INOVIO PHARMACEUTICALS, INC.
Form 10-K
March 15, 2017

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, 2016

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
(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, or a smaller reporting company. See definitions of "large accelerated filer," "accelerated filer," and "smaller reporting 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¨
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, 2016 was approximately $632,081,983 based on $9.24, the closing price on that date of the Registrant's Common Stock on the NASDAQ.
The number of shares outstanding of the Registrant's Common Stock, $0.001 par value, was 74,101,380 as of March 8, 2017.

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 2016 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, 2016.

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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 DNA immunotherapies and vaccines focused on treating and preventing cancers and infectious diseases. Our DNA-based immunotherapies, in combination with our proprietary electroporation delivery devices, are intended to generate robust immune responses, in particular T cells, to fight target diseases. In 2014 we reported that in a controlled Phase 2 clinical study we generated significant, functional antigen-specific T cells that correlated to clinically relevant efficacy against HPV-associated cervical dysplasia (precancer). This data was published in The Lancet in September 2015. We are planning to take this product, VGX-3100, into a Phase 3 study for cervical dysplasia in 2017.

Our novel SynCon® immunotherapy design has shown the ability to help break the immune system's tolerance of cancerous cells. Our SynCon® product design approach 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 our published Phase 2 results, our scientists believe 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 HPV-caused pre-cancers (including cervical, anal and vulvar neoplasia), HPV-caused cancers (head and neck and cervical), prostate cancer, breast/lung/pancreatic cancer, hepatitis C virus (HCV), hepatitis B virus (HBV), HIV, Ebola, MERS (Middle East Respiratory Syndrome) 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., ApolloBio Corporation, Plumbline Life Sciences, Inc., 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"), HIV Vaccines Trial Network ("HVTN"), and Defense Advanced Research Projects Agency ("DARPA").

Inovio's Differentiated Immunotherapy Platform

The idea of stimulating the immune system to prevent or treat infections and cancers has been and continues to be a compelling concept. Today the opportunity for immune activating technologies with the potential to fight cancers and chronic infectious diseases has never appeared more promising, with notable technology advancements such as checkpoint inhibitors leading the way in oncology. Yet, while yielding promising results, in many respects the surface has been barely scratched. There remains a significant need and opportunity for further advancements.

Our immunotherapy platform comprising our DNA-based immunotherapy and electroporation delivery technologies has an important fundamental capability with a multitude of possible disease/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: 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 for the 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 electroporation 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, monoclonal antibodies generated in this manner can then also trigger desired immune system functions.

With our core technologies we have developed a rich pipeline of pre-clinical and clinical stage products that have generated, in vivo (in the body), best-in-class immune responses, in particular CD8+ T cells fundamental to eliminating cancerous or infected cells. They are showing their potential to be used against potentially any targeted cancer or infectious disease. Our lead immunotherapy (for treating HPV-associated precancer) met its primary and secondary endpoints in a controlled Phase 2 clinical study, 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 only statistically significant adverse event was temporary injection site pain and redness.

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

These results suggest unique and significant market potential not only for our lead product but for our existing and emerging cancer products as well as the broad spectrum of infectious disease products that may be created based on our technology platform.

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, we direct the patient's immune system to fight specific organisms or cells in a highly targeted and robust fashion. We do this simply by introducing the genetic code for a target antigen(s) into cells of the body that will serve as a temporary antigen production facility.

Our immunotherapies consist of one or more DNA plasmids (circular string of DNA) encoding one or more selected antigens. Our approach uniquely 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 (e.g. viruses, bacteria, and other microorganisms) or abnormal cells (e.g. 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), i.e. to "break tolerance." Alternatively we have proof of principle in human studies that we can generate immune responses with SynCon immunotherapies not matched to different strains of an infectious disease, e.g. influenza, creating more universal protective

capabilities against unmatched strains of a circulating virus. 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. 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 proven 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 (see next section) 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.

Another critical attribute of Inovio’s product development platform is the speed of design, pre-clinical testing, cGMP manufacturing, and regulatory approval for translation into clinical development of its vaccine and immunotherapy products. This is an important feature, particularly as it relates to developing a rapid response to globally emerging infectious diseases. Indeed Inovio has led the way in being globally the first entity in 2016 to move a Zika vaccine into human clinical studies a mere 4.5 months after WHO declared the emerging Zika infections to be a Pandemic Health Emergency of International Concern. Prior to that Inovio led the development of the first MERS vaccine to enter into human clinical studies. As such, Inovio’s rapid 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 (as referenced above).

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 to 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 highly efficient, proprietary electroporation (EP) DNA delivery technology. EP 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 a thousand-fold or more compared to delivering “naked DNA” alone. This extent of cellular uptake has proven to enable the best-in-class immune responses that we have reported, along with the efficacy results generated by these immune responses.

Alternative delivery approaches based on the use of viruses, bacteria, and lipids are complex and expensive and have in the past 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 vectors possess no antigens of its own: the plasmid results in production of only the target antigen.

We have published data showing superior immune responses generated by our SynCon® immunotherapies delivered using our CELLECTRA® electroporation technology compared to a leading viral vector (Adenovirus type 5) based approach. We have not seen any published data indicating the capability of alternative technologies focused on using genetic code to generate preventive or therapeutic antigens to exceed Inovio’s immune response data obtained to date, nor match the efficacy and immune responses data generated in our controlled Phase 2 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 importantly 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

Inovio's primary focus is, independently and in partnerships, to advance the products developed from its integrated platform consisting of its SynCon® immunotherapy and CELLECTRA® electroporation technologies. We are currently developing a number of DNA-based immunotherapies for the prevention or treatment of cancer and chronic infectious diseases. The table on the following page summarizes the status of our product development programs.

Active SynCon® Immunotherapy Development Programs

Product Area	Product and Indication(s)	Development Status				Partner/Funding/Sponsor
		Pre-Clinical	Phase 1	Phase 2	Phase 3	
Cancer	Cervical dysplasia (CIN 2/3) (VGX-3100)	X	X	X	P	Inovio
	HPV-related cancer (INO-3112) (VGX-3100 + DNA-based IL-12 cytokine)	X	IP			MedImmune
	Prostate cancer (INO-5150 +/- DNA-based IL-12 cytokine)	X	IP			Inovio
	hTERT expressing cancers (breast, lung, pancreatic) INO-1400	X	IP			Inovio
	New cancer target (INO-5400 (hTERT + 2 new antigens) +/- DNA-based IL-12 cytokine with checkpoint inhibitor	X	P			Inovio
Infectious Disease	Hepatitis B Virus INO-1800	X	IP			Inovio
	Hepatitis C Virus INO-1800 + DNA-based IL-28 cytokine)	X	IP			GeneOne Life Sciences/NCI
	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			NIH/NIAID
	Universal influenza (INO-3510)	X	X			NIH
	Biodefense targets	IP				US AMRIID

X = Completed
IP= In Progress
P = Planning

Cancer Vaccines/Immunotherapies

Previous Immune Therapy Successes Point to the Potential of Inovio's Immunotherapy Approach

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. Herceptin has been used to treat over 420,000 women (Genentech Inc., 2010). 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 studies by multiple companies of different checkpoint inhibitors have shown notable therapeutic impact against melanoma and other cancers - yet, 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, ie 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 has achieved dramatic results in B cell cancers. Unfortunately it has 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. Moreover, this technology is still in early clinical development.

So while the last two decades have yielded promising technology advancements that better harness or activate capable killer T cells, there is 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 (i.e. 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 (e.g. granzyme and perforin)
- Generate robust T cell responses (e.g. 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
- Are capable of “breaking tolerance” of cancer cells grown in the body.

Our Phase 2 data (discussed under HPV Immunotherapy-VGX-3100) 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.

HPV Immunotherapy-VGX-3100

High Grade Cervical Dysplasia (CIN 2/3)

Human papillomavirus (HPV) is a causative agent responsible for cervical pre-cancers (cervical dysplasia), cervical cancer, other anogenital cancers, and one of the most rapidly growing cancers in men - head & neck cancer. 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 recognized as 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 US, and even less in other countries around the world.

While roughly 90% of HPV infections are cleared by the body on its own (i.e. by the person’s immune system), persistent HPV infection can lead to high grade cervical dysplasia (CIN 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 16/18 are the two most prevalent high-risk types of HPV worldwide, causing the vast

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 CIN 1 caused by HPV types 16 and 18 of 1.4M in the US and 1.3M in the top 5 European countries. There is an annual incidence rate of CIN 2/3 caused by HPV types 16 and 18 of 195K in the US and 233K in Europe. These represent a significant market opportunity. CIN 1 has no treatment. CIN 2/3 is served only 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 US 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 3 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.

Inovio's VGX-3100 is an immunotherapy designed to significantly increase immune responses (humoral and cell mediated) 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 1 Study Results

We completed a Phase 1 study of our cervical precancer immunotherapy (VGX-3100) in 2010. This dose escalation study tested the safety and immunogenicity of VGX-3100 in women previously treated for moderate or severe cervical intraepithelial neoplasia (CIN 2/3), a high grade premalignant lesion that is a precursor to cervical cancer. The trial enrolled patients in three cohorts of six subjects each with VGX-3100 doses of 0.6 mg (0.3 mg each of two DNA plasmids), 2.0 mg, and 6.0 mg. Each subject was dosed at months 0, 1 and 3.

In September 2010, we presented top-line data showing achievement of best-in-class immune responses in this dose escalation study. Data from the trial included:

- Antigen-specific, dose-related T cell responses across the three dose groups;
- Strong antigen-specific antibody responses in all three dose groups;
- VGX-3100 delivered using Inovio’s proprietary CELLECTRA® intramuscular electroporation delivery device was generally safe and well tolerated at all dose levels; and
- No immunotherapy-related serious adverse events (SAEs). Reported adverse events and injection site reactions were mild to moderate and required no treatment.

Immunological analyses of blood samples collected before and after treatment indicate that antigen-specific immune responses were induced against the target proteins produced by Inovio's immunotherapy. We assessed the cellular immune responses by different analytical assays that measure the production of antigen specific T cells as well as their ability to kill in an antigen specific manner. Overall, 17/18 (94%) patients, including 6/6 (100%) of the high dose group, demonstrated vaccine induced antigen (E6 and E7 proteins for HPV types 16 and 18) specific T cell responses. In July 2011 we reported data demonstrating long-term durability of T cell immune responses of up to two years (at the latest time measured) in 7 of 8 evaluated patients following a fourth vaccination of VGX-3100.

In October 2012 we reported that the immune responses generated in this study displayed a powerful killing effect on cells changed by HPV into precancerous dysplasias. These results appeared in the peer-reviewed journal, Science-Translational Medicine, in an article entitled, "Immunotherapy against HPV 16/18 generates potent Th1 and cytotoxic cellular immune responses." In this study, 91% of patients who developed T cell responses showed the presence of CD8 T cells capable of the desired killing activity. Direct killing by CTLs was observed in all

immunized subjects (6 of 6) in the 6 mg cohort.

Antibody responses to E6 and E7 antigens were also measured. Specific antibody responses to tumor antigens can function as an important surrogate potency marker for determining the immunogenicity (immune response characteristics) of an immunotherapy, i.e. its ability to induce an immune response. Antibodies were generated against all four antigens, as tested by the enzyme-linked immunosorbent assay (ELISA). Overall, 100% of the study participants (18 of 18) reported antibody positivity to at least two immunotherapy antigens, and 94% (17 of 18) reported positivity to three antigens; 56% (10 of 18) were positive to all four antigens.

More recently, in 2016 we published data in Molecular Therapy - Oncolytics on a follow-on study (HPV-002) to our previously reported Phase 1 study (HPV-001). In this study, all volunteers were offered a booster vaccination (fourth dose) 6-18 months after they had completed their initial 3 dose regimen and 13 were enrolled. We demonstrated that vaccine specific immune responses were persistent for 6-18 months following the initial vaccination regimen and were augmented following the booster dose. Importantly, the patients had established memory T cells and upon boosting the cells from patients exhibited a CTL phenotype as well as activated CD8 T cells expressing lytic proteins measurable in the periphery. We were also able to identify HPV specific immune signatures in the periphery and identify putative HPV specific T cell receptor sequences in the cervix of vaccinated patients.

Phase 2 Study Results

Based on the successful results from our Phase 1 study, in March 2011 we initiated a randomized, placebo-controlled, double-blind Phase 2 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 our Phase 1 study) or a placebo 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 (ClinicalTrials.gov NCT01304524).

In July 2014 Inovio released top line efficacy data from this Phase 2 clinical trial (HPV-003) for VGX-3100. The primary endpoint, 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 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). This trial also demonstrated virological clearance of HPV 16 or 18 from the cervix in conjunction with histopathological regression of cervical dysplasia to CIN1 or no disease, a secondary endpoint of the trial, in 43 of 107 (40.2%) VGX-3100 recipients compared to 5 of 35 (14.3%) placebo recipients (p=0.001). This is an important outcome as persistence of the virus is associated with recurrence of the disease.

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 randomised, 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, we determined that higher levels of CD8+ killer T cells which co-expressed checkpoint molecule CD137 on their surface as well as the cytolytic protein perforin could 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 and 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. In fact, the difference in frequencies of CD8+ cells expressing CD137 and perforin was greatest in patients who had both regressed their lesions and cleared HPV 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. Inovio has successfully identified several key biomarkers of killer T cells which can be used to predict the clinical efficacy of VGX-3100 as well as other immunotherapies in future

clinical studies.

Importantly, this study 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 a 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. These results have significant

implications in displaying the broad therapeutic and preventive potential of Inovio's existing and future cancer and infectious disease products.

Preparation and launch of VGX-3100 registration Phase 3 study

Based on the Phase 2 results we have stated our intention to advance VGX-3100 into a Phase 3 study. Following is an update on the steps we are taking toward launching this clinical study.

We completed a one-year follow-up to primarily assess safety.

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 our VGX-3100 immunotherapy product.

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 Phase 2 device.

With our submission to start the Phase 3, we obtained alignment with the FDA on the trial design of the pivotal Phase 3 program to support an indication in CIN2/3 as well as for the commercial-scale manufactured DNA product. The FDA requested additional information relating to the new CELLECTRA® 5PSP device, including stability data for the device's single-use disposable electrode array and placed us on a clinical hold pending provision of the additional data on the new device.

This clinical hold was not instituted after a safety issue in an already running clinical study. We had only submitted our Phase 3 regulatory package to the FDA for their review. Rather the hold was intended to delay the trial initiation until the FDA's comments and questions on the new device are addressed.

We received the FDA's formal letter with their comments and questions in November 2016. They had no hold comments regarding our trial design or the biologic. We are currently generating the necessary device-related data to prepare our response and aim to start the Phase 3 study in the first half of 2017.

While on device-focused clinical hold we cannot ship product or recruit or enroll subjects. We are able to secure and prepare targeted clinical sites and submit document packages to institutional review boards for ethical review, which would in any event be a critical activity in the early stage of the trial since in a larger study all the desired investigational sites would not be immediately up and running. Upon lifting of the clinical hold, we plan to be well positioned with clinical sites that are ready to enroll.

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. 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.

VGX-3100 has the potential to be a less-invasive first-line medical treatment option that is focused on preserving reproductive health.

Inovio also plans to expand VGX-3100 to treat other dysplasia conditions caused by HPV infections such as vulvar and anal intraepithelial neoplasias, with the intent to launch at least one new Phase 2 study in 2017.

In February 2017 we announced that we entered into a License and Collaboration Agreement (the "ApolloBio Agreement") with ApolloBio Corporation providing ApolloBio with the exclusive right to develop and commercialize VGX-3100 within Greater China (China, Hong Kong, Macao, Taiwan). Details of this ApolloBio Agreement are provided under Corporate Development.

HPV Immunotherapy-INO-3112 (VGX-3100 +DNA-Based IL-12 Cytokine INO-9012)

Head & Neck Cancer and Cervical Cancer

HPV is also associated with head and neck cancers, especially those in the oropharynx and larynx but also the oral cavity and nose/nasal passages. The incidence of HPV-caused oropharyngeal cancer has increased significantly within the last 20 years and has been increasing at an epidemic rate. In the US, approximately 12,000 new cases of HPV-associated head and neck cancer are diagnosed annually. The estimated prevalence of HPV-caused oropharyngeal cancer in the U.S. in 2012 was nearly 212,000.

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 (HPV currently causes 63% of head & neck cancers). Greater than 70% of cancers of the oropharynx are linked to HPV, with HPV16 being the most prevalent serotype.

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.

In June 2014 we initiated a Phase 1/2a clinical study (ClinicalTrials.gov: NCT02163057) assessing the immunogenicity and safety of INO-3112 (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 HIV immunotherapy clinical study (HVTN-080) showed that the addition of IL-12 to our DNA immunotherapy can enhance the activation of CD8 T cells.

This open-label Phase 1 study called HPV-005 fully enrolled 22 adults with HPV16 and/or HPV18-positive head & neck squamous cell carcinoma (HNSCC) were treated with INO-3112 and 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 Inovio's CELLECTRA® delivery system.

In November 2015 we reported interim data showing that INO-3112 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 we reported interim immunology results showing that in the group 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 only minimal increases in T cell immune responses developed progressive disease at 11 months post start of the study. These results were presented November 12th at the 2016 Annual Meeting of the Society for Immunotherapy of Cancer (SITC).

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 sixteen subjects who received four doses of INO-3112 after at least two months following completion of definitive chemoradiation or surgery and adjuvant chemoradiation therapy.

Cervical cancer is the most commonly occurring cancer among women in developing countries and is the second most commonly occurring cancer amongst women worldwide. Without consistent HPV vaccination or improvements in screening and treatments, current incidence trends suggest that the incidence of cervical cancer could rise from roughly 530,000 cases per year to approximately 1 million cases per year in 2050. The prognosis for advanced cervical cancer patients is characteristically poor and treatment options are palliative at best.

In June of 2014 we initiated a phase 1/2a clinical study called HPV-004 (ClinicalTrials.gov: NCT02172911) assessing the immunogenicity and safety of INO-3112 (VGX-3100 in combination with INO-9012) in cervical cancer patients. Up to 30 patients with HPV16 and/or HPV18-caused inoperable invasive cervical cancer or recurrent or persistent cervical cancer are being evaluated in an open-label study called HPV-004. Women will receive four treatments of INO-3112 every four weeks after completion of a standard chemoradiation or salvage therapy regimen. Each INO-3112 treatment will be a combination of 6 mg of VGX-3100 and 1 mg of INO-9012 delivered together intramuscularly with the CELLECTRA® delivery system. The study team will evaluate clinical responses and assess disease-free survival and disease recurrence up to 18 months after the initial immunotherapy with Inovio's INO-3112. T cell immune responses will be analyzed pre- and post-immunotherapy in the tumor tissue as well as in the periphery blood samples. This study is ongoing.

In August 2015 we formed a strategic partnership with MedImmune, LLC focused on cancer immunotherapies (see Corporate Development). Under this agreement MedImmune licensed INO-3112, which it intends to study in combination with selected immunotherapy molecules within its pipeline in HPV-driven cancers. 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. We expect MedImmune to initiate a combination study in humans in 2017.

HPV Immunotherapy-INO-3106 +/- DNA-Based IL-12 Cytokine

Aerodigestive Cancer

In September 2014 we launched a compassionate Phase 1 clinical trial (ClinicalTrials.gov: NCT02241369) in patients with HPV-caused aerodigestive cancer. Aerodigestive cancer is a condition that affects the lips, mouth, tongue, nose, throat, vocal cords, larynx, and parts of the esophagus and windpipe. Current treatment for HPV-associated aerodigestive cancers includes chemotherapy, radiation, and surgery, all of which have negative side effects.
This Phase 1 study was designed to test INO-3106 alone or in combination with INO-9012 (DNA-based IL-12) in subjects with HPV-6 associated invasive aerodigestive malignancies who have exhausted other treatment options (chemotherapy, radiation and surgery). This is a physician initiated Investigational New Drug application (IND) and is open to suitable patients for compassionate use.

