consolidated balance sheet as a current liability which is revalued at each balance sheet date subsequent to the initial issuance. Determining the appropriate fair-value model and calculating the fair value of registered warrants requires some judgment, including estimating stock price volatility and expected warrant life. The Company develops its estimates based on historical data. A small change in the estimates used may have a relatively large change in the estimated valuation. The Company uses the Black-Scholes pricing model to value the registered warrants. Changes in the fair market value of the warrants are reflected in the consolidated statement of operations as "Change in fair value of common stock warrants".

The following table summarizes the warrants outstanding as of December 31, 2017 and 2016:

| | | | As of December 31, 2017 | | As of December 31, 2016 | |
|---|---|---|---|---|---|---|
| Issued in Connection With: | Exercise Price | Expiration Date | Number of Warrants | Common Stock Warrant Liability | Number of Warrants | Common Stock Warrant Liability |
| March 2013 financing | $ 3.17 | September 12, 2018 | 284,091 | $ 360,795 | 284,091 | $ 1,167,614 |
| Total | | | 284,091 | $ 360,795 | 284,091 | $ 1,167,614 |

During the years ended December 31, 2017 and 2016, no warrants to purchase shares of the Company's common stock which were issued in connection with the March 2013 financing were exercised.

Stock Options and Restricted Stock Units

The Company has a stock-based incentive plan, the 2016 Omnibus Incentive Plan (the "2016 Incentive Plan"), pursuant to which the Company may grant stock options, restricted stock awards and restricted stock unit awards ("RSUs") to employees, directors and consultants.

The 2016 Incentive Plan was approved by the Company's stockholders on May 13, 2016. The maximum number of shares of the Company's common stock available for issuance over the term of the 2016 Incentive Plan may not exceed 6,000,000 shares, provided that commencing with the first business day of each calendar year beginning January 1, 2018, such maximum number of shares shall be increased by 2,000,000 shares of common stock unless the Board determines, prior to January 1 for any such calendar year, to increase such maximum amount by a fewer number of shares or not to increase the maximum amount at all for such year. On January 1, 2018, the maximum number of shares to be issued was increased by 2,000,000. At December 31, 2017, there were 6,000,000 shares of common stock reserved for issuance upon exercise of incentive awards granted and to be granted at future dates under the 2016 Incentive Plan. At December 31, 2017, the Company had 3,994,511 shares of common stock available for future grant under the 2016 Incentive Plan, 819,507 shares underlying outstanding but unvested RSUs and options outstanding to purchase 1,136,057 shares of common stock under the 2016 Incentive Plan. The awards granted under the 2016 Incentive Plan generally vest over three years and have a maximum contractual term of ten years. The 2016 Incentive Plan terminates by its terms on March 9, 2026.

The Company's previous stock-based incentive plan, the Amended and Restated 2007 Omnibus Incentive Plan (the "2007 Incentive Plan"), was adopted on March 31, 2007 and terminated by its terms on March 31, 2017. At December 31, 2017, the Company had 414,661 shares underlying outstanding but unvested RSUs and options outstanding to purchase 6,357,071 shares of common stock under the 2007 Incentive Plan. The awards granted under the 2007 Incentive Plan generally vest over three years and have a maximum contractual term of ten years.

At December 31, 2017, the Company also had options outstanding to purchase 201,742 shares of common stock under the VGX Equity Compensation Plan, which the Company assumed in connection with its acquisition of VGX in 2009. The terms and conditions of the options outstanding under this plan remain unchanged.

Total stock-based compensation cost recognized in the consolidated statement of operations for the years ended December 31, 2017, 2016 and 2015 was $12.9 million, $10.2 million and $5.8 million, respectively, of which $5.8

million, $4.8 million and $3.2 million was included in research and development expenses and $7.1 million, $5.4 million and $2.6 million was included in general and administrative expenses, respectively.

At December 31, 2017 and 2016, there was $5.9 million and $5.8 million of total unrecognized compensation cost, respectively, related to unvested stock options, which is expected to be recognized over a weighted-average period of 1.8 years and 1.9 years respectively.

At December 31, 2017 and 2016, there was $5.3 million and $4.0 million of total unrecognized compensation cost, respectively, related to unvested RSUs, which is expected to be recognized over a weighted-average period of 1.8 years and 2.0 years, respectively.

The fair value of options granted to non-employees at the measurement dates were estimated using the Black-Scholes pricing model. Total stock-based compensation for options granted to non-employees for the years ended December 31, 2017, 2016 and 2015 was $201,000, $321,000 and $385,000, respectively. As of December 31, 2017, options to purchase 701,367 shares of common stock granted to non-employees remained outstanding.