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 January 2011 we announced the publication of a scientific paper in the journal Human Vaccines detailing potent immune responses in a pre-clinical study of our SynCon® immunotherapy for prostate cancer targeting two antigens, prostate specific antigen ("PSA") and prostate specific membrane antigen ("PSMA"). While current prostate cancer therapies target single antigens, in this study we tested the hypothesis in mice that a multi-antigen immunotherapy administered with Inovio's electroporation delivery technology would improve the breadth and effectiveness of a prostate cancer immunotherapeutic.
This study, conducted by our scientists and collaborators, is described in the published paper entitled, "Co-delivery of PSA and PSMA DNA vaccines with electroporation induces potent immune responses." The SynCon® immunotherapy evaluated in this study consists of PSA and PSMA synthetic consensus immunogens based on human and macaque amino acid sequences, which enabled the sequences for these antigens to differ slightly from the native proteins associated with prostate cancer in humans. In humans, this difference may help overcome self-tolerance of cancer cells displaying these prostate-related proteins and enable the generation of an anti-tumor immune response. Mice received two immunizations of highly optimized immunotherapy delivered by electroporation. Immunogenicity was evaluated one week after the second immunization. The resultant data showed the induction of strong PSA and PSMA-specific cellular immune responses and also significant antigen specific seroconversion, illustrating that both humoral and cellular immune responses can be generated by this approach.
In July 2015 we initiated a Phase 1 trial (ClinicalTrials.gov: NCT02514213) 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, Inovio's DNA-based IL-12 immune activator. The multi-centered study will also evaluate changes in PSA levels, an important biomarker in prostate cancer. This study is intended to enroll 60 patients across 4 dose cohorts. We intend to report preliminary data in 2017.

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 July 2013, we announced that our hTERT DNA cancer immunotherapy administered with our CELLECTRA® electroporation delivery device generated robust and broad immune responses, induced T cells with a tumor-killing function, and increased the rate of survival in pre-clinical studies.
In December 2014 we initiated a Phase 1 clinical trial (ClinicalTrials.gov: NCT02327468) for our hTERT (human telomerase reverse transcriptase) DNA immunotherapy (INO-1400) alone or in combination with our DNA IL-12 immune activator (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 in approximately 54 subjects is evaluating the safety, tolerability, and immunogenicity of INO-1400. We expect to report preliminary data in 2017. We have also stated that INO-1400 will be part of a new product called INO-5401 that will be an immunotherapy comprising three tumor-associated antigens and with which we intend to initiate a clinical study with a checkpoint inhibitor.

Cancer Immunotherapy-INO-5401

We previously reported our intention to initiate in 2017 a clinical study focused on an aggressive cancer with a new immunotherapy product called INO-5401, which would be comprised of three tumor-associated antigens, and that we intended to combine 5401 with a checkpoint inhibitor through a collaborative relationship.

In February 2017 we reported that the three antigens encoded in INO-5401 are WT1, hTERT and PSMA.

We also 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.”

Study results revealed that while mice did not mount an immune response to native mouse WT1 antigens, mice immunized with Inovio’s SynCon WT1 antigen broke tolerance and generated robust neo-antigen-like T cells. Furthermore, the immunized mice 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. Inovio’s ability to overcome the immune system’s usual tolerance of WT1 antigen suggests the potential of its SynCon WT1 antigen to tackle any WT1-expressing cancer in humans, which include pancreatic, brain, lung, thyroid, breast, testicular, ovarian, and melanoma.

Inovio previously reported such results for its 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 a powerful universal cancer immunotherapy in combination with different checkpoint inhibitors. We intend to advance INO-5401 into a phase 1/2 study in combination with a checkpoint inhibitor in the first half of 2017.

Infectious Disease Vaccines/Immunotherapies

Hepatitis B Virus-INO-1800

Although an effective preventive vaccine against hepatitis B virus (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 350 million people chronically infected with the virus and at risk of developing cirrhosis or liver cancer. It is estimated that upwards of 1.4 million people in the US 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 unfortunately 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.

In November 2012 we announced data indicating that our HBV immunotherapy generated strong T cell responses that eliminated targeted liver cells in mice. Results from this pre-clinical study appeared in the peer-reviewed journal, Cancer Gene Therapy, in an article entitled, "Synthetic DNA immunogen encoding hepatitis B core antigen drives immune response in liver."

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, our researchers first demonstrated that this therapy elicited strong HBcAg-specific T cell and antibody responses in the periphery (outside of the liver) 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 a strong immunotherapy-induced T cell response was also present in the liver.

In the study the antigen-specific T cells exhibited a killing function, and could migrate to and stay in the liver and cause clearance of target cells without any evidence of liver injury. Taken together, 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 September, 2013, Roche exclusively licensed this SynCon® immunotherapy in conjunction with the use of Inovio's CELLECTRA® electroporation technology for this immunotherapy (see Corporate Development).

In April 2015 we initiated a Phase 1 trial called HBV-001 (ClinicalTrials.gov: NCT02431312) to evaluate INO-1800 in patients chronically infected with hepatitis B. This Phase 1, 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-9112, Inovio's IL-12-based immune activator. This international study is enrolling patients in the United States and Asia Pacific region with a primary endpoint of safety and tolerability of the therapy. The secondary endpoints will evaluate the cellular and humoral immune response to INO-1800 and investigate the therapy's effect on several viral and antiviral parameters. All trial

subjects are also medicated with standard-of-care antiviral therapies. The study has completed interim safety reviews with a favorable safety profile to date. Immunology analyses are planned after completion of enrollment.

In August 2016 Roche terminated its collaboration with Inovio for the development of INO-1800, Inovio's hepatitis B immunotherapy. The termination was finalized in January 2017. All of Roche's rights to INO-1800, including the right to license the product to other parties, have been returned. Inovio was already running a Phase 1 study of INO-1800 initiated in April 2015 and expects to complete enrollment in the first half of 2017 and report preliminary results in the second half of 2017.

Inovio anticipates completing enrollment of the HBV-001 Phase 1 study in the first half of 2017 and expects interim results in the second half of 2017.

Hepatitis C Virus (HCV)-INO-8000/VGX-6150

Hepatitis C virus is a major cause of acute hepatitis. HCV is spread primarily by direct contact with human blood, the major causes worldwide being the use of unscreened blood transfusions and re-use of needles and syringes that have not been adequately sterilized. As many as 75 -85% of newly infected patients may progress to develop chronic infection. Of those with chronic liver disease, 5% - 20% may develop cirrhosis. About 1%-5% of infected people may die from the consequences of long term infection (due to liver cancer or cirrhosis). Globally, more than 170 million people are chronically infected with HCV, which represents a reservoir sufficiently large for HCV to persist, and 3 to 4 million people are newly infected each year. People with chronic HCV infection face an increased risk of developing hepatocellular cancer, a difficult-to-treat cancer with a poor prognosis. Approximately 700,000 people die each year from hepatitis C-related liver diseases.

The HCV therapy market has been recently transformed by the launch and rapid adoption of Sovaldi® and other combo drugs in its class. Yet prices for these products remain high and out of reach for most of the patients in the world. Furthermore, there is no immune system stimulating approach that may provide a better solution for many HCV-infected people.

In April, 2010, we announced, along with our collaborators from Drexel University, Cheyney University, and the University of Pennsylvania, that we received a combined $2.8 million grant from the PA Commonwealth Universal Research Enhancement Program (CURE), to advance our proprietary immunotherapy to treat HCV using our CELLECTRA® electroporation delivery system. The grant funded pre-clinical studies using an expanded set of SynCon® immunogens to test the safety and effect on the immune system of our novel immunotherapy designed to treat persons who are chronically infected with HCV and have not responded to currently available therapies.

At the end of 2011 we announced positive pre-clinical results from our HCV immunotherapy, INO-8000, which were published in Molecular Therapy. This multi-antigen DNA immunotherapy covers hepatitis C virus genotypes 1a and 1b, the most difficult-to-treat genotypes, and targets the antigens NS3/4A, which includes HCV nonstructural proteins 3 (NS3) and 4A (NS4A), as well as NS4B and NS5A proteins. Following immunization, rhesus macaques mounted strong HCV-specific T cell immune responses strikingly similar to those reported in patients who have cleared the virus on their own. The responses included strong NS3-specific interferon-gamma (IFN-g) induction, robust CD4 and CD8 T cell proliferation, and induction of polyfunctional T cells. Importantly, we also observed functional T cells in the liver.

In October 2013 our partner GeneOne (formerly VGX International Inc.) launched a Phase 1 study (ClinicalTrials.gov: NCT02027116) of this HCV immunotherapy. Under a 2011 development agreement GeneOne is fully funding IND-enabling, Phase 1, and Phase 2 studies for this immunotherapy. They are currently testing VGX-6150 (INO-8000 with DNA-based IL-28 cytokine) in Phase 1 testing in Korea.

In April 2016 we announced that INO-8000 will be evaluated in a Phase 1 trial in chronically infected patients who are not receiving other HCV treatments. The study will enroll patients who are in the early stages of chronic HCV infection to determine the therapy's ability to decrease and potentially eliminate HCV viral load, measure HCV specific immune responses and durability of these immune responses, and evaluate safety and tolerability. In this dose-escalation study INO-8000 is being combined with increasing doses of DNA-based IL-12 (INO-9012), an immune activator, which in previous studies has been shown to increase the therapeutic immune response to DNA immunotherapies.

The study is funded by the National Cancer Institute's Division of Cancer Prevention and will be conducted at the Mayo Clinic and other U.S. sites.

Emerging Infectious Diseases

There is a growing international concern and effort focused on how to better diagnose, prevent and treat emerging infectious diseases that continue to wreak havoc around the world. This concern resulted in 2016 in the formation of the Coalition for Epidemic Preparedness Innovation (CEPI), with the vision to better address epidemic outbreaks of infectious diseases at an early stage to prevent them from becoming public health emergencies that result in loss of life, undermine social and economic development and emerge into humanitarian crises.

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

Zika Virus

First identified in Uganda, Zika virus subsequently spread to equatorial Asia and over the past two years has rapidly spread through the South Pacific, including Hawaii, and to South America, Central America, and the Caribbean. 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 is found throughout the world there is concern that outbreaks will spread to new countries. There is also concern that Zika can spread sexually, as has been reported for some returning travelers. In February 2016 WHO stated that 39 countries had reported locally acquired circulation of the Zika virus since January 2007. Geographical distribution of the virus has steadily expanded. 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 Inovio and GeneOne Life Sciences announced a joint research collaboration with academic collaborators of a SynCon® Zika virus vaccine (GLS-5700).

In February 2016 Inovio announced that its Zika vaccine administered using Inovio's 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. Data reported in May showed that two doses of the Zika DNA vaccine delivered either intramuscularly or intradermally resulted in seroconversion, or the development of detectable specific antibodies in the blood, 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. Additional data also demonstrated that 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 June, Inovio was 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 the CELLECTRA®-3P device, Inovio’s proprietary intradermal DNA delivery device.

In December Inovio reported that in this fully enrolled Phase 1 trial Zika-naïve subjects in both low dose and high dose vaccine groups demonstrated Zika antigen-specific antibody responses after one or two vaccinations. In addition, the vaccine was well tolerated and no significant safety concerns were noted in any of the 40 subjects out to 14 weeks from initiation of dosing, the latest available data from the study. This study will evaluate safety, tolerability and induction and persistence of Zika specific antibody and T cell responses out to 60 weeks.

In February 2017 we reported that in our fully enrolled 40-subject phase 1 Zika study of GLS-5700, high levels of binding antibodies were measured (ELISA) in 100% (39 of 39) of evaluated subjects after three vaccinations; 82% (32 of 39) after two doses; and 40% (16 of 40) after one dose. The vaccine was well tolerated with no significant safety concerns to date.

In August Inovio and GeneOne announced they initiated a second clinical study of Inovio's preventive Zika vaccine (GLS-5700), this one designed to enroll 160 subjects in Puerto Rico, where the Zika virus outbreak had been declared a public

health emergency. In this placebo-controlled, double-blind trial involving healthy adult volunteers, 80 subjects will receive vaccine and 80 subjects will receive placebo. The study will evaluate the safety, tolerability and immunogenicity of GLS-5700 administered with Inovio's CELLECTRA®-3P device. The companies will also assess differences in Zika infection rates in participants given either placebo or vaccine as part of an exploratory endpoint.

In December 2016 we also announced the award of a $6.1 million sub-grant to Inovio 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 is 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 Synthetic DNA-based Monoclonal Antibodies Products for further information on our DNA-based monoclonal antibody program.

Ebola

The Ebola virus has been described as one of the most virulent viral diseases known to man 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).

In 2014 we announced our intent to advance our DNA immunotherapy for Ebola into a Phase 1 clinical trial in collaboration with GeneOne Life Science Inc. In the collaboration, Inovio and GeneOne agreed to co-develop Inovio's DNA-based Ebola immunotherapy through a Phase 1 clinical trial. The decision to advance our Ebola immunotherapy was based on positive results achieved in preclinical studies. We observed that 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, "Induction of Broad Cytotoxic T Cells by Protective DNA Vaccination Against Marburg and 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. 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, PhD, Inovio board member, 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.

The Inovio-led consortium is 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. This promising new technology 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.
- 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.

The award covers pre-clinical development costs for the dMAb products and protein mAb candidates as well as GMP manufacturing costs and the Phase 1 clinical study costs with the three product candidates. The academic partners are leading Ebola research and medical centers at the front edge of the discovery efforts for highly potent anti-Ebola mAbs. The funding

period is over two years and covers a base award of $21 million and an option award of $24 million, which was exercised in September 2015 upon the successful completion of certain pre-clinical development milestones. Inovio has completed all of the vaccine development milestones (see below) and is on track to complete the protein Mab and the dMAb milestones in 2017. Inovio has completed the identification, screening, and selection of the protein MAb and dMAb candidates under the award. In February 2017, DARPA awarded Inovio a No Cost Extension by 1-year to enable the completion of cGMP manufacturing of the protein MAb and the dMAb candidates and preparation of the first human clinical study with the dMAb.

In May 2015 the collaborators initiated a Phase 1 trial (EBOV-001, ClinicalTrials.gov: NCT02464670) for the Ebola DNA vaccine to evaluate safety, tolerability and immune responses in 75 healthy subjects. The study was designed to evaluate INO-4212 and its components INO-4201 and INO-4202, alone or in combination with INO-9012 (DNA-based IL-12), delivered into muscle or skin using Inovio's proprietary DNA delivery technology.

In March 2016 Inovio announced that this fully enrolled Phase 1 study was safe, tolerable, and generated strong T cell and antibody responses.

This initial trial evaluated INO-4212 in five groups of healthy subjects. INO-4212 consists of two optimized SynCon® DNA plasmids coding for the Ebola glycoprotein antigen from circulating Ebola strains from 1975 - 2014. These plasmids were tested separately and together in muscle and skin in five study arms, one including Inovio's DNA-based IL-12 immune activator. Of 69 evaluated subjects, 64 (92.7%) 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.

Significantly, 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, and 13 of 13 evaluable subjects (100%) produced strong antibody responses after three immunizations and12 of 13 (92.3%) demonstrated 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 and had not demonstrated systemic serious adverse effects, such as fever, joint pain, and low white blood cell counts, reported in association with some viral vector based Ebola vaccines currently in development. Moreover, unlike the viral vectored vaccines which must be kept frozen, INO-4212 was formulated in a solution which was refrigerated at 2-8 C.

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

In August Inovio announced that enrollment of this study was being expanded to 200 subjects to further characterize and identify in humans the most optimal immunization regimen using intradermal (skin) delivery of its preventive Ebola DNA vaccine. Inovio will be enrolling an additional 125 subjects to assess immune response characteristics generated with fewer intradermal administrations, lower doses, and with and without its DNA-based IL-12 immune activator.

Inovio aims to report additional data from these programs in 2017.

Middle East Respiratory Syndrome (MERS)

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. The virus has not been shown to spread in a sustained way in communities, but the situation is still evolving. Like the severe acute respiratory syndrome (SARS) outbreak in 2003, which infected 8,000 people and was fatal in nearly 10% of cases, MERS is caused by a coronavirus and appears to cause a severe lung infection. MERS differs in that it also causes rapid kidney failure. Its extremely 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 almost 1,900 MERS infections and nearly 700 deaths worldwide. Twenty seven countries have reported cases, including Korea where an outbreak in the summer of 2015 resulted in 186 cases and 38 deaths. While a SARS epidemic in 2003 killed 10% of those infected, MERS has killed about 36% of people who contracted this communicable virus.

In November 2013 Inovio announced that preclinical testing of its SynCon® MERS vaccine (GLS-5300) induced robust and durable immune responses, demonstrating the potential for such a vaccine to prevent and treat this deadly virus. DNA vaccine constructs targeting multiple MERS antigens were designed using Inovio's 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 Inovio's CELLECTRA® electroporation-based delivery technology.

A consensus MERS "spike" protein vaccine construct was created based on multiple strains of the MERS virus. Inovio's MERS DNA vaccine was immunogenic in mice and seroconversion, or the development of detectable specific antibodies in the blood as a result of immunization, was observed in all animals. Furthermore, 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 unvaccinated mice in the control group (10) 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.

These 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 May 2015 Inovio announced it would advance its MERS vaccine into a Phase 1 clinical trial in healthy volunteers in a collaboration with GeneOne Life Science Inc.

In August 2015 Inovio announced that its MERS vaccine 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. The data from camels is an important finding because camels represent not only a host reservoir of the disease but 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 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." Inovio's collaborators for this study included researchers from the University of Pennsylvania, Public Health Agency of Canada, NIH, University of Washington, and University of South Florida.

Vaccinations of GLS-5300 in this Phase 1 study of 75 healthy subjects began in February 2016 at the Walter Reed Army Institute of Research (WRAIR) in Maryland, where the trial is being conducted. 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 Inovio announced that the International Vaccine Institute (IVI) will provide new funding and support to further advance 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 41 billion Won (USD $34 million) grant publicly pledged in 2015 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 that in our fully enrolled 75-subject phase 1 study of our MERS DNA vaccine GLS-5300, high levels of binding antibodies were measured (ELISA) 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 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 US were living with HIV.

Effective vaccines have been actively pursued for over 20 years, without success. HIV represents one of the most confounding targets in medicine. The virus' 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.

In October 2009, along with the HIV Vaccines Trial Network ("HVTN") we initiated a Phase 1 study (HVTN-080) of PENNVAX®-B (with and without a DNA cytokine, DNA IL-12) with the CELLECTRA® electroporation delivery device in healthy, uninfected individuals. The SynCon®vaccine was encoded for HIV antigens gag, pol, and env from HIV subtype, or clade, B. This randomized, double-blind, multi-center study was sponsored by the NIAID, an agency of the National Institutes of Health (the "NIH"), conducted by the NIAID-funded HVTN, and was designed to assess safety and levels of immune responses.

Of 48 healthy, HIV-negative volunteers, eight received placebo, 10 received a 1 mg dose of PENNVAX®-B immunotherapy, and 30 received a 1 mg dose of PENNVAX®-B along with IL-12 DNA. All volunteers received vaccine or placebo administered with electroporation at months 0, 1, and 3. T-cell immune responses were detected using a validated flow cytometry-based intracellular cytokine staining (ICS) assay.

This data was published in July 2013 in the peer-reviewed Journal of Infectious Diseases in the article, "Safety and comparative immunogenicity of an HIV-1 DNA vaccine in combination with plasmid IL-12 and impact of intramuscular electroporation for delivery." Overall, CD4, CD8 or both T-cell responses were observed against at least one of the immunotherapy antigens in 88.9% (24 of 27) of evaluated subjects after three immunizations with electroporation plus DNA-based IL-12. The magnitude of cellular immune responses were equal to or greater than those reported from vector-based HIV vaccines such as adenovirus. These results represented best-in-class immune responses that had not previously been observed with other platforms.

Other specific results included:

- Antigen-specific CD4 T cell responses were generated in 80.8% of evaluated immunotherapy recipients (21 of 26).
- Significant antigen-specific CD8 T cell responses were generated in 51.9% of evaluated immunotherapy recipients (14 of 27).
- Compared to a previously conducted HVTN 070 Phase 1 study, which assessed PENNVAX®-B with cytokine adjuvant IL-12 at double the dose, with four immunizations, but without electroporation delivery, response rates in HVTN 080 with electroporation were significantly higher than HVTN 070 CD4 responses (40.7%) and CD8 T cell responses (3.6%). Samples from eight placebo recipients and pre-vaccine samples were negative for both CD4 T cell responses and CD8 T cell responses.
- PENNVAX®-B delivered using the CELLECTRA® intramuscular electroporation delivery device with or without IL-12 was safe and generally well tolerated. There were no immunotherapy-related serious adverse events. Reported adverse events and injection site reactions were mild to moderate and required no treatment.

A second clinical study testing PENNVAX®-B in a therapeutic setting was conducted in collaboration with the University of Pennsylvania. The HIV-001 open label, Phase 1 study enrolled 12 adult HIV-positive volunteers to assess safety and levels of immune responses generated by PENNVAX®-B delivered with our CELLECTRA® electroporation device. Study volunteers were required to be on a highly active antiretroviral therapy (HAART) regimen, have undetectable plasma viral load (<75 copies/mL), and have CD4 T lymphocyte counts above 400 cells/μL with nadirs over 200 cell/μL. Twelve (12) eligible subjects were administered a four dose series (day 0, weeks 4, 8 and 16) of PENNVAX®-B containing 3 mg of DNA/dose via intramuscular electroporation.