The following table summarizes total stock options outstanding at December 31, 2017:

| | Options Outstanding | | | Options Exercisable | |
|---|---|---|---|---|---|
| Exercise Price | Shares Underlying Options Outstanding | Weighted-Average Remaining Contractual Life (in Years) | Weighted Average Exercise Price | Shares Underlying Options Exercisable | Weighted Average Exercise Price |
| $1.48-$3.00 | 1,177,183 | 4.6 | $ 2.25 | 1,177,183 | $ 2.25 |
| $3.01-$6.00 | 753,932 | 3.4 | $ 4.64 | 668,244 | $ 4.57 |
| $6.01-$9.00 | 4,709,442 | 7.6 | $ 7.09 | 2,639,454 | $ 7.23 |
| $9.01-$12.00 | 357,603 | 8.0 | $ 9.79 | 263,180 | $ 9.83 |
| $12.01-$15.00 | 696,710 | 6.2 | $ 12.96 | 696,710 | $ 12.96 |
| | 7,694,870 | 6.6 | $ 6.77 | 5,444,771 | $ 6.68 |

At December 31, 2017, the aggregate intrinsic value of options outstanding was $2.3 million, the aggregate intrinsic value of options exercisable was $2.3 million, and the weighted average remaining contractual term of options exercisable was 5.9 years.

At December 31, 2017, the aggregate intrinsic value of unvested RSUs was $5.1 million and the aggregate intrinsic value of RSUs which vested during the year ended December 31, 2017 was $3.6 million.

At December 31, 2017, options to purchase 7,694,870 shares of common stock and 1,234,168 RSUs are expected to vest.

Stock option activity under the Company's equity incentive plans during the year ended December 31, 2017 was as follows:

| | Number of Shares | Weighted-Average Exercise Price |
|---|---|---|
| Balance, December 31, 2016 | 6,806,183 | $ 6.81 |
| Granted | 1,788,121 | 6.62 |
| Exercised | (452,973 ) | 5.18 |
| Cancelled | (446,461 ) | 8.49 |
| Balance, December 31, 2017 | 7,694,870 | $ 6.77 |

RSU activity under the Company's equity incentive plans during the year ended December 31, 2017 was as follows:

| | Number of Shares | Weighted-Average Exercise Price |
|---|---|---|
| Balance, December 31, 2016 | 798,834 | $ — |
| Granted | 1,035,443 | — |
| Vested | (561,462 ) | — |
| Cancelled | (38,647 ) | — |
| Balance, December 31, 2017 | 1,234,168 | $ — |

The weighted average exercise price per share was $9.67 for the 200,501 options which expired during the year ended December 31, 2017, $9.01 for the 69,570 options which expired during the year ended December 31, 2016 and $10.89 for the 83,696 options which expired during the year ended December 31, 2015.
The weighted average grant date fair value per share was $4.33, $4.59 and $4.60 for options granted during the years ended December 31, 2017, 2016 and 2015, respectively.
The weighted average grant date fair value was $6.66, $7.41 and $7.76 per share for RSUs granted during the years ended December 31, 2017, 2016 and 2015, respectively.
The Company received $2.3 million, $1.8 million and $552,000 in proceeds from the exercise of stock options during the years ended December 31, 2017, 2016 and 2015, respectively. The aggregate intrinsic value of options exercised was $519,000, $3.5 million and $456,000 during the years ended December 31, 2017, 2016 and 2015, respectively.

11. Commitments

San Diego Leases

In April 2013, the Company entered into a lease for office space located in San Diego, California. The term of the Lease commenced on December 1, 2013. The initial term of the Lease is ten years, with a right to terminate on December 1, 2019, subject to specified conditions. In June 2015, the Company amended the lease for this space to increase the total leased space and occupy the entire building. The commencement of the amended lease was in January 2016 and increased monthly lease payments to range from free rent to $99,000. The Company has capitalized $822,000 of tenant improvements within fixed assets on the consolidated balance sheet related to this additional space, and has recorded a corresponding increase to deferred rent.
In October 2016, the Company entered into an office lease (the “new Lease”) for a second property located in San Diego, California. The total space under the new Lease is approximately 51,000 square feet. The Company is using the facility for office, manufacturing and research and development purposes. The term of the new Lease commenced on June 1, 2017. The initial term of the new Lease is ten years, with a right to terminate on November 30, 2023, subject to specified conditions.
The base rent adjusts periodically throughout the term of the new Lease, with monthly payments ranging from free rent to $95,000, with a portion of the rent abated for certain periods during the first two years of the initial term. In addition, the Company is obligated to reimburse the landlord its share of operating and other expenses, and has paid a security deposit of $95,000. As of December 31, 2017, the Company has capitalized $2.3 million of reimbursable tenant improvements to the new office which has been recorded as a leasehold improvement within fixed assets on the consolidated balance sheet, offset by a corresponding amount recorded in deferred rent.

Plymouth Meeting Lease and Sublease

In March 2014, the Company entered into a lease (the "Lease") with a publicly owned real estate investment trust for office space located in Plymouth Meeting, Pennsylvania. The Company occupied the space in June 2014. The initial term of the Lease was 11.5 years.
The base rent adjusts periodically throughout the term of the Lease, with monthly payments ranging from free rent to $58,000. In addition, the Company is obligated to reimburse the landlord its share of operating and other expenses and a property management fee, and has paid a security deposit of $49,000. In July 2015, the Company amended the Lease to increase the total leased space. The commencement of the amended Lease was in the first quarter of 2016 and increased monthly lease payments to range between free rent to $80,000.
In June 2017, the Company entered into a sublease (the “Sublease”) for additional space in its current office in Plymouth Meeting, Pennsylvania. The total additional space subject to the Sublease is approximately 30,000 square feet, which the Company intends to use for office purposes. The Sublease commenced on October 1, 2017 and will end on June 30, 2027. The base rent adjusts periodically throughout the term of the Sublease, with monthly payments ranging from $75,000 to $90,000. In addition, the Company is obligated to reimburse the sub-landlord its share of operating and other expenses. In December 2017, the Sublease was reassigned by the sub-landlord back to the landlord, with no change in the underlying terms of the Sublease.
In June 2017, the Company entered into a second amendment to the Lease to extend the lease term and term of the Sublease through December 31, 2029. In connection with the second amendment, the Company will pay the landlord

an additional security deposit of $75,000. Total monthly rent payments for the additional term will range between $173,000 and $179,000. The Company has capitalized $2.6 million of tenant improvements to the Plymouth Meeting office within fixed assets on the consolidated balance sheet, offset by a corresponding amount recorded in deferred rent.

Rent expense was $2.4 million, $1.6 million and $1.3 million for the years ended December 31, 2017, 2016 and 2015, respectively. Future minimum lease payments under non-cancelable operating leases as of December 31, 2017 are as follows:

| Year ending December 31, | |
|---|---|
| 2018 | $3,251,000 |
| 2019 | 3,756,000 |
| 2020 | 3,891,000 |
| 2021 | 3,979,000 |
| 2022 | 4,052,000 |
| Thereafter | 19,975,000 |
| Total | $38,904,000 |

In the normal course of business, the Company is a party to a variety of agreements pursuant to which it may be obligated to indemnify the other party. It is not possible to predict the maximum potential amount of future payments under these types of agreements due to the conditional nature of the Company's obligations and the unique facts and circumstances involved in each particular agreement. Historically, payments made by the Company under these types of agreements have not had a material effect on its business, consolidated results of operations or financial condition.

12. Investments in Affiliated Entities

The Company held 1,644,155 common shares, representing a 7.8% and 10.2% ownership interest in GeneOne as of December 31, 2017 and 2016, respectively, and 395,758 common shares, representing a 16.4% ownership interest in PLS as of each of December 31, 2017 and 2016.

The Company's investment in GeneOne is measured at fair value on a recurring basis. The Company elected the fair value option in conjunction with the investment in GeneOne at the inception of the investment; therefore, changes in the fair value of the investment are reflected as other income (expense) in the consolidated statements of operations. The fair market value of the Company’s interest in GeneOne was determined using the closing price of GeneOne's shares of common stock as listed on the Korean Stock Exchange as of December 31, 2017 and 2016.

The Company accounts for its investment in PLS as an available-for sale security by which the fair value was determined using the closing price of the common shares on the Korea New Exchange (KONEX) Market. The Company did not elect the fair value option for the investment in PLS at the inception of the investment, but rather recorded the investment under the equity method until its ownership interest dropped below 20% in June 2015 and accordingly began recording the investment under the cost method using the carryover basis from the equity method of zero. Once shares of PLS began trading on the KONEX, the Company classified the investment as available-for-sale and began recording the investment at fair value with changes in fair value reflected in other comprehensive income (loss).

13. Business Combination

On April 29, 2016, the Company acquired all of the assets of Bioject Medical Technologies Inc.’s ("Bioject"), including its needle-free injection technology, products and intellectual property. The transaction, which was accounted for as a business combination, provided the Company with further opportunities in device development. The Company paid Bioject aggregate consideration of $5.5 million, consisting of $4.3 million in shares of the Company's common stock and $1.2 million in cash upon closing.