T cell responses were measured using a validated ELISpot assay. Overall, significant immunotherapy-specific T cell responses were observed in 75% (9 out of 12) of subjects against at least one of the three immunotherapy antigens (gag, pol, or env) following immunization. Fifty percent of the subjects (6 out of 12) had strong immunotherapy induced antigen-specific responses above the pre-immunization levels to at least two of the antigens. Importantly, the responses induced by immunization were predominantly antigen-specific (i.e. gag, pol and env) CD8 T-cells, which are considered to be paramount in clearing chronic viral infections and an important measurement of the performance of an immunotherapeutic. These results are in stark contrast to previously reported studies with other DNA immunotherapies delivered without electroporation that yielded poor overall T cell immune responses.

In December 2014 the results from this clinical study appeared in the peer-reviewed journal Molecular Therapy in the article, "Synthetic consensus HIV-1 DNA induces potent cellular immune responses and synthesis of granzyme B, perforin in HIV infected individuals," authored by Inovio researchers and collaborators.

Our HIV immunotherapy was found to have significantly increased antigen-specific CD8+ T-cell responses in all 12 patients. We observed that these activated CD8+ killer T cells produced the cell-killing substances granzyme B and perforin (both necessary to kill targeted cells and viruses) in quantities and with characteristics similar to those of long-term non-progressors (i.e. HIV-infected individuals who, without treatment, do not progress to further stages of the disease). It is

believed that in these extremely rare individuals who self-regulate their HIV infection, part of their ability to control the infection may lie in their unique immune responses.

Another striking result of this HIV study was that PENNVAX®-B increased the number of HIV-specific CD8+ killer T cells displaying the receptor integrin, which is associated with the ability to carry T cells to the gastrointestinal tract (GIT), the most important target organ for HIV.

We believe these positive results demonstrate the potency of our immunotherapy technology platform and raise the potential for the development of immunotherapies against HIV.

The valuable proof of concept data achieved with the PENNVAX®-B (targeting clade B envelope viruses) clinical studies provided a strong and positive basis with which to advance our HIV immunotherapy development program via an HIV Vaccine Design and Development Teams (HVDDT) contract for PENNVAX®-GP (discussed below).

In September 2010 the United States Military HIV Research Program (MHRP) initiated a Phase 1 trial (RV262) using one of our prophylactic HIV immunotherapies in a unique prime-boost strategy. This program was developed to protect against diverse subtypes of HIV-1 prevalent in North America, Europe, Africa, and South America. The study is being conducted by the United States MHRP through its clinical research network in the US and East Africa. The prime was a DNA immunotherapy, Inovio's PENNVAX®-G, and the boost was delivered using a vaccinia viral vector, Modified Vaccinia Ankara-Chiang Mai Double Recombinant (MVA-CMDR). Together, the vaccines were designed to deliver a diverse mixture of antigens for HIV-1 subtypes A, B, C, D and E. The study tested PENNVAX®-G delivered with electroporation in conjunction with the MVA-CMDR boost. The NIAID sponsored the study, which was designed to enroll up to 92 participants and assess safety and immune responses. Interim data presented in October 2014 showed that the vaccine administration was generally safe and well tolerated. Antigen specific T cell responses were detected by interferon gamma ELISpot assay in 12/27 subjects and antibody responses were noted by ELISA in 10/11 subjects whose samples had been analyzed up to that point.

Based on the proof-of-concept established with PENNVAX®-B, we were awarded a contract under the NIAID's HIV Vaccine Design and Development Teams program to advance a more optimized preventive HIV DNA vaccine, PENNVAX®-GP, delivered using intradermal electroporation delivery. The contract provided for up to $25.3 million of funding over seven years. The funding and development program covered pre-clinical optimization, immunogenicity and challenge studies in animal models, IND-enabling toxicology studies, cGMP (current good manufacturing practices) manufacturing of all components of the immunotherapy and intradermal CELLECTRA® electroporation device, and the conduct of a Phase 1 human clinical trial.

In September 2015 the first patient was dosed in a Phase 1 trial (HVTN-098, ClinicalTrials.gov: NCT02431767) to evaluate safety and tolerability of PENNVAX®-GP, Inovio's "universal" DNA vaccine for HIV. This human study is in collaboration with the HIV Vaccine Trials Network (HVTN). The trial will measure 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 Inovio's CELLECTRA® delivery technology.

In 2015 Inovio and its collaborators were awarded an additional $16 million Integrated Preclinical/Clinical AIDS Vaccine Development (IPCAVD) grant from the National Institute of Allergy and Infectious Diseases (NIAID). This new five-year program grant was awarded based on a peer-reviewed meritorious proposal by Dr. David Weiner, executive vice president at the Wistar Institute, Inovio board member and chair of the scientific advisory board, and Inovio. New PENNVAX® envelope constructs will be designed and tested with Inovio's DNA-based immune activator encoding novel cytokine genes and will be studied in a prime-boost strategy with recombinant HIV envelope proteins. The 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 Inovio's 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.

Inovio is working with NIH/DAIDS and collaborators to also launch a Phase 1 clinical study of PENNVAX®-GP in a therapeutic setting.

HIV remains a challenging and tremendously important area of medical research, and we value the NIH's support to further evaluate the immunogenicity and efficacy of our electroporation delivery system and novel preventive HIV immunotherapy candidate.

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 the HIV virus. See the section called Synthetic DNA-based Monoclonal Antibodies Products for more details on this technology.

Avian Influenza Immunotherapies

Influenza is one of the most communicable diseases and typically affects children and elderly most severely. Complications from influenza cause more than 200,000 hospitalizations and cause between 3,000-49,000 deaths each year in the United States alone, according to the Centers for Disease Control. The world is annually subjected to two influenza sessions (one per hemisphere), between three and five million cases of severe illness, and up to 500,000 deaths. A pandemic occurs every ten to twenty years, which infects a large proportion of the world's population and can kill tens of millions of people as the “Spanish Flu” did in just two years (50-100 million deaths during 1918-1919). New influenza viruses are constantly produced by mutation or reassortment, and can develop resistance to standard antiviral drugs. The H5N1 flu virus spread from Asia despite the belief that it was under control immediately after outbreaks there in 2004. In 2005, there were reports of H5N1 in wild birds in Europe. In 2006, there were reports of an H5N1 strain in wild birds and poultry in Africa and the Near East. According to the World Health Organization, the H5N1 bird flu infected 650 people and resulted in 386 deaths (approximately 60% death rate) in 15 countries since 2003 (WHO, February 2014). While H5N1 has never been passed person-to-person and has not spread widely, one concern is the potential for the lethal H5N1 to “reassort” with another of the influenza sub-types that have been prone to spread more rapidly in humans, possibly creating a more dangerous influenza strain. Through 2006, over 140 million birds had been killed and over $10 billion spent to try to contain H5N1 avian influenza, which has a death rate of 90%-100% in birds.

Our VGX-3400X candidate targets H5N1. The immunotherapy consists of three distinct DNA plasmids coded for a consensus hemagglutinin (HA) antigen derived from different H5N1 virus strains; a consensus neuraminidase (NA) antigen derived from different N1 sequences; and a consensus nucleoprotein (NP) fused to a small portion of the m2 protein (m2E) based on a broader cross-section of influenza viruses in addition to H5N1 and H1N1.

In our first proof of principle study of our universal flu immunotherapy program, VGX-3400X was delivered with intramuscular electroporation using our CELLECTRA® electroporation device. The primary objectives of this clinical trial were to assess safety and tolerability. The secondary objective was the measurement of antigen-specific T cell and antibody responses, including binding and hemagglutination inhibition (HAI) responses, i.e. a measure of protection, against multiple strains of H5N1 influenza.

The study assessed a total of 60 healthy volunteers, 30 in the US and 30 in Korea (in a separate, parallel clinical trial sponsored by Inovio affiliate GeneOne. Three dose cohorts of 10 subjects were each given two injections of 0.2 mg, 0.67 mg, or 2.0 mg of each plasmid at months 0 and 1.

In a report in July 2011 of interim data VGX-3400X was found to be generally safe and well tolerated at all dose levels. There were no vaccine-related serious adverse events. Reported adverse events and injection site reactions were mild to moderate and required no treatment.

We tested for antibody responses against the target antigens and observed high levels of binding antibodies in 26 of 27 evaluated subjects (96%). Antibodies were generated against all three antigens, as tested by the enzyme-linked immunosorbent assay (ELISA). Positive antibody responses persisted to seven months, the latest time point tested.

In testing for HAI responses against the Vietnam (A/H5N1/1203/04) strain, 3 of 27 subjects (11%) showed HAI titers greater than 1:40, which is considered to be an indicator of protection against influenza in humans. Two of the three subjects with HAI titers exceeding 1:40 against the Vietnam strain also demonstrated greater than 1:40 titers against the Indonesia (A/H5N1/5/2005) strain, demonstrating cross-reactive responses in these volunteers.

Significantly, antigen-specific cytotoxic T-lymphocyte (CTL) responses were also observed against all three antigens (HA, NA and NP). After two vaccinations, 13 of 18 vaccinated subjects (72%) from the first two cohorts developed strong CTL responses to at least one of the immunotherapy components. After cohort 3 samples were analyzed, 20 of 29 immunized subjects (69%) in all 3 cohorts developed strong CTL responses to at least one of the immunotherapy components. These positive T cell responses were measured up to seven months after the first immunization. Generation of influenza antigen-specific T cell responses is believed to be important for generating universal, long-lasting immunity against influenza as well as to generate a stronger immune response against flu in elderly people.

In another component of the study, participants received a booster vaccination using just the H5 HA immunotherapy component of VGX-3400X delivered using intradermal (rather than intramuscular) electroporation. The intradermal (ID) part of the study was the first flu study using ID electroporation delivery in humans. ID electroporation delivers our SynCon® immunotherapies into skin, which contains large amounts of immune cells such as dendritic cells and

macrophages considered most important for generating protective antibodies. Our new ID electroporation device uses a patented miniaturized needle array which creates electroporation conditions uniquely optimized for skin delivery. The goal of this booster vaccination was to determine if ID delivery of the H5 HA construct can increase HAI titers beyond those achieved by the initial intramuscular immunizations. Twenty-two participants received the ID booster immunization.

Immune response data measured one month after this boost were reported in November 2011. Ten of 20 subjects (50%) exhibited a four-fold or greater rise in geometric mean titers (GMT) in the HAI assay (ranging from 1:20 to 1:80 HAI

titers) against the Clade 1 A/Vietnam/1203/04 strain. Significantly, a four-fold or greater rise in GMT titers against five other Clade 2 (Clade 2.1, 2.2; 2.3.2; 2.3.4) and Clade 0 H5N1 viruses was also noted in 10-25% of the vaccinated subjects, further demonstrating cross-reactive immune responses in these volunteers. One subject displayed greater than 1:40 HAI titers against all six different H5N1 viruses tested. ID immunization was found to be generally safe and well tolerated.

HAI measurements from the blood of an immunized subject are used to assess the generation of protective antibody responses. A four-fold rise in HAI titers (compared to pre-vaccination) is considered to be an important indicator of immune activation. Generating an HAI titer of 1:20 is generally regarded as a positive vaccine response, with a titer of 1:40 or higher in the blood of immunized subjects generally associated with protection against influenza in humans. Seventeen subjects boosted with the minimally invasive ID vaccination were subsequently given a second ID booster vaccination. In May 2012 we reported that 100% and 89% of immunized subjects demonstrated high-titer binding antibody responses against the more common Clade 1 A/Vietnam/1203/04 and Clade 2 A/Indo/5/05 strains, respectively, demonstrating vaccine-specific immune activation. We also tested the immunotherapy's ability to generate protective HAI responses against six distinct H5N1 virus strains (Clades 0, 1, 2.1, 2.2, 2.3.2 and 2.3.4), representing all major genetic branches of the H5N1 genetic tree. Of the 17 subjects who completed the full immunization regimen:

- Eight of 17 (47%) immunized subjects had an HAI titer of 1:40 or higher against at least one of the tested H5N1 viruses.
- Twelve of 17 (71%) vaccinated subjects had an HAI titer of 1:20 or higher against at least one H5N1 strain.
- Seven of 17 (41%) had an HAI titer of 1:40 or higher against the Clade 2.2 A/Turkey/1/05 strain.
- Five of 17 immunized subjects (29%) displayed an HAI titer of 1:20 or higher against at least three different H5N1 viruses tested.
- In an unprecedented result, two immunized subjects demonstrated an HAI titer of 1:20 or higher against all six strains tested.

Hemagglutination inhibition (HAI) measurements from the blood of an immunized subject are used to assess the generation of protective HA antibody responses generated by a vaccine. All HAI titer data are presented in geometric mean titers (GMT). Generating an HAI titer of 1:20 is generally regarded as a positive response to the vaccine; a titer of 1:40 or higher in the blood of immunized subjects is generally associated with protection against seasonal influenza viruses and has been observed in multiple subtypes.

Although a number of companies have well-developed avian influenza programs and lead vaccine candidates have entered into national stockpiles (US and EU), we believe there exists a need for broadly protective and easily scalable technologies to prepare for the as yet unknown target presented by the next form of avian influenza. Our SynCon® technology provides protection from known avian influenza viruses (in animal studies) and has also shown the ability to protect against newly emergent, unmatched strains.

Responding to the 2013 H7N9 influenza outbreak, we completed the design, optimization, and manufacturing of an H7N9 DNA immunotherapy within two weeks. A pre-clinical study of this DNA therapy showed that 100% of vaccinated mice were protected against sickness and death when they were challenged with a lethal dose of H7N9 virus. This study further highlights the ability of Inovio's SynCon® immunotherapies to create cellular immune responses that could reduce the severity of H7N9 infection in a person that acquires the virus and limit the spread of the virus in a pandemic setting. Data from this study was published in Vaccine in a paper titled “Protective immunity to H7N9 influenza viruses elicited by DNA vaccine.”

We are seeking additional grant funding to advance our influenza program further.

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 noted above. 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 developed a universal vaccine strategy to deal with the ever-changing flu threats. Using our SynCon® process, our scientists 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. Thus, 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 September 2012 we announced that an interim analysis of a SynCon® universal H1N1 influenza vaccine showed that it generated protective HAI titers against some of the most prevalent strains of H1N1 influenza from the past 100 years in a Phase 1 clinical trial. The open label Phase 1 study evaluated two H1N1 hemagglutinin (HA) plasmids designed to broadly protect against unmatched influenza strains within different branches of the H1N1 subtype. These plasmids were delivered in healthy adults with Inovio's CELLECTRA® intradermal electroporation device up to three times. The delivered immunotherapy was well tolerated; reported adverse events and injection site reactions were mild to moderate and required no treatment.

Researchers exposed blood samples from the vaccinated subjects to each of the nine key H1N1 viruses in circulation over the last 100 years: eight were H1N1 strains used to formulate the seasonal vaccines of the last 25 years; one was the H1N1 strain that caused the 1918 Spanish flu. These unmatched influenza strains were used to assess the generation of hemagglutination inhibition (HAI) titers meeting or exceeding 1:40. Demonstrating Inovio's vaccine's broad cross-reactive coverage, a significant percentage of subjects immunized with Inovio's SynCon® immunotherapy had an HAI titer of 1:40 or higher against each of the nine H1N1 strains tested, ranging from a 30% response rate to the A/Brisbane/59/07 strain to a 100% response rate to the A/Beijing/262/95 strain. The benchmark for the current licensed seasonal flu vaccines, which are based on matching the vaccine HA sequence to that of the circulating strain, is to have greater than 65% of vaccinees generate an HAI titer of 1:40 or higher against the matched vaccine strain. By design, our SynCon® universal flu immunotherapy is not matched to any single virus and was not matched to any of the strains tested in this study. The immunotherapy recipients generated protective HAI responses against the H1N1 A/South Carolina/1/18 strain from the 1918 Spanish flu as well as all the H1N1 strains which were part of the annual seasonal trivalent inactivated flu vaccines (TIV) since 1986, including: A/Taiwan/1/86, A/Texas/36/91, A/Bayern/07/95, A/Beijing/262/95, A/New Caledonia/20/99, A/Solomon Islands/03/06, A/Brisbane/59/07, A/California/07/09. The HAI titers in the positive responders ranged from 1:40 to greater than 1:1280.

Compared to the seasonal TIV (trivalent influenza vaccine)-immunized control group, which was matched to the current H1N1 seasonal flu strain (A/California/07/09), those immunized with our immunotherapy generated a higher or similar percentage of positive HAI titer responders against all of the strains except for A/California/07/09. As anticipated, the TIV recipients generated the best HAI titers against the matched strain, but did not generate vaccine-induced response rates against the unmatched strains.

We are conducting optimization studies in animal models to further strengthen our H1N1 immunotherapy's potency against all strains, especially the current circulating strain, A/California/07/09, as well as to reduce the number of injections needed to generate protective responses against multiple strains.

In December 2012 we reported interim results of a Phase 1 trial that showed that a single dose of our H1N1 universal SynCon® flu immunotherapy followed with a dose of a seasonal flu vaccine generated protective immune responses in 40% of trial subjects compared with a 20% response rate in elderly patients who received the seasonal flu vaccine alone.

People over 65 years of age represent about 90% of annual influenza deaths in the US. Older people's immune systems typically mount much weaker protective immune responses to seasonal vaccines, often in only 10 to 20% of this population. In younger adults, the same flu vaccines generate protective immune responses in at least 65% of the vaccine recipients. Other approaches, such as the use of higher vaccine doses and novel adjuvants, have not significantly improved the seasonal vaccine's impact in the older population. Thus, there is a significant need for a new approach to provide better protection in this more vulnerable population.

With the vulnerability of the elderly in mind, this Phase 1 study evaluated the ability of Inovio's SynCon® immunotherapy alone, as well as in combination with the 2012 seasonal influenza vaccine, to generate protective levels of antigen-specific antibody immune responses in a greater proportion of the elderly population as well as to

assess the potential for more universal protection against both matched and unmatched seasonal influenza strains. In the trial, conducted at the University of Manitoba in Winnipeg, Canada, 50 healthy elderly patients were divided into three groups: one group of 20 subjects received a two-dose regimen of Inovio's H1N1 universal SynCon® flu immunotherapy delivered using Inovio's proprietary CELLECTRA® intradermal electroporation device 16 weeks apart; a second group of 20 subjects received one dose of Inovio's SynCon® immunotherapy delivered using electroporation followed by a dose of

seasonal flu vaccine 16 weeks later; a third group of 10 subjects received placebo delivered by electroporation followed by a dose of the seasonal flu vaccine 16 weeks later. The study's objectives were to assess the tolerability, safety, and immune responses of these different immunization regimens.

Serum samples from the immunized subjects were used to assess the generation of hemagglutination inhibition (HAI) titers meeting or exceeding a dilution of 1:40 to the current H1N1 seasonal flu strain (A/California/07/09). An HAI titer of 1:40 is the level recognized as a protective immune response against influenza in humans. Because of generally high HAI titer background rates to the A/California/07/09 strain, immunotherapy-specific, protective response rates were determined by assessing the number of patients in each group who had HAI titers greater than 1:40 and HAI titers at least 4-fold higher than the background value at the start of the trial. In reported interim data, immunization with the H1N1 universal SynCon® flu immunotherapy followed with a dose of a seasonal flu vaccine generated protective immune responses in 40% (8 of 20) of trial subjects compared with a 20% (2 of 10) response rate in elderly patients who received the seasonal flu vaccine alone. We are analyzing the final data with the intent to prepare a paper for submission to a peer-reviewed scientific publication.

Finally, on our path to develop a universal seasonal flu immunotherapy we completed tests in animal models of our immunotherapy constructs for A/H3N2 and Type B influenza. Our goal is to develop immunotherapies that can also generate HAI titers exceeding 1:40 against unmatched strains within the H3N2 and Type B subtypes. In January 2012, we reported that our immunotherapies for influenza Type A H3N2 and Type B achieved protective antibody responses in immunized animals against multiple unmatched strains.

In the study of our SynCon® H3N2 immunotherapy, investigators immunized small animals (mice and guinea pigs) with a vaccine designed to produce the influenza hemagglutinin (HA) antigen in the animals. Inovio investigators have to date tested blood samples from the animals for immune responses against unmatched strains from several clades of H3N2. (Like the branches of a tree, there are dozens of distinct strains within each of these clades). The animals immunized with the SynCon® H3N2 immunotherapy developed HI titers exceeding the 1:40 level commonly associated with protective immunity against several clades of H3N2 tested. These included strains circulating in the 2000-01, 2006-07, and 2008-09 influenza seasons, which had necessitated a change in the composition of the seasonal flu vaccine for those years. Additional animal testing of the remaining few H3N2 clades continued through 2012 and was to include a new strain, H3N2v (A/Indiana/10/2011 X203), which was selected in January 2012 by the CDC as a pandemic vaccine target.