The acquisition consideration was allocated to the estimated fair vales of the assets acquired as follows:

| | |
|---|---|
| Developed technology | $3,800,000 |
| Customer-related intangible assets | 1,000,000 |
| Trademarks | 200,000 |
| Covenants not-to-compete | 100,000 |
| Goodwill | 400,000 |
| Total purchase consideration | $5,500,000 |

The fair value of the acquired intangible assets was estimated based on the discounted cash flow method that estimated the present value of a revenue stream derived from the licensing of the Bioject technology. These projected cash flows were

discounted to present value using a discount rate of 14%. The fair value of the developed technology is being amortized on a straight-line basis over the estimated useful life of 15 years. The fair value of the remaining intangible assets acquired is being amortized on a straight-line basis over the estimated useful lives of between 2-5 years. The excess of the acquisition date consideration over the fair values assigned to the assets acquired was recorded as goodwill. The goodwill resulting from the acquisition consists primarily of the synergies expected from combining the technologies and know-how of Bioject with the Company's existing business. This includes synergies expected from combining Bioject's needle-free injection technology with the Company's existing electroporation delivery devices.

14. Income Taxes

In accordance with the guidance pursuant to accounting for income taxes, a deferred tax asset or liability is determined based on the difference between the financial statement and tax basis of assets and liabilities as measured by the enacted tax rates which will be in effect when these differences reverse. The Company provides a valuation allowance against net deferred tax assets unless, based upon the available evidence, it is more likely than not that the deferred tax asset will be realized.

The components of the provision for income taxes are presented in the following table:

| | Year Ended December 31, | | |
|---|---|---|---|
| | 2017 | 2016 | 2015 |
| Current: | | | |
| Federal | $— | $— | |
| State | — | — | |
| | — | — | |
| Deferred: | | | |
| Federal | — | (1,594,000) | |
| State | — | (504,000) | |
| | — | (2,098,000) | |
| | $— | $(2,098,000) | |

The reconciliation of income taxes attributable to continuing operations computed at the statutory tax rates to income tax expense (recovery), using a 35% statutory tax rate, is as follows:

| | Year Ended December 31, | | |
|---|---|---|---|
| | 2017 | 2016 | 2015 |
| Income (benefit) taxes at statutory rates | $(30,872,000) | $(25,809,000) | $(10,920,000) |
| State income tax, net of federal benefit | (4,000) | (4,000) | (2,640,000) |
| Change in valuation allowance | (20,965,000) | 29,678,000 | 7,882,000 |
| Research and development tax credits | (3,456,000) | (3,117,000) | (1,537,000) |
| Fair value warrant | (282,000) | (47,000) | (253,000) |
| Stock compensation | 2,332,000 | 113,000 | 2,288,000 |
| Uncertain tax positions | 846,000 | 1,367,000 | 1,968,000 |
| Expired NOLs and credits | 454,000 | 4,269,000 | 339,000 |
| Limited NOLs and credits | (165,000) | (6,456,000) | (297,000) |
| Change in state tax rate | 50,019,000 | (495,000) | 676,000 |
| Other | 2,093,000 | 501,000 | 396,000 |
| | $— | $— | $(2,098,000) |

The income tax benefit recorded during the year ended December 31, 2015 of $2.1 million is principally due to a requirement under Accounting Standards Codification ("ASC") 740, Accounting for Income Taxes, that a Company must consider all sources of income in order to determine the tax benefit resulting from a loss from continuing

operations. As a result of the requirement under ASC 740-20-45-7, the pretax income which the Company generated from other comprehensive income was a source of income which resulted in the partial realization of the current year loss from continuing operations.

Significant components of the Company's deferred tax assets and liabilities as of December 31, 2017 and 2016 are shown below:

| | As of December 31, | |
|---|---|---|
| | 2017 | 2016 |
| Deferred tax assets: | | |
| Capitalized research expense | 8,546,000 | $ 567,000 |
| Net operating loss carryforwards | 71,665,000 | 95,500,000 |
| Research and development and other tax credits | 7,531,000 | 5,300,000 |
| Deferred revenue | 297,000 | 5,452,000 |
| Deferred rent | 2,097,000 | 2,231,000 |
| Stock-based compensation | 3,091,000 | 4,511,000 |
| Acquired intangibles | 858,000 | 989,000 |
| Other | 1,906,000 | 3,783,000 |
| | 95,991,000 | 118,333,000 |
| Valuation allowance | (94,039,000) | (113,407,000) |
| Total deferred tax assets | 1,952,000 | 4,926,000 |
| Deferred tax liabilities: | | |
| Acquired intangibles | (124,000) | (175,000) |
| Investment in affiliated entity | (422,000) | (3,624,000) |
| Fixed assets | (1,430,000) | (1,302,000) |
| Net deferred tax liabilities | $ (24,000) | $ (175,000) |

As of December 31, 2017, the Company had federal, California and Pennsylvania tax net operating loss carry forwards of approximately $298.9 million, $68.6 million and $75.6 million, respectively, net of the net operating losses that will expire due to IRC Section 382 limitations. The federal, California and Pennsylvania net operating loss carry forwards will begin to expire in 2018, 2028 and 2021, respectively, unless previously utilized.

The Company adopted ASU 2016-09 in the first quarter of 2017. Under the new guidance, companies will no longer record excess tax benefits and certain tax deficiencies related to share-based payment to employees in additional paid-in capital. Instead, the Company will recognize all income tax effects of awards in its income statement when awards vest or are settled. All excess tax benefits not previously recognized were to be recorded to retained earnings as a cumulative effect adjustment upon adoption. Upon adoption, no adjustment to retained earnings was necessary due to the Company's valuation allowance position. Approximately $1.1 million attributable to excess tax benefits on stock compensation that had not been previously recognized was added to the deferred tax asset for NOLs with a corresponding increase to the valuation allowance.

In addition, the Company had federal and state research tax credit carryforwards of approximately $11.1 million and $2.1 million, respectively. The federal tax credit carryforwards will begin to expire in 2018. The California research tax credits do not expire.

Utilization of the NOL and tax credit carryforwards is subject to a substantial annual limitation under Section 382 of the Internal Revenue Code of 1986, and similar state provisions due to ownership change limitations that have occurred previously or that could occur in the future. These ownership changes will limit the amount of NOL and tax credit carryforwards and other deferred tax assets that can be utilized to offset future taxable income and tax, respectively. In general, an ownership change, as defined by Section 382, results from transactions increasing ownership of certain stock holders or public groups in the stock of the corporation by more than 50 percentage points over a three-year period.

The Company and VGX both experienced ownership changes under Section 382 as a result of their 2009 merger. The ownership change resulted in annual limitations on the utilizations of tax attributes, including net operating loss carryforwards and tax credits. The Company estimates that approximately $13.4 million of tax benefits related to NOL and tax credit carryforwards will expire unused. Accordingly, the related NOL and R&D credit carryforwards have been removed from deferred tax assets accompanied by a corresponding reduction of the valuation allowance.

Due to the existence of the valuation allowance, limitations created by current and future ownership changes, if any, related to the Company's operations in the United States will not impact its effective tax rate. Any additional ownership changes, may further limit the ability to use the net operating losses and credits carryovers.

The Tax Cuts and Jobs Act ("the Act") was enacted on December 22, 2017. The Act includes a number of changes to existing U.S. tax laws that impact the Company, most notably a reduction of the U.S. federal corporate tax rate from a maximum of 35% to a flat 21%, effective January 1, 2018. In conjunction with the tax law changes, the SEC staff issued Staff Accounting Bulletin 118 ("SAB 118") to address the application of U.S. GAAP in situations when a registrant does not have the necessary information available, prepared, or analyzed (including computations) in reasonable detail to complete the accounting for certain income tax effects of the Act. In these instances, a Company can record provisional amounts in its financial statements for the income tax effects for which a reasonable estimate can be determined. For items for which a reasonable estimate cannot be determined, a company should continue to apply ASC 740 based on the provisions of the tax laws that were in effect immediately prior to the Act being enacted. As a result of the new law, the Company has revalued its deferred tax assets, which represent a reduction in the amount of corporate taxes that are expected to be paid in the future, by $50.0 million. The Company has also reduced its valuation allowance by $(50.2) million for a net impact of $(0.2) million as a result of the Act. This impact is considered to be a provisional amount as the Company is still analyzing certain aspects of the Act and refining our calculations. The ultimate impact may differ from this provisional amount, due to, among other things, additional analysis, changes in interpretations and assumptions the Company has made, additional regulatory guidance that may be issued, and actions the Company may take as a result of the Act.

In addition, as there is some uncertainty around the grandfathering provisions related to performance-based executive compensation, the Company has not estimated a provisional amount for deferred tax assets related to performance-based executive compensation and continue to apply ASC 740 based on the provisions of the tax laws that were in effect immediately prior to the Act being enacted. Upon the issuance of additional guidance by the U.S. Treasury Department and other standard-setting bodies, the Company plans to adjust its deferred tax assets accordingly.

The following table summarizes the activity related to the Company's unrecognized tax benefits:

| | Year ended December 31, | | |
|---|---|---|---|
| | 2017 | 2016 | 2015 |
| Balance at beginning of the year | $6,855,000 | $5,455,000 | $2,759,000 |
| Increases related to current year tax positions | 1,532,000 | 1,183,000 | 615,000 |
| Increases (decreases) related to prior year tax positions | (74,000) | 217,000 | 2,081,000 |
| Balance at end of the year | $8,313,000 | $6,855,000 | $5,455,000 |

The amount of unrecognized tax benefit that, if recognized and realized, would affect the effective tax rate was $7.1 million as of December 31, 2017. The Company has not recorded any interest and penalties on the unrecognized tax positions as the Company has continued to generate net operating losses after accounting for the unrecognized tax benefits. The Company does not anticipate that the total amount of unrecognized tax benefits will significantly increase or decrease within twelve months of the reporting date.