Similarly, in the study of our SynCon® Type B immunotherapy, investigators tested blood samples from immunized mice for immune responses against multiple, unmatched strains of Type B influenza. All the animals immunized with the SynCon® Type B immunotherapy developed HI titers exceeding the 1:40 level against all of the strains of Type B tested, including those circulating and consequently a part of the vaccine formulation in 2001-02, 2008-09, and 2011-12. Type B influenza mutates more slowly than Type A, but enough to preclude lasting immunity. Type B influenza can lead to life-threatening complications, including pneumonia, in young children, persons over 50, those with chronic diseases (e.g. diabetes) or suppressed immune systems, and others at risk for complications.

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

In October 2014 we announced that the Defense Advanced Research Projects Agency (DARPA) awarded $12.2 million to scientists from the Perelman School of Medicine at the University of Pennsylvania, Inovio Pharmaceuticals, 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 Synthetic DNA-based Monoclonal Antibodies Products for more details on our dMAb programs.

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 biowarfare pathogens. Over the past five years, we have been successful at securing funding from the US government for such projects.

The company continues 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 March 2011 we received a U.S. Department of Defense Small Business Innovation Research (SBIR) grant to test the feasibility of delivering DNA vaccines by intradermal electroporation simultaneously to two or more spatially distinct sites on the body. The purpose of such a prototype device would be to mitigate potential immune interference that may result from combination vaccines that are formulated together. The device design would also facilitate rapid vaccination against multiple emerging infectious disease or pandemic threats and better meet the demands of quickly vaccinating U.S. troops stationed around the world.

In April 2012 we received a U.S. Department of Defense SBIR grant to advance the development of a low-cost, non-invasive surface electroporation delivery device and test its utility in combination with our novel DNA immunotherapies against viruses with bioterrorism potential, including hanta, puumala, arenavirus and pandemic influenza. This project is a continuation of a first-stage DOD grant in 2011 that initiated Inovio's development of this skin delivery system.

In the first phase of this project, Inovio focused on optimizing the device design of our current minimally invasive surface EP device. In this second phase, the objective was to further advance and validate this device and the resulting immune responses in appropriate animal models. We 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 Inovio was selected to receive a $500,000 grant from the U.S. Army’s SBIR program to further advance the development of Inovio’s 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 Inovio’s 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 Products

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

Monoclonal antibodies (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 unique 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 Remicade®). 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 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 - not outside of the body like conventional mAb technology. This approach provides potentially significant production costs advantages. More importantly, we believe our dMAb products can target a pharmacokinetic profile that provides significant control and advantages in terms of dosing regimen, peak responses, duration of responses, and toxicity.

We expect to design dMAb products not only for new disease targets not currently addressable with conventional mAbs; we can also target existing, commercially successful mAb products. This new application of our core technology platform represents another potentially paradigm-shifting transformation in the immunotherapy field with very significant business potential. We have already designed and produced dMAb products targeting cancer mechanisms including checkpoint inhibition, anti-cancer pathways, e.g. like Herceptin, and anti-Tregs, as well as prophylactic and therapeutic dMAb products 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.” The results demonstrated that 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.Importantly, this delivery strategy resulted in a rapid increase (i.e., in as little as 48 h) in Fab levels 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 products was very rapid, with 100% survival in mice challenged with lethal enhanced dengue disease less than a week after dMAb product 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 products 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 , “Rapid and long-term immunity elicited by DNA encoded antibody prophylaxis and DNA vaccination against Chikungunya virus,” discussed our results demonstrating 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. 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.

Chikungunya virus (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.

Next Steps

In October 2014 we announced that the Defense Advanced Research Projects Agency (DARPA) awarded $12.2 million to scientists from the Perelman School of Medicine at the University of Pennsylvania, Inovio Pharmaceuticals, and MedImmune to develop and assess dMAb products 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 products focused on influenza virus and antibiotic resistant bacteria (Pseudomonas aeruginosa and Staphylococcus aureus).

In 2016 we expanded the collaboration to include The Wistar Institute after the collaborating investigator Dr. David Weiner moved to the Institute. Successful completion of the initial preclinical activities under the DARPA grant would lead to clinical studies on selected product candidates under suitable future funding from government or non-government organizations.

In April 2015 the company received a grant from DARPA to lead a collaborative team 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, PhD, Emory University and Vanderbilt University.

The consortium is 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 dMAb™ against the Ebola virus infection. This promising new technology 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.
- A DNA-based vaccine against Ebola.

The aim of this research 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 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 the HIV virus.

Funding for this research is part of a $23 million grant from the National Institutes of Health to The Wistar Institute, an Inovio collaborator. This grant brings together Inovio and more than 30 of the nation's leading HIV investigators to work on finding a cure for the virus. The grant, called BEAT-HIV: Delaney Collaboratory to Cure HIV-1 Infection by Combination Immunotherapy, was one of six awarded by the NIH as part of the Martin Delaney Collaboratories for HIV Cure Research.

In December 2016 we announced the award of a $6.1 million 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. The goal of this program, which is 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.

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.

Inovio is the 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. Our electroporation technology has shown a preeminent ability to safely and effectively deliver DNA-based immunotherapies. Numerous human studies have to date demonstrated best-in-class immune responses from DNA immunotherapies delivered using electroporation. 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. The uptake is up to 1000 fold greater than the injection of a DNA plasmid alone without other delivery mechanisms (“Electroporation delivery of DNA vaccines: prospects for success,” Current Opinion in Immunology, June 2011, Niranjan Y Sardesai and David B Weiner). The cellular machinery then uses the DNA’s instructions to produce the encoded antigen or monoclonal antibody.

The combination of Inovio's synthetic DNA immunotherapies delivered using its 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; it 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. As observed in our Phase 2 study (HPV-related cervical dysplasia), intramuscular delivery by electroporation of DNA encoded antigens has been shown to induce 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® Electroporation 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®-IM EP device in human clinical trials. These devices are intended to be used in combination with a DNA plasmid-based immunotherapy.

Our past electroporation systems consisted of an electrical pulse generator box the size of a large laptop attached by a cord to a separate needle-electrode applicator. More recently we designed and have completed engineering, manufacturing, quality control, and regulatory steps to introduce a new series of devices. Bringing together groundbreaking advancements, the new CELLECTRA®-SP products 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 highly amenable to mass vaccination. The devices are designed to accommodate different electrode arrays to meet the requirements of the particular immunotherapy and targeted tissue for delivery (ie skin or muscle).

The new CELLECTRA®-5PSP device has been designed and developed to support our planned VGX-3100 Phase 3 study, which we expect to start in 2017, and commercial use upon product approval. On October 24, 2016, we announced that the U.S. Food and Drug Administration (FDA) placed a clinical hold on our Phase 3 clinical program. A clinical hold is a notification issued by the FDA to a trial sponsor to delay a proposed clinical trial or suspend an ongoing clinical trial. This study has not yet been initiated and has not enrolled or dosed subjects. Additionally, the hold does not pertain to any of our other ongoing clinical studies.

Preparing for our Phase 3 study, we designed and manufactured a new electroporation device for commercial use, our CELLECTRA® 5PSP, which is fully automated, smaller and more user-friendly compared to our Phase 2 device. With our submission to start the Phase 3, the FDA requested additional information relating to this new device such as stability data for the device's single-use disposable electrode array and placed us on a device-focused clinical hold. We are currently generating the necessary device-related data to prepare our response and aim to start the Phase 3 study in the first half of 2017. The clinical hold is discussed in more detail in the section called HPV Immunotherapy-VGX-3100, High Grade Cervical Dysplasia (CIN 2/3).

While on a clinical hold we cannot ship product, nor recruit or enroll subjects. We are able to secure and prepare targeted clinical sites and submit document packages to institutional review boards for ethical review, which would in any event be a critical activity in the early stage of the trial since in a larger study all the desired investigational sites would not be immediately up and running. Upon lifting of the clinical hold, we plan to be well positioned with clinical sites that are ready to enroll.

Next Generation Electroporation Research and Devices

All of our electroporation delivery systems noted above can increase levels of gene expression (i.e. production of the immune-stimulating protein the immunotherapy was coded to produce) of DNA immunotherapies by 1000-fold or more compared to delivery of DNA immunotherapies via conventional injection alone. Delivery of our SynCon® immunotherapies 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 2 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 National Institute of Allergy and Infectious Diseases 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 Inovio's 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 an SBIR grant to advance the development of a low-cost, non-invasive surface electroporation delivery device and test its utility in combination with Inovio's 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.

Subsequent to year end, in January 2016 we received a $500,000 grant from the U.S. Army’s Small Business Innovation Research (SBIR) program 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. Our data related to influenza, HIV, malaria, and smallpox antigens demonstrate 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 is comparable to intramuscular electroporation devices currently in the clinic.

In March 2016 Inovio announced the acquisition of pioneering needle-free jet injection technology, devices, and intellectual property from Bioject Medical Technologies Inc. Inovio’s is developing an integrated non-invasive delivery device combining needle-free Bioject’s jet injection technology with Inovio’s 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 demonstrated desirable utility, safety, and tolerability attributes in animals and humans. Under a prior research agreement, Inovio assessed this technology with its new EP delivery system and generated compelling antigen expression and immune responses in animals.

Corporate Development

We have entered into various arrangements with corporate, academic, and government collaborators, licensors, licensees and others. These arrangements are summarized below and elsewhere in this annual report. In addition, we conduct ongoing discussions with potential collaborators, licensors and licensees.

Strategic Partnerships and Collaborations

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 Inovio's INO-3112 immunotherapy, which targets cancers caused by human papillomavirus (HPV) types 16 and 18. MedImmune intends to study INO-3112 in combination with selected immunotherapy molecules within its pipeline in HPV-driven cancers.

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 development and commercial milestones. We are entitled to receive up to double-digit tiered royalties on INO-3112 product sales.

Within the broader collaboration, we and MedImmune will develop up to two new, additional DNA-based cancer vaccine products not included in Inovio's current product pipeline, which MedImmune will have the exclusive rights to develop and commercialize. 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.

This partnership represents an important step in executing our immuno-oncology combination strategy and advancing Inovio's cancer vaccine R&D pipeline. This agreement builds on the existing partnership between us and MedImmune on two research and development collaborations funded by DARPA focused on developing DNA-based monoclonal antibodies for Ebola, influenza, and bacterial infections.

In September 2013 we entered into an exclusive worldwide license agreement with Roche to research, develop and commercialize our multi-antigen DNA immunotherapies targeting prostate cancer (INO-5150) and hepatitis B (INO-1800). Under the terms of the agreement, Roche made an upfront payment of $10 million to Inovio and agreed to pay for all ongoing development costs and certain development, regulatory and commercial event based payments. Roche also agreed to potentially pay additional development event based payments if Roche pursues other indications with INO-5150 or INO-1800.

In November 2014 Roche terminated the agreement to co-develop INO-5150, our prostate cancer immunotherapy. All of Roche's rights to INO-5150, including the right to license the product to other parties, were returned to us. We independently initiated a Phase 1 clinical trial of INO-5150 in July 2015.

In July 2016 Roche terminated its collaboration with us for the development of INO-1800, our hepatitis B immunotherapy. 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. We were already running a Phase 1 study of INO-1800 initiated in April 2015 and expect to complete enrollment in the first half of 2017 and report preliminary results in the second half of 2017.

In March 2010 we entered into a Collaboration and License Agreement (the “Agreement”) with GeneOne Life Science Inc. (formerly VGX International Inc.). Under the Agreement, we granted GeneOne an exclusive license to our SynCon® universal influenza vaccine (the “Product”) delivered with electroporation to be developed in certain countries in Asia.

As consideration for this license we have received a research and development initiation fee, as well as research support and annual license maintenance fees, and will receive royalties on net product sales. In addition, contingent upon achievement of clinical and regulatory milestones, we will receive development payments over the term of the Agreement. The Agreement also provides us 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 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 Agreement) for any Product in that country, unless the 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.

In October 2011, we entered into a product development collaboration agreement with GeneOne to co-develop our SynCon® immunotherapies for hepatitis B and C infections. Under the terms of the agreement, GeneOne received marketing rights for these immunotherapies in Asia, excluding Japan, and in return was to fully fund IND-enabling and initial Phase 1 and 2 clinical studies. We will receive payments based on the achievement of clinical milestones and royalties based on sales in the licensed territories and will retain all commercial rights in all other territories.

In conjunction with our announcement of our Roche partnership, we also announced that we reacquired the rights, title and interest to the SynCon® hepatitis B immunotherapy in Asia from 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 vacine 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 we will advance its DNA vaccine for MERS (Middle East Respiratory Syndrome) 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 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 Gene One entered into a First Amendment to the May 2015 Collaborative Development Agreement to expand the agreement to test and advance the Company's DNA-based vaccine for preventing and treating Zika virus.

In February 2017, we announced that we had entered into a License and Collaboration Agreement with ApolloBio. While the Agreement has been executed by the parties, the Agreement by its terms will become effective on the date that the ApolloBio board of directors and stockholders approve the Agreement, which is anticipated to occur in the next few weeks. Under this Agreement, ApolloBio licensed INO-3100, providing ApolloBio with the exclusive right to develop and commercialize VGX-3100 within Greater China (China, Hong Kong, Macao, Taiwan). This collaboration on VGX-3100 encompasses the treatment and/or prevention of pre-cancerous HPV infections and HPV-driven dysplasias, and excludes HPV-driven cancers and all combinations of VGX-3100 with other immunostimulants.

Under the collaboration and license agreement, we will receive $15 million in upfront and near term payments comprised of an initial $3 million signing fee and a $12 million milestone upon lifting of the VGX-3100 phase 3 pre-initiation clinical hold by the FDA. Under a separate stock purchase agreement, ApolloBio will invest in our common stock subsequent to lifting of the clinical hold at a volume weighted average price encompassing a trading period prior to and following the lifting of the clinical hold. The stock purchase agreement will become effective at the same time the Agreement becomes effective. The aggregate investment under the stock purchase agreement, which is expected to be completed in the first half of 2017, will not exceed $35 million and may be a lower amount such that ApolloBio will not be our largest shareholder.

ApolloBio will fund all clinical development costs within the licensed territory, and will pay us up to $20 million based upon the achievement of certain regulatory milestones in the United States, China and Korea, and double digit royalties on net sales of VGX-3100. The agreements are subject to People’s Republic of China (PRC) corporate and regulatory approvals, and payments are subject to PRC currency approvals.

Core DNA Immunotherapy Technology and Product License

In March 2016 Inovio signed collaborative research agreements 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.

Prior to his recent move to Wistar, the underlying technology for Inovio’s DNA-based products was first developed at Dr. Weiner’s laboratory at the University of Pennsylvania (UPenn). We have license agreements for intellectual property relating to DNA-based immunotherapy technology and multiple products developed at UPenn. The core license agreement with UPenn continues to be in effect.

Under the terms of the original license agreement with UPenn completed in 2007 and amendments in 2010, 2011, 2012, and 2014, we obtained exclusive worldwide rights to develop multiple DNA plasmids and constructs with the potential to treat and/or prevent cancer therapeutic vaccines targeting Wilms' tumor gene or WT1, prostate cancer, other undisclosed cancer antigen targets, HPV, HBV, HCV, HIV, influenza, RSV (respiratory syncytial virus), cytomegalovirus, Chikungunya, dengue fever, malaria, herpes viruses, Middle East Respiratory Syndrome (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 global rights to DNA based monoclonal antibodies and new chemokine and cytokine molecular adjuvant technologies.

This agreement and subsequent amendments provide for royalty payments, based on future sales, to UPenn.

Other Collaborations and Grants

We have been successful in securing many different collaborations and grants to assist the research and advancement of its DNA based immunotherapies in multiple disease.

In 2014 we acquired worldwide rights (excluding China) for early preclinical therapies addressing Alzheimer's disease and multiple sclerosis based on the academic research of Dr. Bin Wang, a professor at Fudan University's Shanghai Medical College. These newly licensed technologies are based on patent-protected and published discoveries from Dr. Wang and his collaborator, who found a novel way to generate inducible regulatory T cells, or iTregs. These novel approaches could be used to develop therapies targeting major inflammatory diseases.

In 2014 we along with the Perelman School of Medicine at the University of Pennsylvania and MedImmune were awarded $12.2 million from the Defense Advanced Research Projects Agency (DARPA) to develop DNA-based monoclonal antibodies for infectious disease treatment. Together we will develop and assess the dMAb products in preclinical studies using technology developed by Penn and licensed by us. The collaboration will focus on influenza virus, Pseudomonas aeruginosa and Staphylococcus aureus. Successful completion of the initial preclinical activities under the DARPA grant aims to lead to clinical studies on selected product candidates to be funded under a future increment to the award.

In 2014, VGX Animal Health, Inc. (VAH), our 85% owned subsidiary, concluded an agreement for the sale of its animal health assets to Plumbline Life Sciences, Inc. (PLS) of Korea. The assets transferred included an exclusive license with Inovio for animal applications of our growth hormone-releasing hormone (GHRH) technology and animal DNA vaccines plus a non-exclusive license to our electroporation delivery systems. In return, VAH 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 we received 395,758 shares or approximately 16.8% of PLS common stock. We will receive milestone payments and royalties on product sales as well as retain the human applications of our GHRH technology.

In March 2015 we and our academic collaborators, including the University of Pennsylvania, were awarded a new five-year $16 million Integrated Preclinical/Clinical AIDS Vaccine Development Program grant from the National Institute of Allergy and Infectious Diseases (NIAID). The grant will fund research to expand PENNVAX® coverage of HIV strains as well as to further enhance antibody responses generated by the vaccine. We will couple our expertise in constructing, developing and manufacturing HIV vaccines with researchers from four world-leading academic institutions (University of Pennsylvania, Emory University, Duke University and the University of Massachusetts) along with VGXi, a contract DNA plasmid manufacturer, and Waisman Biomanufacturing, a contract protein manufacturer. (See the above section, HIV Preventive and Therapeutic Immune Therapies, for more details.)

In April 2015, we 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. Other collaborators are MedImmune, the global biologics research and development arm of AstraZeneca; GeneOne Life Sciences and its manufacturing subsidiary, VGXI, Inc.; and Professor David B. Weiner, PhD, executive vice president at the Wistar Institute, Inovio board member and chairman of the scientific advisory board, Emory University and Vanderbilt University. (See the above section, Ebola, for more details.)

In July 2015, we established a collaboration with the European Organization for Research and Treatment of Cancer (EORTC) to evaluate Inovio's immunotherapy, INO-3112, in combination with traditional chemo-radiotherapy for the treatment of patients with locally advanced stage cervical cancer. This collaboration was terminated by us at the request of MedImmune following the formation of the partnership and license agreement between MedImmune and us.

In March 2016, we announced the acquisition of all needle-free jet injection technology, device, and intellectual property assets from Bioject Medical Technologies Inc. for $5.5 million in cash and stock. We will develop an integrated non-invasive delivery device combining Bioject’s needle-free jet injection technology with our new needle-free, skin-surface electroporation (EP) technology. Our goal is to facilitate preventive immunization using its DNA vaccines against critical infectious diseases with unmet needs in large populations.

In August 2016, we licensed a veterinary vaccine for foot and mouth disease (FMD) to Plumbline Life Sciences (KONEX: 222670), an animal health company headquartered in South Korea. Plumbline will fund all development activities for this FMD vaccine. We will receive milestone payments as well as royalties on product sales from Plumbline for commercial rights to this FMD synthetic vaccine in Asia, excluding Japan.

In December 2016, we were awarded a $6.1 million 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. The goal of this program, funded by a grant to The Wistar Institute from the Bill & Melinda Gates Foundation, is to develop a Zika dMAb® therapy ready for human clinical trials in less than two years.

Also in December, we announced that the International Vaccine Institute (IVI) will provide funding and support to further advance GLS-5300, its vaccine to prevent Middle East Respiratory Syndrome virus infection. We are co-developing this vaccine with GeneOne Life Science. IVI will add technical, laboratory and financial support for GLS-5300 clinical trials in Korea.

Various additional grants that have been awarded to us to advance research for next-generation electroporation delivery technology are described in the above section, Electroporation Delivery Technology.

Competition

We face competition at two levels. At the highest level we face competition by 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, which are broadly engaged in

vaccine/immunotherapy research and development. These include Janssen Pharmaceuticals (part of J&J), Sanofi-Aventis, GlaxoSmithKline plc (and its acquisition of Novartis Vaccines), Merck, Pfizer, and MedImmune, Inc., a wholly owned subsidiary of AstraZeneca, Inc. There are also various development stage biotechnology companies involved in different vaccine and immunotherapy technologies including Novavax, Moderna, BioNTech, Curevac, Advaxis, and Kite. As these companies develop their technologies, they may develop proprietary technologies that may materially and adversely affect our business.