The Company and its subsidiaries are subject to United States federal income tax as well as income tax in multiple state jurisdictions. With few exceptions, the Company is no longer subject to United States federal income tax examinations for years before 2014 and state and local income tax examinations before 2013. However, to the extent allowed by law, the tax authorities may have the right to examine prior periods where net operating losses were generated and carried forward, and make adjustments up to the amount of the net operating loss carryforward amount. The Company is not currently under Internal Revenue Service (“IRS”), state or local tax examination.

15. 401(k) Plan

The Company has adopted a 401(k) Profit Sharing Plan covering substantially all of its employees. The defined contribution plan allows the employees to contribute a percentage of their compensation each year. The Company currently matches 50% of its employees’ contributions, up to 6% of their annual compensation. The Company’s contributions are recorded as expense in the accompanying consolidated statements of operations and totaled $822,000, $496,000 and $328,000 for the years ended December 31, 2017, 2016 and 2015, respectively.

16. Related Party Transactions

GeneOne Life Sciences

In December 2017, the Company completed the sale of certain assets related to its compound VGX-1027 to GeneOne for a purchase price of $1.0 million.

In May 2015, the Company entered into a Collaborative Development Agreement with GeneOne to co-develop a DNA vaccine for MERS (Middle East Respiratory Syndrome) through Phase 1 clinical trials. Under the terms of the agreement, GeneOne will be responsible for funding all preclinical and clinical studies through Phase 1. In return, GeneOne will receive up to 35% milestone-based ownership interest in the MERS immunotherapy upon achievement of the last milestone event of completion of the Phase 1 safety and immunogenicity study. The collaborative research program shall terminate upon the completion of activities under the development plan, unless sooner terminated.

In January 2016, the Company and GeneOne amended the Collaborative Development Agreement to expand the agreement to test and advance the Company's DNA-based vaccine for preventing and treating Zika virus. GeneOne will be responsible for funding all preclinical and clinical studies through Phase 1. In return, GeneOne will receive up to 35% milestone-based ownership interest in the Zika immunotherapy upon achievement of the last milestone event of the completion of the Phase 1 safety and immunogenicity study. All other agreement terms remain the same.

In 2014, the Company entered into a Collaborative Development Agreement with GeneOne to co-develop an Ebola vaccine through Phase 1 clinical trials. In 2015, the Company amended the Agreement to change control of development back to Inovio in return for the Company’s payment of certain expenses relating to GeneOne's contribution to the clinical trials.

In 2011, the Company entered into a Collaborative Development and License Agreement (the “Hep Agreement”) with GeneOne. Under the Hep Agreement, as originally executed, the Company and GeneOne agreed to co-develop the Company’s SynCon® therapeutic vaccines for hepatitis B and C infections (the “Hep Products”). Under the terms of the Hep Agreement, GeneOne will receive marketing rights for the Products in Asia, excluding Japan, and in return will fully fund IND-enabling and initial Phase 1 and 2 clinical studies with respect to the Products. The Company will receive from GeneOne payments based on the achievement of clinical milestones and royalties based on sales of the Hep Products in the licensed territories, retaining all commercial rights to the Products in all other territories. In 2013, the Company amended the Hep Agreement to grant back to the Company the SynCon® therapeutic vaccines targeting hepatitis B, along with all associated rights, from the collaboration in return for certain remuneration including a percentage of license fees. In 2013, the Company further amended the Hep Agreement to in part provide exclusive patent rights to IL-28 technology for use with the Products in Asia, excluding Japan. The Hep Agreement shall terminate upon the later of the expiration or abandonment of the last patent that is a component of the rights or 20 years after the effective date.

In 2010, the Company entered into a Collaboration and License Agreement (the “GeneOne Agreement”) with GeneOne. Under the GeneOne Agreement, the Company granted GeneOne an exclusive license to the Company's SynCon® universal influenza vaccine delivered with electroporation to be developed in certain countries in Asia (the “Product”). As consideration for the license granted to GeneOne, the Company received an upfront payment of $3.0 million, and will receive research support, annual license maintenance fees and royalties on net Product sales. The Company recorded the $3.0 million as deferred revenue from affiliated entity, and will recognize it as revenue over the eight year expected period of the Company’s performance obligation. In addition, contingent upon achievement of clinical and regulatory milestones, the Company will receive development payments over the term of the GeneOne Agreement. The GeneOne Agreement also provides the Company with exclusive rights to supply devices for clinical and commercial purposes (including single use components) to GeneOne for use in the Product. The term of the GeneOne Agreement commenced upon execution and will extend on a country by country basis until the last to expire of all Royalty Periods for the territory (as such term is defined in the GeneOne Agreement) for any Product in that country, unless the GeneOne Agreement is terminated earlier in accordance with its provisions as a result of breach, by mutual agreement, or by GeneOne's right to terminate without cause upon prior written notice.