A number of companies are developing products to specifically address diseases we are also targeting. 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.

At another level, we 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. We believe our electroporation system is strongly positioned to succeed as the dominant delivery method for DNA-based immunotherapies.

Viral DNA Delivery

This technology utilizes a virus as a carrier to deliver genetic material into target cells. The method is very 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. Together with our partners and collaborators, we have been the leader in establishing proof-of-principle of electroporation-delivered immunotherapies.
- We have a broad product line of electroporation instruments designed to enable DNA delivery in tumors, muscle, and skin.
- We have been very 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 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.

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 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

In March 2014, our affiliated entity VGX International Inc. changed its name to GeneOne Life Sciences ("GeneOne").

We acquired an equity interest in GeneOne in 2005. As of December 31, 2016, we owned 10.2% 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.

We have also entered into license and collaboration agreements pursuant to which we have granted GeneOne exclusive rights to certain of our product candidates in certain jurisdictions. For example, GeneOne has exclusive rights in countries in Asia including Korea to our VGX-3400X and INO-3510 for treatment of flu and our hepatitis C program. In exchange for

these rights, GeneOne shares the development costs for some of our product candidates. Prior to signing the Roche Agreement, we reacquired the rights, title and interest to hepatitis B in Asia previously licensed to GeneOne. As a result, we paid $300,000 to GeneOne as of December 31, 2013 based on the up-front payment received from Roche.
On September 23, 2014, we entered into a Collaborative Development Agreement with GeneOne to co-develop an Ebola vaccine through Phase 1 clinical trials. In July 2015, we amended the Agreement with an effective date of April 2015 to change control of development in return for the payment of certain development fees.
On May 26, 2015, we 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 Inovio and GeneOne entered into a First Amendment to the May 2015 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.
For the years ended December 31, 2016 and 2015, we recognized revenue from GeneOne of $1.2 million and $450,000, respectively, which consisted of licensing and other fees from the influenza and Zika collaborations. Operating expenses related to GeneOne for the years ended December 31, 2016 and 2015 were $2.8 million and $6.9 million, respectively, primarily related to biologics manufacturing. At December 31, 2016 and 2015, we had an accounts receivable balance of $441,000 and $4,000, respectively, and an accounts payable and accrued liability balance of $379,000 and $165,000, respectively, related to GeneOne and its subsidiaries. At December 31, 2016 and 2015, $571,000 and $373,000 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, 2016, our patent portfolio included over 130 issued United States patents and 490 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 leader
- 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. No. 8,697,084, and 9,376,471, entitled, "HIV Consensus Envelop Sequences And Methods For Using The Same"
- US Pat. No. 8,835,620, “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. No. 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, "Improved HCV Vaccines And Methods For Using The Same"
- US Pat. No. 9,192,660 and 8,298,820, entitled, “Influenza Nucleic Acid Molecules and Vaccines Made Therefrom”
- US Pat. No. 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”
- 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”

- 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, 2016 and 2015, we derived 75% and 28% of our revenue from DARPA, and 14% and 27% 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 $88.7 million in 2016 and $57.8 million in 2015.

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 was incorporated in Delaware on June 15, 2001. This merger was 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 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 is located at 660 W. Germantown Pike, Suite 110, Plymouth Meeting, Pennsylvania 19462, and the telephone number is (267) 440-4200. Inovio Pharmaceuticals (NASDAQ: INO) is focused on advancing products based on its integrated technology platform consisting of its SynCon® DNA immunotherapies and vaccines delivered with its CELLECTRA® electroporation delivery devices.

The device-focused 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 (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.

Available Information

Our Internet website address is www.inovio.com. We make our annual report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K, Forms 3, 4, and 5 filed on behalf of directors and executive officers, and any 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 Internet site (www.inovio.com). We will provide any of the foregoing information without charge upon request to Peter Kies, 10480 Wateridge Circle, San Diego, CA, 92121.

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 Internet site (www.inovio.com) or in a report on Form 8-K, as required by applicable law.

Employees

As of March 14, 2017, we employed 239 people on a full-time basis and 14 people under consulting and project employment agreements. Of the combined total, 205 were in product research, which includes research and development, quality assurance, clinical, engineering, and manufacturing, and 48 were in general and administrative, 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, 2016 our accumulated deficit was approximately $434.8 million. We have generated limited revenues, primarily consisting of license and grant revenue, and interest income. 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 programs are in the early stages of research and development, and currently include vaccine product candidates in discovery, pre-clinical studies and Phase 1 and 2 clinical studies. There is limited data regarding the efficiency of synthetic vaccines 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 vaccine product candidates could fail for a number of reasons. For example, we could experience delays in product development and clinical trials. Our vaccine 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 vaccine products more quickly and efficiently or more effectively market their competing products.

In addition, adverse events, or the perception of adverse events, relating to vaccines and vaccine delivery technologies may negatively impact our ability to develop commercially successful vaccine 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 products and could result in greater governmental regulation, stricter labeling requirements and potential regulatory delays in the testing or approval of our potential products.

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We will need substantial additional capital to develop our synthetic vaccine and electroporation delivery technology and other product candidates and for our future operations.

Conducting the costly and time consuming research, pre-clinical and clinical testing necessary to obtain regulatory approvals and bring our vaccine delivery technology and product candidates 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 been experiencing heightened volatility and turmoil, making it more difficult to raise capital through the issuance of equity securities. Furthermore, as a result of the recent volatility in the capital markets, the cost and availability of credit has been and may continue to be adversely affected by 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 H5N1, H1N1 and universal influenza vaccines, and several H1N1 vaccines developed by our competitors have been approved for human use. Our competitors and potential competitors include

large pharmaceutical and medical device companies 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.

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 having the FDA remove the clinical hold on our proposed Phase 3 clinical program for VGX-3100;
- 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. 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;
- 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.

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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.

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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 contributed to increased volatility and diminished expectations for the economy and the markets going forward. These factors, combined with volatile oil prices, declining business and consumer confidence and increased unemployment, have precipitated an economic recession. Domestic and international capital markets have also been experiencing heightened volatility and turmoil. These events and the continuing market upheavals may have an adverse effect on us. In the event of a continuing 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. Given the current instability of financial institutions, 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.

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 has evolved over recent years and continues to undergo review and revision, both in the United States. 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.

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 is expected to 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 is expected to 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.

The market price for our shares may not maintain their pre-reverse stock split market price.

On June 5, 2014, we effectuated a 4-for-1 reverse split of the Company's outstanding common stock. We cannot be certain that the reverse split will have a long-term positive effect on the market price of our common stock, or increase our ability to consummate financing arrangements in the future. The market price of our common stock is based on factors that may be unrelated to the number of shares outstanding. These factors include our performance, general economic and market conditions and other factors, many of which are beyond our control. The market price for our post-reverse stock split shares may not rise or remain constant in proportion to the reduction in the number of pre-split shares outstanding before the reverse

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split. Accordingly, the total market capitalization of our common stock after the reverse split may be lower than the total market capitalization before the reverse split.

ITEM 1B. UNRESOLVED STAFF COMMENTS

We have no unresolved written comments from the SEC staff regarding our filings under the Exchange Act.

ITEM 2. PROPERTIES

We own no real property and have no plans to acquire any real property in the future. Our corporate headquarters is located at 660 W. Germantown Pike, Suite 110, Plymouth Meeting, Pennsylvania. This lease was signed in March 2014 and we occupied the building in June 2014. The initial term of the lease is 11.5 years for a total of approximately 21,000 square feet. The base rent adjusts periodically throughout the term of the lease, with monthly payments ranging from $0 to $58,000. In addition, we will pay the landlord our share of operating expenses and a property management fee. We have paid the landlord a security deposit of $49,000. We have capitalized $933,000 of tenant improvements within fixed assets on the consolidated balance sheet and recorded a corresponding increase to deferred rent. In July 2015, we amended the lease to increase the total leased space by approximately 7,000 square feet. The amended lease commenced during the first quarter of 2016, increased monthly lease payments by approximately $16,000 and extended the lease term by 2 years.

The corporate office in San Diego is located at 10480 Wateridge Circle in San Diego, California. This lease was signed in April 2013 and we occupied the building in early December 2013. The initial term of the lease runs through December 1, 2023 for a total of approximately 26,500 square feet. The base rent adjusts periodically throughout the ten year term of the lease, with monthly payments ranging from $0 to $83,000. In addition, we pay the landlord our share of operating expenses and a property management fee. We currently use the facility for office and research and development purposes. In June 2015, we amended the lease to increase the total leased space and occupy the entire building. The amendment required the lessor to complete and pay for certain improvements to the additional space before the commencement of the amended lease in January 2016. The amended lease increased monthly lease payments by approximately $13,000. We have capitalized $822,000 of tenant improvements within fixed assets on the consolidated balance sheet related to this additional space, and have recorded a corresponding increase to deferred rent.

In October 2016, we entered into an office lease for a property located at 6769 Mesa Ridge Road in San Diego, California. The total space is approximately 51,000 square feet. We intend to use the facility for office, manufacturing and research and development purposes. The term of the lease commences on the earlier to occur of the date we first conduct business from any portion of the premises, or June 1, 2017. The initial term of the lease is ten years, with a right to terminate on November 30, 2023, with appropriate notice to the landlord. The base rent adjusts periodically throughout the term of the new lease, with monthly payments ranging from $0 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 will pay the landlord our share of operating expenses and have paid a security deposit of $95,000. As of December 31, 2016 we have capitalized $390,000 of tenant improvements to the new property which have been recorded as a leasehold improvement within fixed assets on the consolidated balance sheet, offset by a corresponding amount recorded in deferred rent.

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

Not applicable.

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

On September 4, 2014, we provided notice to the NYSE MKT that the Company intends to voluntarily transfer the listing of our common stock, par value $0.001 per share (the "Common Stock"), from NYSE MKT to the NASDAQ Global Select Market ("NASDAQ"). The Common Stock was approved for listing on NASDAQ, and began trading on NASDAQ on September 15, 2014 under the symbol "INO". The following table sets forth the quarterly high and low per share closing prices of our common stock for the two most recent fiscal years.

	Year Ended December 31,			
	2016		2015	
Period:	High	Low	High	Low
First Quarter	$8.71	$4.92	$9.49	$6.45
Second Quarter	$11.39	$8.29	$10.60	$7.86
Third Quarter	$10.42	$8.52	$8.19	$5.69
Fourth Quarter	$9.52	$5.98	$7.41	$5.65

As of February 28, 2017, we had approximately 489 common stockholders of record. This figure does not include beneficial owners who hold shares in nominee name. The closing price per share of our common stock on March 9, 2017 was $6.61, as reported on the NASDAQ.

Dividends

The payment of any dividends on our common stock is within the discretion of our board of directors. We have not 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 matches Inovio Pharmaceuticals Inc.'s cumulative 5-Year total shareholder return on common stock with the cumulative total returns of the NYSE MKT Composite index, the S&P SuperCap Biotechnology index and the NASDAQ Composite index. The graph tracks the performance of a $100 investment in our common stock and in each index (with the reinvestment of all dividends) from December 31, 2011 to December 31, 2016.

	12/11	12/12	12/13	12/14	12/15	12/16
Inovio Pharmaceuticals, Inc.	100.00	116.71	677.57	536.22	392.52	405.37
NYSE MKT Composite	100.00	106.15	115.07	118.71	106.60	117.67
NASDAQ Composite	100.00	116.41	165.47	188.69	200.32	216.54
S&P SuperCap Biotechnology	100.00	143.06	246.93	326.29	340.49	291.82

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 is not being filed for purposes of the Securities Exchange Act of 1934, as amended, and is not to be incorporated by reference into any filing of the Company, whether made before or after the date hereof, regardless of any general incorporation language in such filing.

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, 2016 and 2015 and the selected consolidated statements of operations data for each year ended December 31, 2016, 2015 and 2014 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, 2014, 2013, and 2012 and the selected consolidated statements of operations data for the years ended December 31, 2013 and 2012 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, 2016	Year Ended December 31, 2015	Year Ended December 31, 2014	Year Ended December 31, 2013	Year Ended December 31, 2012
Operations Data:					
Revenue under collaborative research and development arrangements, including from affiliated entity	$7,891,341	$27,655,700	$7,896,032	$9,664,547	$660,003
Grants and miscellaneous revenue, including from affiliated entity	27,477,020	12,916,411	2,560,734	3,802,799	3,458,649
Total revenues	35,368,361	40,572,111	10,456,766	13,467,346	4,118,652
Loss from operations	(76,235,937)	(34,283,702)	(39,495,961)	(19,544,332)	(23,493,532)
Interest and other income, net	1,257,257	305,071	331,461	132,214	166,113
Change in fair value of common stock warrants	127,554	177,561	348,143	(45,632,669)	1,982,620
Gain (Loss) on investment in affiliated entity	1,110,787	2,600,467	2,676,224	(1,038,745)	1,631,819
Income tax benefit	—	2,097,766	—	—	—
Net loss	(73,740,339)	(29,102,837)	(36,140,133)	(66,083,532)	(19,712,980)
Net (income) loss attributable to non-controlling interest	—	(84,769)	18,420	55,084	44,025
Net loss attributable to Inovio Pharmaceuticals, Inc.	$(73,740,339)	$(29,187,606)	$(36,121,713)	$(66,028,448)	$(19,668,955)
Net loss per common share attributable to common stockholders					
Basic	$(1.01)	$(0.43)	$(0.61)	$(1.43)	$(0.58)
Diluted	$(1.01)	$(0.44)	$(0.64)	$(1.43)	$(0.58)
Balance Sheet Data:					
Cash and cash equivalents	$19,136,472	$57,632,693	$40,543,982	$33,719,796	$5,646,021
Short-term investments	85,629,412	105,357,277	53,075,974	18,905,608	8,034,001
Total assets	173,707,166	213,840,859	131,785,097	88,287,207	45,138,754
Current liabilities	43,823,027	31,466,406	14,085,294	28,966,456	8,376,577
Noncurrent liabilities	6,505,719	6,441,400	6,162,209	6,418,068	1,904,772
Accumulated deficit	(434,838,235)	(361,097,896)	(331,910,290)	(295,788,577)	(229,760,129)
Total stockholders' equity	123,378,420	175,933,053	111,537,594	52,902,683	34,857,405

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 government healthcare proposals.

Overview

Inovio is developing active DNA immunotherapies and vaccines focused on treating and preventing cancers and infectious diseases. Our DNA-based immunotherapies, in combination with our proprietary electroporation delivery devices, are intended to generate robust immune responses, in particular T cells, to fight target diseases. In 2014 we reported that in a controlled Phase 2 clinical study we generated significant, functional antigen-specific T cells that correlated to clinically relevant efficacy against HPV-associated cervical dysplasia (precancer). This data was published in The Lancet in September 2015. We are planning to take this product, VGX-3100, into a phase 3 study for cervical dysplasia in 2017.

Our novel SynCon® immunotherapy design has shown the ability to help break the immune system's tolerance of cancerous cells. Our SynCon® product design approach 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 our published phase 2 results, our scientists believe 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 HPV-caused pre-cancers (including cervical, anal and vulvar neoplasia), HPV-caused cancers (head and neck and cervical), prostate cancer, breast/lung/pancreatic cancer, hepatitis C virus (HCV), hepatitis B virus (HBV), HIV, Ebola, MERS (Middle East Respiratory Syndrome) 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., ApolloBio Corporation, Plumbline Life Sciences, Inc., 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”), HIV Vaccines Trial Network (“HVTN”), and Defense Advanced Research Projects Agency (“DARPA”).

All of our potential human products are in research and development phases. We have not generated any revenues from the sale of any such 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 July 28, 2016 Roche provided notice that they would be discontinuing our collaboration and the development of INO-1800, our DNA immunotherapy against the hepatitis B virus. The termination was effective in October 2016, 90 days after the notice date. All of Roche’s rights to INO-1800, including the right to license the product to other parties, have been returned to us. We plan to continue to develop our hepatitis B DNA vaccine (INO-1800) and independently advance our Phase 1 study of INO-1800.

In August 2016, we incorporated a 100%-owned subsidiary, GENEOS Therapeutics, Inc., to develop and commercialize neo-antigen based personalized cancer therapies. While we pursue our SynCon® immunotherapy design to break tolerance and create cancer products targeting shared tumor specific antigens, GENEOS will exclusively focus on leveraging the Company's DNA immunotherapy technology platform to advance the field of patient-specific neo-antigen therapies. 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 neo-antigens into formulations, and generation of potent killer T cell responses that are needed to drive clinical efficacy.

On October 24, 2016, we announced that the U.S. Food and Drug Administration (FDA) has placed a clinical hold on our proposed Phase 3 clinical program for VGX-3100. A clinical hold is a notification issued by the FDA to a trial sponsor to delay a proposed clinical trial or suspend an ongoing clinical trial. This study has not yet been initiated and has not enrolled or dosed subjects. Additionally, the hold does not pertain to any of our other ongoing clinical studies. The FDA has requested additional information relating to the new CELLECTRA® 5PSP device, including stability data for the device’s single-use disposable electrode array. We are currently generating the necessary device-related data to prepare our response and aim to start the Phase 3 study in the first half of 2017.

In February 2017, we announced that we have entered into a collaboration and license agreement providing ApolloBio Corporation with the exclusive right to develop and commercialize VGX-3100, our DNA immunotherapy product designed to treat pre-cancers caused by human papillomavirus (HPV), within Greater China (China, Hong Kong, Macao, Taiwan). The agreement provides for potential inclusion of the Republic of Korea three years following the effective date. Under the collaboration and license agreement, we will receive $15.0 million in upfront and near term payments comprising an initial $3.0 million signing fee and a $12.0 million milestone upon lifting of the VGX-3100 Phase 3 pre-initiation clinical hold by the FDA. Under a separate equity agreement, ApolloBio will invest in our common stock subsequent to lifting of the clinical hold at a volume weighted average price encompassing a trading period prior to and following the lifting of the clinical hold. The aggregate investment, which is expected to be completed in the first half of 2017, will not exceed $35.0 million and may be a lower amount such that ApolloBio will not be our largest shareholder. ApolloBio will fund all clinical development costs within the licensed territory, and will pay the Company up to $20.0 million based upon the achievement of certain regulatory milestones in the US, China and Korea, and double digit royalties on net sales of VGX-3100. The agreements are subject to People’s Republic of China (PRC) corporate and regulatory approvals, and payments are subject to PRC currency approvals.

As of December 31, 2016, we had an accumulated deficit of $434.8 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.

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 as the 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 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 Financial Accounting Standards Board's ("FASB") 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 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, our 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. We assess 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, we determine 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. Since the Company's inception, most of its activities have consisted of research and development efforts related to developing electroporation technologies and DNA 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 trials 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 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.

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

	December 31, 2016	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, including from affiliated entity	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 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

Revenue primarily consists of revenue under collaborative research and development arrangements and grants and government contracts. Our total revenue decreased $5.2 million or 13% for the year ended December 31, 2016, as compared to the year ended December 31, 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 Agreement with MedImmune 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 of 85 employees 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 the year ended December 31, 2015 was primarily due to an increase in employee non-cash stock-based compensation, increase in headcount of 14 employees, 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

Employee stock-based compensation cost is measured at the grant date, based on the fair value of the award reduced by estimated forfeitures, and is recognized as expense over the employee's requisite service period. 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. At December 31, 2016, there was $5.8 million of total unrecognized compensation cost related to unvested stock options, which we expect to recognize over a weighted-average period of 1.9 years, as compared to $5.4 million for the year ended December 31, 2015 expected to be recognized over a weighted-average period of 1.9 years. At December 31, 2016, there was $4.0 million of total unrecognized compensation cost related to unvested restricted stock units, which is expected to be recognized over a weighted-average period of 2.0 years, as compared to $1.2 million for the year ended December 31, 2015 expected to be recognized over a weighted-average period of 2.1 years. Total stock-based compensation for options granted to non-employees for the years ended December 31, 2016 and 2015 was $321,000 and $385,000, respectively.

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 OncoSec common stock warrants and revaluation of the registered common stock warrants issued by us in March 2013. We revalue warrants at each balance sheet date to fair value. Warrants that were exercised during the period were revalued the day prior to exercise and reclassified into stockholders' equity upon exercise. 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.

Gain on sale of assets

The gain on sale of assets is related to the May 2014 sale of animal health assets to Plumbline Life Sciences ("PLS"). The gain is related to the cash received related to the sale (See Note 15).

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.

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. As of December 31, 2016, we had net operating loss carry forwards for federal, California and Pennsylvania income tax purposes of approximately $255.6 million, $73.6 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 $7.6 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. Utilization of net operating losses and credits are subject to a substantial annual limitation due to ownership change limitations provided by the Internal Revenue Code of 1986, as

amended.