One of the Company's directors, Dr. David B. Weiner, acts as a consultant to GeneOne.

Revenue recognized from GeneOne consists of licensing and other fees from the influenza and Zika collaborations. For the years ended December 31, 2017, 2016 and 2015, the Company recognized revenue from GeneOne of $551,000, $1.2 million and $450,000, respectively.

Operating expenses recorded from transactions with GeneOne relate primarily to biologics manufacturing. Operating expenses related to the transactions with GeneOne for the years ended December 31, 2017, 2016 and 2015 were $2.3 million, $2.8 million and $6.9 million, respectively.

At December 31, 2017 and 2016, the Company had an accounts receivable balance of $0 and $441,000, respectively, and an accounts payable and accrued liability balance of $107,000 and $379,000, respectively, related to GeneOne and its subsidiaries. At December 31, 2017 and 2016, $331,000 and $571,000 of prepayments made to GeneOne, respectively, were classified as long-term other assets on the consolidated balance sheet.

Plumbline Life Sciences, Inc.

In May 2014, the Company's 85% owned subsidiary VGX Animal Health entered into an agreement for the sale of its animal health assets to PLS. The assets transferred included an exclusive license with the Company for animal applications of its growth hormone-releasing hormone ("GHRH") technology and animal DNA vaccines plus a non-exclusive license to Inovio

electroporation delivery systems. In return, VGX Animal Health received $2.0 million in cash, of which $1.0 million was received in May 2015 and the remainder in May 2016, and 465,364 shares of PLS, of which the Company received 395,758 shares or approximately 16.4% of PLS's common stock.

During each of the years ended December 31, 2016 and 2015, VGX Animal Health distributed $1.0 million cash received to its shareholders, of which $850,000 was received by the Company and $150,000 was paid to minority shareholders in each year.

One of the Company's directors, Dr. David B Weiner, acts as a consultant to PLS.

As of December 31, 2017 the Company accounts for its ownership interest in PLS under the accounting guidance for investments considered available-for-sale (Accounting Standards Codification (ASC) 320). The original carrying value of the Company's investment in PLS was $0. On July 28, 2015, PLS registered on the Korea New Exchange (KONEX) Market. The total carrying value of the Company's investment in PLS was $2.3 million as of December 31, 2017. The fair value is based on the market value of the common shares as listed on the KONEX. The changes in carrying value of PLS are recorded in the Company's consolidated statements of comprehensive loss as an unrealized gain (loss) on investment in affiliated entity.

In August 2016, the Company licensed a veterinary vaccine for foot and mouth disease (FMD) to PLS. PLS will fund all development activities for this FMD vaccine. The Company will receive milestone payments as well as royalties on product sales from PLS for commercial rights to this FMD synthetic vaccine in Asia, excluding Japan.

For the years ended December 31, 2017 and 2016, the Company recognized revenue from PLS of $215,000 and $212,000, respectively. At December 31, 2017 and 2016, the Company had an accounts receivable balance of $370,000 and $155,000, respectively, related to its license agreement with PLS.

The Wistar Institute

One of the Company's directors, Dr. David B. Weiner, is the Executive Vice President and Director of the Vaccine Center of The Wistar Institute ("Wistar").

In March 2016, the Company entered into collaborative research agreements with Wistar for preventive and therapeutic DNA-based immunotherapy applications and products developed by Dr. Weiner and Wistar for the treatment of cancers and infectious diseases. Under the terms of the agreement, the Company will reimburse Wistar for all direct and indirect costs incurred in the conduct of the collaborative research, not to exceed $3.1 million during the five-year term of the agreement. The Company will have the exclusive right to in-license new intellectual property developed in this agreement.

In December 2016 the Company received a $6.1 million sub-grant through Wistar to develop a DNA-based monoclonal antibody against the Zika infection.

The Company is also a collaborator with Wistar on an Integrated Preclinical/Clinical AIDS Vaccine Development (IPCAVD) grant from the National Institute of Allergy and Infectious Diseases (NIAID), awarded in 2015.

Revenue recognized from Wistar is related to work performed by the Company on the research sub-contract agreements. For the years ended December 31, 2017 and 2016, the Company recognized revenue from Wistar of $2.6 million and $341,000, respectively.