Comparison of Years Ended December 31, 2015 and 2014

The consolidated financial data for the years ended December 31, 2015 and December 31, 2014 is presented in the following table and the results of these two periods are used in the discussion thereafter.

	December 31, 2015	December 31, 2014	Increase/ (Decrease) $	Increase/ (Decrease) %
Revenues:				
Revenue under collaborative research and development arrangements, including from affiliated entity	$27,655,700	$7,896,032	$19,759,668	250 %
Grants and miscellaneous revenue	12,916,411	2,560,734	10,355,677	404
Total revenues	40,572,111	10,456,766	30,115,345	288
Operating expenses:				
Research and development	57,791,923	34,095,039	23,696,884	70
General and administrative	18,063,890	15,857,688	2,206,202	14
Gain on sale of assets	(1,000,000)	—	(1,000,000)	100
Total operating expenses	74,855,813	49,952,727	24,903,086	50
Loss from operations	(34,283,702)	(39,495,961)	5,212,259	13
Interest and other income, net	305,071	331,461	(26,390)	(8)
Change in fair value of common stock warrants	177,561	348,143	(170,582)	(49)
Gain on investment in affiliated entity	2,600,467	2,676,224	(75,757)	(3)
Net loss before income tax benefit	(31,200,603)	(36,140,133)	4,939,530	14
Income tax benefit	2,097,766	—	2,097,766	100
Net loss	(29,102,837)	(36,140,133)	7,037,296	19
Net (income) loss attributable to non-controlling interest	(84,769)	18,420	(103,189)	(560)
Net loss attributable to Inovio Pharmaceuticals, Inc.	$(29,187,606)	$(36,121,713)	$6,934,107	19 %

Revenue

Revenue primarily consists of revenue under collaborative research and development arrangements and grants and government contracts. Our total revenue increased $30.1 million or 288% for the year ended December 31, 2015, as compared to the year ended December 31, 2014.

The $19.8 million increase in revenue under collaborative research and development arrangements for the year ended December 31, 2015 as compared to 2014 was primarily due to an increase of $16.0 million in revenue recognized from our Agreement with MedImmune entered into in August 2015 and an increase of $3.4 million in revenue recognized from the Roche Agreement which included revenues previously deferred related to the partial termination of the Agreement as well as the $3.0 million milestone earned during the year.

The $10.4 million increase in grants and miscellaneous revenue for the year ended December 31, 2015 as compared to 2014, was primarily due to revenue recognized from our DARPA Ebola grant of $10.8 million as well as an increase of $681,000 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 $23.7 million increase in research and development expenses for the year ended December 31, 2015 as compared to 2014 was primarily due to an increase in clinical study costs, expenses related to our DARPA Ebola grant, increased employee headcount, sub-license fee expense based on the up-front payment received from MedImmune and higher engineering and lab supplies to support clinical trials and partnerships of $8.2 million, $5.9 million, $5.5 million, $2.3 million and $1.0 million, respectively. These increases were offset by lower costs of $3.1 million incurred for biologics manufacturing and other expenses related to the Roche Agreement, among other variances.

General and Administrative Expenses

The $2.2 million increase in general and administrative expenses for the year ended December 31, 2015 as compared to the year ended December 31, 2014 was primarily due to an increase in employee headcount, employee stock-based compensation and corporate and patent legal fees of $1.4 million, $609,000 and $277,000, respectively, 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 reduced by estimated forfeitures, and is recognized as expense over the employee's requisite service period. Total employee compensation cost for our stock plans for the years ended December 31, 2015 and 2014 was $5.8 million and $4.8 million, of which $3.2 million and $2.8 million was included in research and development expenses and $2.6 million and $2.0 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. At December 31, 2015, there was $5.4 million of total unrecognized compensation cost related to unvested stock options, which we expect to recognize over a weighted-average period of 1.9 years, as compared to $5.3 million for the year ended December 31, 2014 expected to be recognized over a weighted-average period of 2.0 years. At December 31, 2015, there was $1.2 million of total unrecognized compensation cost related to unvested restricted stock units, which is expected to be recognized over a weighted-average period of 2.1 years. Total stock-based compensation for options granted to non-employees for the years ended December 31, 2015 and 2014 was $385,000 and $585,000, respectively.

Interest and Other Income, net

Interest and other income, net, decreased by $(26,000) for the year ended December 31, 2015 as compared to 2014 primarily due to impairments considered to be other-than-temporary recorded on our short-term investments of $274,000 offset by higher average cash and short-term investment balances.

Change in fair value of common stock warrants

The net change in fair value of common stock warrants for the years ended December 31, 2015 and 2014 was $178,000 and $348,000, respectively. The variance is due to the revaluation of the OncoSec common stock warrants and revaluation of the registered common stock warrants issued by us in March 2013. We revalue warrants at each balance sheet date to fair value. Warrants that were exercised during the period were revalued the day prior to exercise and reclassified into stockholders' equity upon exercise. 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, 2015.

Gain on sale of assets

The gain on sale of assets is related to the May 2014 sale of animal health assets to Plumbline Life Sciences ("PLS"). The gain is related to the cash received related to the sale (See Note 15).

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.

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. As of December 31, 2015, we had net operating loss carry forwards for federal, California and Pennsylvania income tax purposes of approximately $177.4 million, $56.5 million and $141.3 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 $4.4 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. Utilization of net operating losses and credits are subject to a substantial annual limitation due to ownership change limitations provided by the Internal Revenue Code of 1986, as amended.

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, 2016 we had cash and short-term investments of $104.8 million and working capital of $80.8 million, as compared to $163.0 million and $140.4 million, respectively, as of December 31, 2015. The decrease in cash and short-term investments during the year ended December 31, 2016 was primarily due to expenditures related to our research and development activities and various general and administrative expenses related to legal, consultants, accounting and audit, and corporate development.

Net cash used in operating activities was $62.6 million and $12.4 million for the years ended December 31, 2016 and 2015, respectively. The variance was primarily due to the increase in net loss for the period due to a decrease in revenue of $5.2 million and an increase in research and development and general and administrative operating expenses of $30.9 million and $5.8 million, respectively. In addition, an up-front payment of $27.5 million was received from MedImmune in September 2015, of which $12.5 million was recorded as deferred revenue at December 31, 2015. These variances were offset by an increase of $8.3 million in non-cash expenses during the period, including a $4.3 million increase in employee stock-based compensation expense.

Net cash provided by (used in) investing activities was $16.3 million and $(54.8) million for the years ended December 31, 2016 and 2015, respectively. The variance was primarily the result of timing differences in short-term investment purchases, sales and maturities.

Net cash provided by financing activities was $7.8 million and $84.4 million for the years ended December 31, 2016 and 2015, respectively. The cash from financing activities in 2016 and 2015 was primarily related to the “at-the-market” (ATM) sales agreement entered into in June 2016 and the May 2015 equity financing, respectively.

In June 2016, we entered into an ATM sales agreement with an outside placement agent (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, 2016, we sold 658,748 shares of common stock under the ATM sales agreement for net proceeds of $6.3 million.

On May 5, 2015, we closed an underwritten public offering of 10,925,000 shares of our common stock, including 1,425,000 shares of common stock issued pursuant to the underwriter’s exercise of its overallotment option, at the public offering price of $8.00 per share. The net proceeds, after deducting the underwriter’s discounts and commission and other offering expenses, were $81.9 million.

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

During the year ended December 31, 2015, warrants and stock options to purchase 551,883 shares of common stock were exercised for total proceeds to the Company of $2.6 million.

As of December 31, 2016, we had an accumulated deficit of $434.8 million. We have operated at a loss since 1994, 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. 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

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As of December 31, 2016, 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 2017 through 2027, and operating leases for copiers, which expire in 2018 through 2020.

We are contractually obligated to make the following operating lease payments as of December 31, 2016:

	Total	Less than 1 year	1 – 3 years	3 – 5 years	More than 5 years
Operating lease obligations	$26,133,000	$1,818,000	$4,948,000	$5,819,000	$13,548,000

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.

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 investments 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 listed 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, 2016, have been 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. 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, including the impact of the existing crisis in the global financial markets in such countries and the impact on both the United States dollar and the noted foreign currencies.

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 2017.

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, 2016, 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, 2016, 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, 2016.

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, 2016, 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, 2016. The report appears below.

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

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

We have audited Inovio Pharmaceuticals, Inc.'s internal control over financial reporting as of December 31, 2016, 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). Inovio Pharmaceuticals, Inc.'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 conducted our audit in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether 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.

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.

In our opinion, Inovio Pharmaceuticals, Inc. maintained, in all material respects, effective internal control over financial reporting as of December 31, 2016, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States), the consolidated balance sheets of Inovio Pharmaceuticals, Inc. as of December 31, 2016 and 2015, and 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, 2016 of Inovio Pharmaceuticals, Inc. and our report dated March 15, 2017 expressed an unqualified opinion thereon.

/s/ Ernst & Young LLP

San Diego, California
March 15, 2017

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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 2016 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 2016 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 2016 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 2016 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 2016 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(a)	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).
4.16+	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).
4.17+	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 with on May 14, 2007).
4.20	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	Lease Agreement by and between the registrant and 1787 Sentry Park West LLC dated December 10, 2009, as amended by First Amendment dated August 18, 2010, as amended by Second Amendment dated February 16, 2012, as amended by Third Amendment dated May 14, 2014, as amended by Fourth Amendment dated July 25, 2014 and as amended by Fifth Amendment dated January 30, 2015 (incorporated by reference to Exhibit 10.1 of the registrant's Form 10-K annual report for the year ended December 31, 2009 filed on March 26, 2010).
10.2†	License Agreement dated June 30, 2013 by and between the registrant and the University of South Florida Research Foundation, Inc. (incorporated by reference to Exhibit 10.5 of the registrant's Form 10-Q quarterly report for the quarter ended September 30, 2000 filed on November 9, 2000).
10.3	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).
10.4	Form of Warrant to Purchase Common Stock (incorporated by reference to Exhibit 4.2 of the registrant's Form 8-K current report filed on August 6, 2007).

Exhibit Number	Description of Document
10.5+	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).
10.7+	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).
10.8	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).
10.9	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).
10.12+	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).
10.15+	Inovio Pharmaceuticals, Inc. 2016 Omnibus Incentive Plan (incorporated by reference to the registrant's Form DEF-14A filed on March 25, 2016).
10.16†	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).
10.17†	Asset Purchase Agreement dated February 21, 2007 by and among Ronald O. Bergan, Mary Alice Bergan, and VGX Pharmaceuticals, Inc. (incorporated by reference to Exhibit 10.32 as filed with the registrant's Registration Statement on Form S-4 (File No. 333-156035) on April 27, 2009).
10.18†	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).
10.23†	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).
10.24†	Sales and Marketing Agreement dated February 28, 2008 by and between VGX International and VGX Pharmaceuticals, Inc. (incorporated by reference to Exhibit 10.42 as filed with the registrant's Registration Statement on Form S-4 (File No. 333-156035) on April 27, 2009).
10.25+	

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).

Exhibit Number	Description of Document
10.26†	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).
10.27	Asset Purchase Agreement dated June 10, 2008 by and among VGXI, Inc. and VGX Pharmaceuticals, Inc. (incorporated by reference to Exhibit 10.48 as filed with the registrant's Registration Statement on Form S-4 (File No. 333-156035) on April 27, 2009).
10.29†	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).
10.30+	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).
10.31	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).
10.32	Memorandum of NIH Research Grant Agreement by and between National Institute of Allergy and Infectious Diseases and VGX Pharmaceuticals, Inc. (incorporated by reference to Exhibit 10.66 as filed with the registrant's Registration Statement on Form S-4 (File No. 333-156035) on April 27, 2009).
10.33	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).
10.34	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).
10.35†	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).
10.36	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).
10.37	Intentionally omitted.
10.38	Intentionally omitted.

10.39+	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).
10.40+	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).

Exhibit Number	Description of Document
10.41+	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).
10.42+	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).
10.43+	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).
10.44+	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).
10.45+	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).
10.46+	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).
10.47+	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).
10.48†	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).
10.49+	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).
10.50+	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).
10.51+	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).
10.52+	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).

10.53+	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).
10.54+	Form of Restricted Stock Units Award Agreement under 2016 Omnibus Incentive Plan. (Filed herewith.)
10.55+	Form of Incentive Stock Option Agreement under 2016 Omnibus Incentive Plan. (Filed herewith.)
10.56+	Form of Nonqualified Stock Option Agreement under 2016 Omnibus Incentive Plan. (Filed herewith.)

Exhibit Number	Description of Document
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 Chief Executive Officer pursuant Securities Exchange Act Rule 13a-14(a).
31.2	Certification of the Chief Financial Officer pursuant Securities Exchange Act Rule 13a-14(a).
32.1	Certification 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.
†Portions redacted pursuant to confidential treatment applications.

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 15, 2017.

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 J. Joseph Kim	President, Chief Executive Officer and Director (Principal Executive Officer)	March 15, 2017
/s/ AVTAR DHILLON Avtar Dhillon	Chairman of the Board of Directors	March 15, 2017
/s/ PETER KIES Peter Kies	Chief Financial Officer (Principal Accounting Officer and Principal Financial Officer)	March 15, 2017
/s/ SIMON X. BENITO Simon X. Benito	Director	March 15, 2017
/s/ ANGEL CABRERA Angel Cabrera	Director	March 15, 2017
/s/ MORTON COLLINS Morton Collins	Director	March 15, 2017
/s/ ADEL MAHMOUD Adel Mahmoud	Director	March 15, 2017
/s/ DAVID WEINER David Weiner	Director	March 15, 2017
/s/ NANCY J. WYSENSKI Nancy J. Wysenski	Director	March 15, 2017

INOVIO PHARMACEUTICALS, INC.
Index to Consolidated Financial Statements

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

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

We have audited the accompanying consolidated balance sheets of Inovio Pharmaceuticals, Inc. as of December 31, 2016 and 2015, and 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, 2016. These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on these financial statements based on our audits.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the financial statements referred to above present fairly, in all material respects, the consolidated financial position of Inovio Pharmaceuticals, Inc. at December 31, 2016 and 2015, and the consolidated results of its operations and its cash flows for each of the three years in the period ended December 31, 2016, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States), Inovio Pharmaceuticals, Inc.'s internal control over financial reporting as of December 31, 2016, 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 15, 2017 expressed an unqualified opinion thereon.

/s/ ERNST & YOUNG LLP

San Diego, California
March 15, 2017

Inovio Pharmaceuticals, Inc.
CONSOLIDATED BALANCE SHEETS

	December 31, 2016	2015
ASSETS		
Current assets:		
Cash and cash equivalents	$19,136,472	$57,632,693
Short-term investments	85,629,412	105,357,277
Accounts receivable	15,821,511	7,299,612
Accounts receivable from affiliated entity	748,355	33,447
Prepaid expenses and other current assets	1,749,059	917,257
Prepaid expenses and other current assets from affiliated entity	1,512,424	610,652
Total current assets	124,597,233	171,850,938
Fixed assets, net	9,025,446	7,306,695
Investment in affiliated entity - GeneOne	16,052,065	14,941,277
Investment in affiliated entity - PLS	3,777,510	5,045,915
Intangible assets, net	7,628,394	3,905,860
Goodwill	10,513,371	10,113,371
Common stock warrants	—	5,970
Other assets	2,113,147	670,833
Total assets	$173,707,166	$213,840,859
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable and accrued expenses	$19,597,787	$13,064,899
Accounts payable and accrued expenses due to affiliated entity	1,072,579	165,047
Accrued clinical trial expenses	6,368,389	2,600,483
Common stock warrants	1,167,614	1,301,138
Deferred revenue	14,762,720	13,449,768
Deferred revenue from affiliated entity	407,292	504,442
Deferred rent	446,646	380,629
Total current liabilities	43,823,027	31,466,406
Deferred revenue, net of current portion	317,808	103,074
Deferred revenue from affiliated entity, net of current portion	86,694	677,371
Deferred rent, net of current portion	5,926,424	5,485,313
Deferred tax liabilities	174,793	175,642
Total liabilities	50,328,746	37,907,806
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, 2016 and December 31, 2015	—	—
Common stock—par value $0.001; Authorized shares: 600,000,000 at December 31, 2016 and December 31, 2015, issued and outstanding: 74,062,370 at December 31, 2016 and 72,217,965 at December 31, 2015	74,062	72,218
Additional paid-in capital	556,718,356	534,004,564
Accumulated deficit	(434,838,235)	(361,097,896)
Accumulated other comprehensive income	1,327,968	2,708,339
Total Inovio Pharmaceuticals, Inc. stockholders' equity	123,282,151	175,687,225
Non-controlling interest	96,269	245,828
Total stockholders' equity	123,378,420	175,933,053
Total liabilities and stockholders' equity	$173,707,166	$213,840,859

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,		
	2016	2015	2014
Revenues:			
Revenue under collaborative research and development arrangements	$6,490,747	$26,876,533	$7,416,568
Revenue under collaborative research and development arrangements with affiliated entity	1,400,594	779,167	479,464
Grants and miscellaneous revenue	27,136,457	12,916,411	2,560,734
Grants and miscellaneous revenue from affiliated entity	340,563	—	—
Total revenues	35,368,361	40,572,111	10,456,766
Operating expenses:			
Research and development	88,712,035	57,791,923	34,095,039
General and administrative	23,892,263	18,063,890	15,857,688
Gain on sale of assets	(1,000,000)	(1,000,000)	—
Total operating expenses	111,604,298	74,855,813	49,952,727
Loss from operations	(76,235,937)	(34,283,702)	(39,495,961)
Other income (expense):			
Interest and other income, net	1,257,257	305,071	331,461
Change in fair value of common stock warrants	127,554	177,561	348,143
Gain on investment in affiliated entity	1,110,787	2,600,467	2,676,224
Net loss before income tax benefit	(73,740,339)	(31,200,603)	(36,140,133)
Income tax benefit	—	2,097,766	—
Net loss	(73,740,339)	(29,102,837)	(36,140,133)
Net (income) loss attributable to non-controlling interest	—	(84,769)	18,420
Net loss attributable to Inovio Pharmaceuticals, Inc.	$(73,740,339)	$(29,187,606)	$(36,121,713)
Net loss per common share attributable to Inovio Pharmaceuticals, Inc. stockholders			
Basic	$(1.01)	$(0.43)	$(0.61)
Diluted	$(1.01)	$(0.44)	$(0.64)
Weighted average number of common shares outstanding used in per share calculations:			
Basic	73,214,766	68,198,142	59,127,349
Diluted	73,214,766	68,365,265	59,408,252

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,		
	2016	2015	2014
Net loss	(73,740,339)	$(29,102,837)	$(36,140,133)
Other comprehensive income (loss):			
Unrealized gain (loss) on investment in affiliated entity, net of tax	(1,268,404)	2,952,201	—
Foreign currency translation adjustments	—	—	(1,689)
Unrealized gain (loss) on short-term investments, net of tax	(111,967)	7,528	(173,336)
Comprehensive loss	$(75,120,710)	$(26,143,108)	$(36,315,158)
Comprehensive (income) loss attributable to non-controlling interest	—	(84,769)	18,420
Comprehensive loss attributable to Inovio Pharmaceuticals, Inc.	$(75,120,710)	$(26,227,877)	$(36,296,738)

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	Number of shares	Amount					
Balance at December 31, 2013	26	52,576,390	$52,577	$348,267,389	$(295,788,577)	$(76,365)	$447,659	$52,902,683
Issuance of shares related to reverse stock split	—	6,378	6	57,181	—	—	—	57,187
Issuance of common stock for cash, net of financing costs of $5.5 million	—	5,452,725	5,453	59,203,729	—	—	—	59,209,182
Conversions of preferred stock to common stock	(3)	1,103	1	(1)	—	—	—	—
Acquisition of non-controlling interest	—	—	—	118,621	—	—	(118,621)	—
Exercise of stock options and warrants for cash	—	2,689,868	2,689	13,249,854	—	—	—	13,252,543
Cashless exercise of warrants	—	14,618	15	(15)	—	—	—	—
Change in classification of warrants from liability to equity due to exercise	—	—	—	17,002,211	—	—	—	17,002,211
Stock-based compensation	—	—	—	5,428,946	—	—	—	5,428,946
Net loss attributable to common stockholders	—	—	—	—	(36,121,713)	—	(18,420)	(36,140,133)
Unrealized loss on short-term investments	—	—	—	—	—	(173,336)	—	(173,336)
Foreign currency	—	—	—	—	—	(1,689)	—	(1,689)

translation adjustments								
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 acquisition	—	440,122	440	4,299,560	—	—	—	4,300,000
Payment to minority stockholders	—	—	—	—	—	—	(149,559)	(149,559)
Exercise of stock options and warrants for cash, 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

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,		
	2016	2015	2014
Cash flows from operating activities:			
Net loss	$(73,740,339)	$(29,102,837)	$(36,140,133)
Adjustments to reconcile net loss to net cash used in operating activities:			
Depreciation	1,708,498	1,048,431	626,554
Amortization of intangible assets	1,377,466	870,199	942,719
Change in value of common stock warrants	(127,554)	(177,561)	(348,143)
Stock-based compensation	10,479,135	6,186,848	5,428,946
Issuance of shares in connection with reverse stock split	—	—	57,187
Amortization of premiums on investments	266,290	348,566	54,534
Deferred taxes	(849)	14,166	27,537
Deferred rent	(16,728)	383,584	762,616
Loss on short-term investments	139,249	432,174	36,949
Gain on investment in affiliated entity	(1,110,787)	(2,600,467)	(2,676,224)
Gain on sale of intangible assets	(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	(8,521,899)	(4,497,225)	499,176
Accounts receivable from affiliated entity	(714,908)	(31,627)	(1,820)
Prepaid expenses and other current assets	(831,802)	(119,284)	(160,540)
Prepaid expenses and other current assets from affiliated entity	(901,772)	771,723	674,975
Restricted cash	—	—	100,762
Other assets	(1,442,314)	(196,265)	(72,493)
Accounts payable and accrued expenses	6,367,965	6,456,581	925,820
Accrued clinical trial expenses	3,767,906	593,051	561,252
Accounts payable and accrued expenses due to affiliated entity	907,532	136,640	(493,848)
Deferred revenue	1,527,686	10,191,840	(260,719)
Deferred revenue from affiliated entity	(687,827)	(49,672)	(368,751)
Net cash used in operating activities	(62,555,052)	(12,438,901)	(29,823,644)
Cash flows from investing activities:			
Purchases of investments	(57,317,671)	(63,526,830)	(47,185,945)
Maturities of investments	76,528,030	10,484,267	12,753,719
Purchases of capital assets	(2,738,470)	(2,781,544)	(1,379,980)
Proceeds from sale of intangible assets	1,000,000	1,000,000	—
Purchase of intangible and other assets	(1,200,000)	—	—
Net cash provided by (used in) investing activities	16,271,889	(54,824,107)	(35,812,206)
Cash flows from financing activities:			
Proceeds from issuance of common stock and warrants, net of issuance costs	6,295,761	81,902,363	59,209,182
Proceeds from stock option and warrant exercises, net of tax payments	1,640,740	2,598,915	13,252,543
Other financing activities	(149,559)	(149,559)	—
Net cash provided by financing activities	7,786,942	84,351,719	72,461,725
Effect of exchange rate changes on cash and cash equivalents	—	—	(1,689)
Increase (Decrease) in cash and cash equivalents	(38,496,221)	17,088,711	6,824,186
Cash and cash equivalents, beginning of period	57,632,693	40,543,982	33,719,796
Cash and cash equivalents, end of period	$19,136,472	$57,632,693	$40,543,982

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	$164,923	$225,148	$12,842
Lease incentive recorded as fixed assets and deferred rent	$523,856	$773,000	$933,000

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 DNA immunotherapies and vaccines in combination with proprietary electroporation delivery devices to prevent and treat cancers and infectious diseases. Inovio's synthetic products are based on the Company's SynCon® design. The Company has completed, current or planned clinical programs of its proprietary SynCon® products for HPV-caused pre-cancers and cancers, influenza, prostate cancer, breast/lung/pancreatic cancer, hepatitis C virus (HCV), 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., ApolloBio Corporation, Plumbline Life Sciences, Inc., 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"), HIV Vaccines Trial Network ("HVTN"), and Defense Advanced Research Projects Agency ("DARPA"). Inovio is incorporated in Delaware.

2. Summary of Significant Accounting Policies

Basis of Presentation

Inovio incurred a net loss attributable to common stockholders of $73.7 million for the year ended December 31, 2016. Inovio had working capital of $80.8 million and an accumulated deficit of $434.8 million as of December 31, 2016. 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, 2016 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 "Merger"), the Company acquired a majority interest in VGX Animal Health and certain shares in GeneOne (a publicly-traded company in South Korea). The Company consolidates Genetronics, Inc. (a wholly-owned subsidiary of Inovio Pharmaceuticals, Inc.), VGX Pharmaceuticals and its subsidiary VGX Animal Health and records a non-controlling interest for the 15% of VGX Animal Health it does not own as of December 31, 2016 and 2015, respectively. The Company's investment in GeneOne, which is recorded as investment in affiliated entity within the consolidated balance sheets 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) on investment in affiliated entity. All intercompany accounts and transactions have been eliminated upon consolidation.

Variable Interest Entities

The FASB issued authoritative guidance that requires companies to perform a qualitative analysis to determine whether a variable interest in another entity represents a controlling financial interest in a variable interest entity. A controlling financial interest in a variable interest entity is characterized by having both the power to direct the most significant activities of the entity and the obligation to absorb losses or the right to receive benefits of the entity. This guidance requires on-going reassessments of variable interests based on changes in facts and circumstances. The Company determined that none of the entities with which the Company currently conducts business and collaborations are variable interest entities except VGXI (a wholly-owned subsidiary of GeneOne). The Company determined that

they are not the primary beneficiary as they do not have voting control or other forms of control over the operations and decision making and therefore are not required to consolidate VGXI. The Company continues to assess its variable interests and has determined that no significant changes have occurred as of December 31, 2016.

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. To date, the Company has viewed its operations and managed 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, which 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 had contracts with customers which represented more than 10% of total revenues for all of the years presented as discussed in Note 6.

Fair value of Financial Instruments

The Company’s financial instruments consist principally of cash equivalents, short-term investments, investments in affiliated entities and common stock warrants. 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 affiliated entity PLS is accounted for as an available-for sale security. The Company’s investment in affiliated entity GeneOne 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. The estimated fair value of the common stock warrants is determined by using the Black-Scholes pricing model as of December 31, 2016, as discussed in Note 5.

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, 2016 and 2015.

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, municipal bonds and an equity investment in the Company's affiliated entity PLS at December 31, 2016 and 2015.

Accounts Receivable

Accounts receivable are recorded at invoiced amounts and do not bear interest. Inovio performs ongoing credit evaluations of our 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 our customers. No allowance for doubtful accounts was deemed necessary at December 31, 2016 and 2015.

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, 2016.

Valuation of Goodwill and Intangible Assets

Goodwill represents the excess of acquisition cost over the fair value of the net assets of acquired businesses. Intangible assets are amortized over their estimated useful lives ranging from 5 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 pre-clinical, Phase 1, and Phase 2 trials using the acquired intangibles, and has entered into certain significant licensing agreements for 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 June 1, 2009, in connection with the acquisition of VGX, all new patent costs are being expensed as incurred. Patent cost capitalized as of June 1, 2009 will continue to be amortized over the expected life of the patent. License costs are recorded based on the fair value of consideration paid and 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, 2016 and 2015, 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 $7.6 million and $3.9 million, respectively.

The determination of the value of such 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 our 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, 2016.

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, 2016, 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 our 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 $113.4 million and $83.2 million at December 31, 2016 and 2015, 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 as the 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 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 Financial Accounting Standards Board's ("FASB") 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 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, our 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. We assess 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, we determine 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

Since the Company's inception, most of its activities have consisted of research and development efforts related to developing electroporation technologies and DNA 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 trials 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 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 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 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 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 loss per share:

	Year Ended December 31,		
	2016	2015	2014
Numerator			
Net loss attributable to Inovio Pharmaceuticals, Inc.	$(73,740,339)	$(29,187,606)	$(36,121,713)
Reflect adjustment for decrease in fair value of warrant liability	—	(721,591)	(2,181,203)
Numerator for use in diluted loss per share	$(73,740,339)	$(29,909,197)	$(38,302,916)
Denominator			
Weighted average number of common shares outstanding	73,214,766	68,198,142	59,127,349
Effect of dilutive potential common shares from warrants	—	167,123	280,903
Denominator for use in diluted loss per share	73,214,766	68,365,265	59,408,252
Net loss per share, diluted	$(1.01)	$(0.44)	$(0.64)

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

	Year Ended December 31,		
	2016	2015	2014
Options to purchase common stock	6,806,183	5,862,364	4,840,514
Warrants to purchase common stock	284,091	276,813	727,969
Restricted stock units	798,834	230,000	—
Convertible preferred stock	8,456	8,456	8,456
Total	7,897,564	6,377,633	5,576,939

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 is determined by the closing market price of the Company's common stock 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 expected to vest on a straight-line basis over the requisite service 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 forfeiture rate is based on historical data, and the Company records stock-based compensation expense only for those awards that are expected to vest. The dividend yield is based on the fact that no dividends have been paid historically and none are currently expected to be paid in the foreseeable future.

Weighted average assumptions used in the Black-Scholes model for employees are presented below:

	Year Ended December 31,		
	2016	2015	2014
Risk-free interest rate	0.91%	0.99%	1.47%
Expected volatility	76%	74%	109%
Expected life in years	5	5	5
Dividend yield	—	—	—
Forfeiture rate	7%	7%	8%

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

	Year Ended December 31,		
	2016	2015	2014
Risk-free interest rate	2.3%-2.5%	2.1%-2.3%	1.5%-2.7%
Expected volatility	71%-104%	105%-108%	104%-115%
Expected life in years	7-10	7-10	7-10
Dividend yield	—	—	—

Recent Accounting Pronouncements

The below recent pronouncements may have a significant effect on the Company's financial statements. Recent 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.

Accounting Standards Update (“ASU”), No. 2016-09- In March 2016, the FASB issued ASU No. 2016-09, Compensation-Stock Compensation. 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 are effective for the Company's annual year and first fiscal quarter beginning on January 1, 2017 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.

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.

ASU, No. 2014-15- In August 2014, the FASB issued ASU 2014-15, Presentation of Financial Statements Going Concern, which intends to define management’s responsibility to evaluate whether there is substantial doubt about an entity’s ability to continue as a going concern and to provide related disclosure. ASU 2014-15 defines the term substantial doubt and requires an assessment for a period of one year after the date of the issuance of the financial statements. It requires certain disclosures when substantial doubt is alleviated as a result of consideration of management’s plans and requires an express statement and other disclosures when substantial doubt is not alleviated. The guidance becomes effective for reporting periods beginning after December 15, 2016, with early adoption permitted. The Company adopted this guidance January 1, 2017 and expects it to have no impact on the Company's financial statements.

ASU, No. 2014-09- In May 2014, the FASB amended the existing accounting standards for revenue recognition, which 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 may require a company to use more judgment and make more estimates than under the current guidance. The amended guidance as currently issued will

be effective for the Company starting in 2018. The new standard allows for two methods of adoption: (a) full retrospective adoption, meaning the standard is applied to all periods presented, or (b) modified retrospective adoption, meaning the cumulative effect of applying the new standard is recognized as an adjustment to the opening retained earnings balance. The Company currently plans on applying the modified retrospective

method upon adoption in the first quarter of 2018. The Company is in the process of determining the effects the adoption will have 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, 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 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 will receive development, regulatory and commercialization event based payments and will be eligible to receive royalties on worldwide net sales for these additional cancer vaccine products. 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 was classified as short-term deferred revenue as of December 31, 2015. The Company believes that no substantive value related to the research collaboration products license and research services has been

transferred to MedImmune prior to their selection of the first research collaboration product since there is no economic benefit from the research unless such product candidate is selected. Furthermore, if MedImmune decides to not proceed with the selection of the product candidate, the research collaboration product license would be terminated. Therefore, the Company believes the license for the research collaboration products is not delivered until the research services are completed and the selection of the product candidate is made by MedImmune (i.e. exercise of an option). The Company has classified the amount allocated to this deliverable as short-term deferred revenue as it is expected that MedImmune will select a product candidate within the next three months. The Company will recognize revenues associated with the product development services for INO-3112 as revenues under collaborative arrangements as the related services are performed and according to the relative selling price method of the allocable arrangement consideration. During the years ended December 31, 2016 and 2015, the Company recognized revenues of $1.5 million and $16.0 million from MedImmune,

respectively. As of December 31, 2016 and 2015, the Company has a deferred revenue balance of $13.7 million and $13.0 million, respectively, related to the Agreement. As of December 31, 2016 and 2015, the Company has an accounts receivable balance of $1.2 million and $1.5 million, respectively, related to the Agreement.

Roche

In September 2013, the Company entered into a Collaborative, License, and Option Agreement (the “Agreement”) with Roche. The companies agreed to co-develop multi-antigen DNA immunotherapies targeting prostate cancer and hepatitis B.

Under the agreement, Roche acquired an exclusive worldwide license for the Company's DNA-based vaccines INO-5150 (targeting prostate cancer) and INO-1800 (targeting hepatitis B) as well as the use of the Company's CELLECTRA® electroporation technology for delivery of the vaccines. Roche also obtained an option to license additional vaccines in connection with a collaborative research program in prostate cancer. Under the terms of the agreement the Company also agreed to perform research and development services, which include preclinical and clinical costs, and manufacturing and supply services, at Roche's expense.

On November 14, 2014, Roche provided notice that they would be partially terminating the Agreement with respect to the development of INO-5150, the Company’s DNA immunotherapy targeting prostate cancer, as well as the research collaboration in prostate cancer under the Agreement. The termination was effective in February 2015, 90 days after the date of notice. All of Roche’s rights to INO-5150, including the right to license the product to other parties, have been returned to the Company.

On July 28, 2016, Roche provided notice that they would be discontinuing its Agreement with the Company and its development of INO-1800, the Company’s DNA immunotherapy against the hepatitis B virus. The termination was effective in October 2016, 90 days after the date of notice. All of Roche’s rights to INO-1800, including the right to license the product to other parties, have been returned to the Company.

Under the terms of the Agreement, Roche made an upfront payment of $10 million and agreed to make additional development, regulatory and commercial event-based payments. These potential future event-based payments have been reduced significantly due to the termination of the Agreement. The Company assessed event-based payments under the authoritative guidance for research and development milestones and determined that $3.0 million related to INO-1800 represents 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-5150 and INO-1800, the option right to license additional vaccines, research and development services, manufacturing and drug supply, and participation in the joint steering committee individually represent separate units of accounting because each deliverable has standalone value. The Company considered the provisions of the multiple-element arrangement guidance in determining whether the deliverables outlined above have standalone value and thus should be treated as separate units of accounting. The Company determined that the licenses and option right to license additional vaccines have standalone value and represent separate units of accounting because the rights conveyed permit Roche to perform all efforts necessary to complete development, commercialize and begin selling the product upon regulatory approval. In addition, Roche 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 Roche to realize the value of the license without receiving any of the remaining deliverables. Roche can also sublicense its license rights to third parties. Also, the Company determined that the research services, committee participation and manufacturing services each represent individual units of accounting as Roche 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 selling prices of the licenses and option right 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 $10 million up-front payment was allocated as follows: $5.0 million and $3.4 million to the license to INO-5150 and INO-1800, respectively, $1.5 million to the Option Right and $155,000 to the Joint Steering Committee obligation. The amounts allocated to the licenses for INO-5150 and INO-1800 were recognized as revenue under collaborative research and development arrangements during the year ended December 31, 2013 as these were determined to be earned upon the granting of the license and delivery of the related knowledge and data. Due to the Company's continuing involvement obligations, the remaining amounts were classified as deferred revenue as of December 31, 2013. The Company will recognize revenues associated with research and development services and manufacturing and drug supply as revenues under collaborative arrangements as the related services are performed and according to the relative selling price

method of the allocable arrangement consideration. During the year ended December 31, 2016, the Company recognized revenues of $4.9 million from Roche. During the year ended December 31, 2015, the Company recognized revenues of $10.8 million from Roche, of which $3.0 million related to previously deferred revenue which was recognized based on the partial termination of the Agreement in February 2015 and $3.0 million related to a milestone earned during the period. As of December 31, 2016 and 2015, the Company has a deferred revenue balance of $0 and $166,000, respectively, related to the Roche Agreement. As of December 31, 2016 and 2015, the Company has an accounts receivable balance of $2.4 million and $1.6 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 Inovio-led consortium 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, 2016 and 2015, the Company recognized revenues of $22.4 million and $10.8 million, respectively, from DARPA related to the grant. As of December 31, 2016 and 2015, the Company has a deferred revenue balance of $1.2 million and $283,000, respectively, related to the DARPA grant. As of December 31, 2016 and 2015, the Company has an accounts receivable balance of $9.2 million and $4.0 million, respectively, related to the DARPA grant.

GeneOne

The Company has entered into various Collaborative Development and License Agreements with GeneOne as discussed in Note 15. Under these Agreements, the Company may receive future event based payments upon approval of an investigational new drug application (IND) and/or initiation of clinical trials and future net sales. These future event based payments do not meet the criteria of a milestone in accordance with the authoritative guidance as they are solely based on the performance of the collaborators.

4. Investments

Investments consist of mutual funds, United States corporate debt securities and an equity investment in the Company's affiliated entity PLS at December 31, 2016 and of mutual funds, United States corporate debt securities, municipal bonds and an equity investment in the Company's affiliated entity PLS at December 31, 2015. 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, 2016 and 2015, net realized loss on investments of $139,000 and $151,000 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. During the years ended December 31, 2016 and 2015, impairments considered to be other-than-temporary of $0 and $274,000 were recorded, respectively. 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, 2016, the Company had 47 available-for-sale securities in a gross unrealized loss position of which 10 with a total unrealized loss of $79,000 were in such position for longer than 12 months.

The following is a summary of available-for-sale securities as of December 31, 2016 and 2015:

	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

	As of December 31, 2015			
	Contractual Maturity (in years)	Cost	Gross Unrealized Gains	Gross Unrealized Losses	Fair Market Value
Mutual funds	---	$78,571,294	$ 435	$ (185,737)	$ 78,385,992
US corporate debt securities	Less than 2	26,923,855	—	(54,452)	26,869,403
Municipal bonds	Less than 1	101,936	—	(54)	101,882
Investment in affiliated entity (PLS)	---	—	5,045,915	—	5,045,915
Total investments		$105,597,085	$ 5,046,350	$ (240,243)	$ 110,403,192

5. 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, 2016 and 2015.

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

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, 2015:

	Fair Value Measurements at December 31, 2015			
	Total	Quoted Prices in Active Markets (Level 1)	Significant Other Unobservable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Assets:				
Money market funds	$54,474,609	$54,474,609	$—	$—
Mutual funds	78,385,992	—	78,385,992	—
US corporate debt securities	26,869,403	—	26,869,403	—
Municipal bonds	101,882	—	101,882	—
Investments in affiliated entities	19,987,192	19,987,192	—	—
Common stock warrants	5,970	—	—	5,970
Total Assets	$179,825,048	$74,461,801	$105,357,277	$ 5,970
Liabilities:				
Common stock warrants	$1,301,138	$—	$—	$ 1,301,138
Total Liabilities	$1,301,138	$—	$—	$ 1,301,138

Level 1 assets include 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. The Company accounts for its investment in GeneOne at fair value on a recurring basis by which the fair value is based on the market value of 1,644,155 common shares on December 31, 2016 and 2015, listed on the Korean Stock Exchange. The Company accounts for its investment in PLS as an available-for sale security by which the fair value is based on the market value of 395,758 common shares on December 31, 2016 and 2015, listed on the Korea New Exchange (KONEX) Market. 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 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).

Level 2 assets at December 31, 2016 include 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.

Level 3 assets at December 31, 2016 include the second warrant received by the Company to purchase shares of common stock of OncoSec Medical Incorporated (“OncoSec”), in connection with the second amendment to the Asset Purchase Agreement between the Company and OncoSec signed in March 2012. This warrant to purchase 150,000 shares of common stock of OncoSec has a contractual life of five years with an exercise price of $20.00 per share. The first warrant to purchase 50,000 shares of common stock of OncoSec at an exercise price of $24.00 per share, expired in September 2016.

The Company reassesses the fair value of the OncoSec warrants at each reporting date utilizing a Black-Scholes pricing model. Inputs used in the pricing model include estimates of OncoSec stock price volatility, expected warrant life and risk-free interest rate. The Company develops its estimates based on publicly available historical data and knowledge of OncoSec. The Company reassesses the fair value of the warrants at each reporting date. The assumptions used to estimate the fair values of the OncoSec common stock warrants at December 31, 2016 and 2015 are presented below:

	Year Ended December 31,	
	2016	2015
Risk-free interest rate	0.51%	0.64%
Expected volatility	88%	90%
Expected life in years	0.25	0.75-1.25
Dividend yield	—	—

As a result of these calculations, the Company recorded a decrease in fair value of the warrants of $(6,000), $(544,000) and $(168,000) for the years ended December 31, 2016, 2015 and 2014, 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 a summary of changes in fair value of the Company’s total Level 3 financial assets for the years ended December 31, 2016 and 2015:

	Year Ended December 31,	
	2016	2015
Balance at beginning of year	$5,970	$550,000
Decrease in fair value included in change in fair value of common stock warrants	(5,970)	(544,030)
Balance at end of year	$—	$5,970

Level 3 liabilities held as of December 31, 2016 and 2015 consist 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, 2016 and 2015, none of these warrants were exercised.