Operating expenses recorded as a result of the relationship with Wistar relate primarily to the collaborative research agreements and sub-contract related to the DARPA Ebola grant. Operating expenses related to the Wistar relationship for the years ended December 31, 2017 and 2016 were $2.3 million and $985,000, respectively.

At December 31, 2017 and 2016, the Company had an accounts receivable balance of $117,000 and $152,000, respectively, and an accounts payable and accrued liability balance of $820,000 and $671,000, respectively, related to Wistar.

17. Quarterly Financial Information (Unaudited)

The following is a summary of the quarterly results of operations of the Company for the years ended December 31, 2017 and 2016 (unaudited):

| | Quarter Ended December 31, 2017 | Quarter Ended September 30, 2017 | Quarter Ended June 30, 2017 | Quarter Ended March 31, 2017 |
|---|---|---|---|---|
| Consolidated Statements of Operations: | | | | |
| Revenue: | | | | |
| Revenue under collaborative research and development arrangements | $7,409,214 | $351,272 | $16,358,316 | $4,288,586 |
| Revenue under collaborative research and development arrangements with affiliated entity | 226,486 | 129,133 | 176,879 | 233,330 |
| Grants and miscellaneous revenue | 980,443 | 1,456,216 | 2,797,647 | 5,240,233 |
| Grants and miscellaneous revenue from affiliated entity | 171,091 | 707,922 | 1,079,282 | 614,036 |
| Total revenues | 8,787,234 | 2,644,543 | 20,412,124 | 10,376,185 |
| Operating Expenses: | | | | |
| Research and development | 24,641,124 | 25,510,239 | 23,878,751 | 24,542,504 |
| General and administrative | 8,033,899 | 6,319,775 | 6,169,106 | 7,767,589 |
| Gain on sale of assets | (1,000,000) | — | — | — |
| Total operating expenses | 31,675,023 | 31,830,014 | 30,047,857 | 32,310,093 |
| Loss from operations | (22,887,789) | (29,185,471) | (9,635,733) | (21,933,908) |
| Interest and other income, net | 509,266 | 463,346 | 300,021 | 340,341 |
| Change in fair value of common stock warrants | 579,546 | 423,296 | (312,500) | 116,477 |
| Gain (Loss) from investment in affiliated entity | 292,798 | (5,835,741) | 169,096 | (1,608,817) |
| Net loss attributable to Inovio Pharmaceuticals, Inc. | $(21,506,179) | $(34,134,570) | $(9,479,116) | $(23,085,907) |
| Net loss per common share attributable to Inovio Pharmaceuticals, Inc. stockholders | | | | |
| Basic | $(0.24) | $(0.39) | $(0.13) | $(0.31) |
| Diluted | $(0.24) | $(0.40) | $(0.13) | $(0.31) |

| | Quarter Ended December 31, 2016 | Quarter Ended September 30, 2016 | Quarter Ended June 30, 2016 | Quarter Ended March 31, 2016 |
|---|---|---|---|---|
| Consolidated Statements of Operations: | | | | |
| Revenue: | | | | |
| Revenue under collaborative research and development arrangements | $476,586 | $2,327,316 | $1,889,988 | $1,796,857 |
| Revenue under collaborative research and development arrangements with affiliated entity | 189,278 | 574,596 | 499,720 | 137,000 |
| Grants and miscellaneous revenue | 7,735,428 | 9,410,648 | 3,814,083 | 6,176,298 |
| Grants and miscellaneous revenue from affiliated entity | 112,660 | 227,903 | — | — |
| Total revenues | 8,513,952 | 12,540,463 | 6,203,791 | 8,110,155 |
| Operating Expenses: | | | | |
| Research and development | 23,911,731 | 26,980,343 | 19,630,801 | 18,189,160 |
| General and administrative | 6,965,517 | 5,755,603 | 5,799,530 | 5,371,613 |
| Gain on sale of assets | — | — | (1,000,000) | — |
| Total operating expenses | 30,877,248 | 32,735,946 | 24,430,331 | 23,560,773 |
| Loss from operations | (22,363,296) | (20,195,483) | (18,226,540) | (15,450,618) |
| Interest and other income, net | 191,460 | 391,596 | 341,131 | 333,070 |
| Change in fair value of common stock warrants | 644,888 | 2,690 | (113,775) | (406,249) |
| Gain (Loss) from investment in affiliated entity | (4,706,522) | (958,141) | (705,527) | 7,480,977 |
| Net loss attributable to Inovio Pharmaceuticals, Inc. | $(26,233,470) | $(20,759,338) | $(18,704,711) | $(8,042,820) |
| Net loss per common share attributable to Inovio Pharmaceuticals, Inc. stockholders | | | | |
| Basic | $(0.35) | $(0.28) | $(0.26) | $(0.11) |
| Diluted | $(0.36) | $(0.28) | $(0.26) | $(0.11) |