As of December 31, 2016 the Company has a $1.2 million 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, 2016 and 2015 are presented below:

	Year Ended December 31,	
	2016	2015
Risk-free interest rate	1.1%	1.36%
Expected volatility	61%	81%
Expected life in years	1.70	2.70
Dividend yield	—	—

Changes in these assumptions as well as in the Company's stock price on the valuation date 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 $(134,000), $(722,000) and $(516,000) for the years ended December 31, 2016, 2015 and 2014, 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, 2016 and 2015:

	Year Ended December 31,	
	2016	2015
Balance at beginning of year	$1,301,138	$2,022,729
Decrease in fair value included in change in fair value of common stock warrants	(133,524)	(721,591)
Balance at end of year	$1,167,614	$1,301,138

6. Major Customers and Concentration of Credit Risk

Customer	2016	% of Total Revenue	2015	% of Total Revenue	2014	% of Total Revenue
MedImmune	$1,518,639	4 %	$16,037,731	40 %	$—	— %
DARPA	26,602,183	75	11,582,623	28	123,605	1
Roche	4,917,929	14	10,778,688	27	7,357,346	70
NIAID	118,171	—	901,475	2	1,229,084	12
GeneOne (affiliated entity)	1,188,432	4	450,000	1	479,464	5
All other	1,023,007	3	821,594	2	1,267,267	12
Total Revenue	$35,368,361	100 %	$40,572,111	100 %	$10,456,766	100 %

During the years ended December 31, 2016, 2015 and 2014, the Company recognized revenue from various license fees, collaborative research and development agreements, grants and government contracts. As of December 31, 2016, $12.1 million or 73%, $2.4 million or 15% and $1.2 million or 7% of the Company's accounts receivable was attributed to DARPA, Roche and MedImmune, respectively. As of December 31, 2015, $4.0 million or 54%, $1.6 million or 22% and $1.5 million or 20% of accounts receivable was attributed to DARPA, Roche and MedImmune, respectively.

The Company’s accounts receivable from DARPA includes $6.8 million of amounts that are unbilled as of December 31, 2016. 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 all 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, 2016 and 2015 consist of the following:

	Cost	Accumulated Depreciation and Amortization	Net Book Value
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
As of December 31, 2015			
Leasehold improvements	$3,571,619	$(721,280)	$2,850,339
Laboratory equipment	1,875,561	(540,555)	1,335,006

Office furniture and fixtures	987,436	(399,524)	587,912
Computer equipment and other	4,419,761	(1,886,323)	2,533,438
	$10,854,377	$(3,547,682)	$7,306,695

Depreciation expense for the years ended December 31, 2016, 2015 and 2014 was $1.7 million, $1.0 million and $627,000, respectively. The Company determined that the carrying value of these long-lived assets was not impaired for the periods presented.

8. Goodwill and Intangible Assets

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

		December 31, 2016			December 31, 2015		
	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	$10,113,371	$—	$10,113,371
Definite lived:							
Patents	8 – 17	5,802,528	(5,618,854)	183,674	5,802,528	(5,516,122)	286,406
Licenses	8 – 17	1,323,761	(1,161,861)	161,900	1,323,761	(1,133,113)	190,648
CELLECTRA®(b)	5 – 11	8,106,270	(6,825,028)	1,281,242	8,106,270	(6,397,947)	1,708,323
GHRH(b)	11	335,314	(240,264)	95,050	335,314	(208,581)	126,733
Bioject (c)	2 – 15	5,100,000	(562,222)	4,537,778	—	—	—
Other(d)	18	4,050,000	(2,681,250)	1,368,750	4,050,000	(2,456,250)	1,593,750
Total intangible assets		24,717,873	(17,089,479)	7,628,394	19,617,873	(15,712,013)	3,905,860
Total goodwill and intangible assets		$35,231,244	$(17,089,479)	$18,141,765	$29,731,244	$(15,712,013)	$14,019,231

(a) Goodwill was recorded from the Inovio AS acquisition in January 2005, the acquisition of VGX 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.

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

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

Aggregate amortization expense on intangible assets was $1.4 million, $870,000 and $943,000 for the years ended December 31, 2016, 2015 and 2014, respectively. Amortization expense related to intangible assets at December 31, 2016 for each of the next five fiscal years and beyond is expected to be incurred as follows:

2017	$1,618,664
2018	1,249,584
2019	1,066,251
2020	547,081
2021	520,414
Thereafter	2,626,400
	$7,628,394

There were no impairment or impairment indicators present and no losses were recorded during the years ended December 31, 2016, 2015 and 2014, respectively.

9. Accounts Payable and Accrued Expenses

Accounts payable and accrued expenses at December 31, 2016 and 2015 consist of the following:

	As of December 31,	
	2016	2015
Trade accounts payable, including from affiliated entity	$5,920,642	$4,292,374
Accrued compensation	6,531,983	4,157,440
Accrued subcontract costs	5,475,359	946,597
Accrued license fees	—	2,300,000
Other accrued expenses	1,669,803	1,368,488
	$19,597,787	$13,064,899

10. Stockholders' Equity

Preferred Stock

			Outstanding as of December 31,	
	Authorized	Issued	2016	2015
Series C Preferred Stock, par $0.001	1,091	1,091	23	23

There were no changes in the number of outstanding shares of our preferred stock for the years ended December 31, 2016 and 2015.

The shares of the Company's outstanding 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 all series of the Company's preferred stock outstanding 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 of the Company's Preferred Stock 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.

Conversion Rights

The Series C Preferred Stock each provide the holder of such shares an optional conversion right and provide a mandatory conversion upon certain triggering events.

Right to Convert 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. 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.

Mandatory Conversion 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 at any time after twelve months following the Original Issue Date of each such series of preferred stock all of the following triggering events occur:

(i) The registration statement covering all of the shares of common stock into which the particular series of preferred stock is convertible is effective (or all of the shares of common stock into which the preferred stock is convertible may be sold without restriction pursuant to Rule 144 under the Securities Act of 1933, as amended);

(ii) the Daily Market Price (as defined in the applicable Certificates of Designations, Rights and Preferences) of the common stock crosses a specified pricing threshold for twenty of the thirty consecutive trading days prior to the date the Company provides notice of conversion to the holders; and

(iii) the average daily trading volume (subject to adjustment for stock dividends, subdivisions and combinations) of the common stock for at least twenty of the thirty consecutive trading days prior to the date the Company provides notice of conversion to the holders exceeds 6,250 shares.

As of December 31, 2016, outstanding shares of the Series C Preferred Stock were convertible into 8,456 shares of our common stock at a conversion price of $27.20 per share, and the applicable Daily Market Price of the common stock for triggering mandatory conversion equaled $72.00 per share.

Common Stock

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, 2016, the Company sold a total of 658,748 shares of common stock under the Sales Agreement. The sales were made at a weighted average price of $9.75 per share with net proceeds to the Company of $6.3 million.

In May 2015, the Company closed an underwritten public offering of 10,925,000 shares of the Company's common stock, including 1,425,000 shares of common stock issued pursuant to the underwriter's exercise of its overallotment option, at the public offering price of $8.00 per share. The net proceeds, after deducting the underwriter's discounts and commission and other offering expenses, were approximately $81.9 million.

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 considerable 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.”

Warrants

The following table summarizes the warrants outstanding as of December 31, 2016 and 2015:

Issued in Connection With:	Exercise Price	Expiration Date	As of December 31, 2016		As of December 31, 2015	
			Number of Warrants	Common Stock Warrant Liability	Number of Warrants	Common Stock Warrant Liability
March 2013 financing	$ 3.17	September 12, 2018	284,091	$ 1,167,614	284,091	$ 1,301,138
Warrants assumed in June 2009 Merger	$ 4.08 - 5.12	April 28, 2016	—	—	276,813	—
Total			284,091	$ 1,167,614	560,904	$ 1,301,138

During the years ended December 31, 2016 and 2015, no warrants to purchase shares of the Company's common stock which were issued in connection with the March 2013 financing were exercised.

During the years ended December 31, 2016 and 2015, warrants to purchase 276,813 and 426,625 shares of the Company's common stock which were assumed in the June 2009 Merger were exercised, with proceeds to the Company of $0 and $2.0 million, respectively.

Stock Options

The Company has two active stock-based incentive plans, the Amended and Restated 2007 Omnibus Incentive Plan (the “Incentive Plan”), pursuant to which the Company has granted stock options and restricted stock awards to executive officers, directors and employees, and the 2016 Omnibus Incentive Plan (the "2016 Incentive Plan").

The 2007 Incentive Plan was adopted on March 31, 2007, approved by the stockholders on May 4, 2007, approved by the stockholders as amended on May 2, 2008, and approved by the stockholders as amended and restated on August 25, 2009, May 14, 2010, May 22, 2014 and May 8, 2015. On May 14, 2010 the stockholders approved to increase the aggregate number of shares available for grant under the Incentive Plan by 500,000 and to provide that the aggregate number of shares available for grant under the Incentive Plan will be increased on January 1 of each year beginning in 2011 by a number of shares equal to the lesser of (1) 513,833 or (2) such lesser number of shares as may be determined by the Board. On May 22, 2014 and May 8, 2015, the stockholders approved to increase the aggregate number of shares available for grant under the Incentive Plan by 1,250,000 and 2,000,000, respectively. At December 31, 2016, the Incentive Plan reserves 7,770,497 shares of common stock for issuance as or upon exercise of incentive awards granted and to be granted at future dates. At December 31, 2016, the Company had 224,507 shares of common stock available for future grant under the Incentive Plan, and 798,834 shares of unvested restricted stock units ("RSU's")and options to purchase 5,978,342 shares of common stock outstanding under the Incentive Plan. The awards granted and available for future grant under the Incentive Plan generally vest over three years and have a maximum contractual term of ten years. The Incentive Plan terminates by its terms on March 31, 2017.

The Incentive Plan supersedes all of the Company’s previous stock option plans, which include the Amended 2000 Stock Option Plan and the VGX Equity Compensation Plan, under which the Company had options to purchase 100,002 and 727,839 shares of common stock outstanding at December 31, 2016, respectively. The terms and conditions of the options outstanding under these plans remain unchanged.

The 2016 Incentive Plan was approved by 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 with January 1, 2018, such maximum number of shares shall be increased by 2,000,000 shares of common stock unless the Board determines, for any such calendar year, to increase such maximum amount by a fewer number of shares. As of December 31, 2016, no awards have been granted under the 2016 Incentive Plan.

Total compensation cost for our stock plans recognized in the consolidated statement of operations for the years ended December 31, 2016, 2015 and 2014 was $10.2 million, $5.8 million and $4.8 million, respectively, of which $4.8 million, $3.2 million and $2.8 million was included in research and development expenses and $5.4 million, $2.6 million and $2.0 million was included in general and administrative expenses, respectively.

At December 31, 2016 and 2015, there was $5.8 million and $5.4 million of total unrecognized compensation cost, respectively, related to unvested stock options, which is expected to be recognized over a weighted-average period of 1.9 years and 1.9 years respectively.

At December 31, 2016 and 2015, there was $4.0 million and $1.2 million of total unrecognized compensation cost related to unvested restricted stock units, which is expected to be recognized over a weighted-average period of 2.0 years and 2.1 years, respecitvely.

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, 2016, 2015 and 2014 was $321,000, $385,000 and $585,000, respectively. As of December 31, 2016, 796,810 non-employee options remained outstanding.

The following table summarizes total stock options outstanding at December 31, 2016:

	Options Outstanding			Options Exercisable	
Exercise Price	Options Outstanding	Weighted-Average Remaining Contractual Life (in Years)	Weighted Average Exercise Price	Options Exercisable	Weighted-Average Exercise Price
$0.00-$3.00	1,184,058	5.6	$ 2.25	1,184,058	$ 2.25
$3.01-$6.00	1,063,941	2.1	$ 4.76	1,055,351	$ 4.75
$6.01-$9.00	3,337,860	7.7	$ 7.25	1,668,725	$ 7.23
$9.01-$12.00	418,612	8.6	$ 9.75	155,420	$ 9.92
$12.01-$15.00	801,712	6.4	$ 12.94	626,277	$ 12.93
	6,806,183	6.3	$ 6.81	4,689,831	$ 6.26

At December 31, 2016, the aggregate intrinsic value of options outstanding was $8.3 million, the aggregate intrinsic value of options exercisable was $8.2 million, and the weighted average remaining contractual term of options exercisable was 5.3 years.

At December 31, 2016, the aggregate intrinsic value of unvested RSU's was $5.5 million and the aggregate intrinsic value of RSU's which vested during the year ended December 31, 2016 was $781,000.

At December 31, 2016, 1,973,141 stock options and 798,834 RSU's are expected to vest.

Stock option activity under our equity incentive plans was as follows:

	Number of Shares	Weighted-Average Exercise Price
Balance, December 31, 2015	5,862,364	$ 6.46
Granted	1,705,169	7.47
Exercised	(631,065)	4.96
Cancelled	(130,285)	8.66
Balance, December 31, 2016	6,806,183	$ 6.81

RSU activity under our equity incentive plans was as follows:

	Number of Shares	Weighted-Average Exercise Price
Balance, December 31, 2015	230,000	$ —
Granted	671,500	—
Vested	(96,666)	—
Cancelled	(6,000)	—
Balance, December 31, 2016	798,834	$ —

The weighted average exercise price was $9.01 for the 69,570 options which expired during the year ended December 31, 2016, $10.89 for the 83,696 options which expired during the year ended December 31, 2015 and $15.95 for the 70,517 options which expired during the year ended December 31, 2014.
The weighted average grant date fair value per share was $4.59, $4.60 and $9.19 for options granted during the years ended December 31, 2016, 2015 and 2014, respectively.
The weighted average grant date fair value was $7.41 and $7.76 per share for restricted stock units granted during the years ended December 31, 2016 and 2015, respectively. There were no restricted stock units granted during the year ended December 31, 2014.
The Company received $1.8 million, $552,000 and $1.4 million in proceeds from the exercise of stock options during the years ended December 31, 2016, 2015 and 2014, respectively. The aggregate intrinsic value of options exercised was $3.5 million, $456,000 and $2.0 million during the years ended December 31, 2016, 2015 and 2014, respectively.

11. Commitments
In October 2016, the Company entered into an office lease (the “new Lease”) for a property located at 6769 Mesa Ridge Road in San Diego, California. The total space is approximately 51,000 square feet. The Company intends to use the facility for office, manufacturing and research and development purposes. The term of the new Lease commences on the earlier to occur of the date the Company first conducts business from any portion of the premises, or June 1, 2017. The initial term of the new Lease is ten years, with a right to terminate on November 30, 2023, with appropriate notice to the landlord.
The base rent adjusts periodically throughout the term of the new Lease, with monthly payments ranging from $0 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 will pay the landlord its share of operating expenses and has paid a security deposit of $95,000. As of December 31, 2016 the Company has capitalized $390,000 of tenant improvements to the new property which have been recorded as a leasehold improvement within fixed assets on the consolidated balance sheet, offset by a corresponding amount recorded in deferred rent.
In March 2014, the Company entered into an office lease (the "Lease") for its corporate headquarters located at 600 W. Germantown Pike, Suite 110, in Plymouth Meeting, Pennsylvania, and occupied the space in June 2014. The initial term of the Lease is 11.5 years and the Company is using the facility for office purposes.
The base rent adjusts periodically throughout the 11.5 year term of the Lease, with monthly payments ranging from $0 to $58,000. In addition, the Company will pay the landlord for its share of operating expenses and a property management fee and have 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 has increased monthly lease payments by approximately $16,000.
The Company has capitalized $933,000 of tenant improvements to the Plymouth Meeting headquarters which have been recorded as a leasehold improvement within fixed assets on the consolidated balance sheet, offset by a corresponding amount recorded in deferred rent.
The Company's corporate office in San Diego is located at 10480 Wateridge Circle in San Diego, California. This lease was signed in April 2013 and the building was occupied in early December 2013. The term of the Lease runs through December 1, 2023. The base rent adjusts periodically throughout the ten year term of the Lease, with monthly payments ranging from $0 to $83,000. In addition, the Company will pay the landlord its share of operating expenses

and a property management fee and has paid a security deposit of $64,000.

In June 2015, the Company amended the lease for its corporate office in San Diego, California to increase the total leased space and occupy the entire building. The amendment required the lessor to complete and pay for certain improvements to the additional space before the commencement of the amended lease in January 2016. The amended lease has increased monthly lease payments by approximately $13,000.

The Company has capitalized $822,000 of tenant improvements on the additional corporate office space in San Diego which have been recorded as a leasehold improvement within fixed assets on the consolidated balance sheet, offset by a corresponding amount recorded in deferred rent.

Rent expense was $1.6 million, $1.3 million and $1.2 million for the years ended December 31, 2016, 2015 and 2014, respectively. Future minimum lease payments under non-cancelable operating leases as of December 31, 2016 are as follows:

2017	$1,818,000
2018	2,266,000
2019	2,682,000
2020	2,869,000
2021	2,950,000
Thereafter	13,548,000
Total	$26,133,000

In the normal course of business, the Company is a party to a variety of agreements pursuant to which they 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.

12. Investments in Affiliated Entities

The Company’s investments in an affiliated entities represent the Company’s ownership interest in the Korean based companies GeneOne Life Sciences ("GeneOne") and Plumbline Life Sciences ("PLS"). The Company held a 10.2% ownership interest in GeneOne as of December 31, 2016 and 2015, and a 16.8% ownership interest in PLS as of December 31, 2016 and 2015.

The Company's investment in GeneOne is measured at fair value on a recurring basis. 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, 2016 and 2015. 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 395,758 common shares owned of PLS on December 31, 2016, listed on the Korea New Exchange (KONEX) Market. 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 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 Bioject Medical Technologies Inc.’s ("Bioject") net assets including needle-free injection technology, products and intellectual property. The transaction, which was accounted for as a business combination, provides the Company with further opportunities in device development. The Company paid Bioject $4.3 million in the Company's stock and $1.2 million in cash upon closing.

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

Developed technology	$3,800,000
Customer-related intangible	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 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 life 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,		
	2016	2015	2014
Current:			
Federal	$—	$—	$—
State	—	—	2,000
	—	—	2,000
Deferred:			
Federal	—	(1,594,000)	18,000
State	—	(504,000)	9,000
	—	(2,098,000)	27,000
	$—	$(2,098,000)	$29,000

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:

	Year Ended December 31,		
	2016	2015	2014
Income (benefit) taxes at statutory rates	$(25,809,000)	$(10,920,000)	$(12,639,000)
State income tax, net of federal benefit	(4,000)	(2,640,000)	(2,362,000)
Change in valuation allowance	29,678,000	7,882,000	14,235,000
Research and development tax credits	(3,117,000)	(1,537,000)	(849,000)
Fair value warrant	(47,000)	(253,000)	(180,000)
Stock compensation	113,000	2,288,000	1,573,000
Uncertain tax positions	1,367,000	1,968,000	340,000
Expired NOL's and credits	4,269,000	339,000	728,000
Limited NOL's and credits	(6,456,000)	(297,000)	(749,000)
Change in state tax rate	(495,000)	676,000	(60,000)
Other	501,000	396,000	(8,000)
	$—	$(2,098,000)	$29,000

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, 2016 and 2015 are shown below:

	As of December 31,	
	2016	2015
Deferred tax assets:		
Capitalized research expense	$567,000	$1,201,000
Net operating loss carryforwards	95,500,000	71,848,000
Research and development and other tax credits	5,300,000	3,339,000
Deferred revenue	5,452,000	5,213,000
Deferred rent	2,231,000	2,171,000
Stock-based compensation	4,511,000	2,135,000
Acquired intangibles	269,000	—
Other	4,328,000	3,457,000
	118,158,000	89,364,000
Valuation allowance	(113,407,000)	(83,245,000)
Total deferred tax assets	4,751,000	6,119,000
Deferred tax liabilities:		
Acquired intangibles	—	(596,000)
Investment in affiliated entity	(3,624,000)	(4,399,000)
Fixed assets	(1,302,000)	(1,299,000)
Net deferred tax liabilities	$(175,000)	$(175,000)

In November 2015, the FASB issued ASU No. 2015-17, Balance Sheet Classification of Deferred Taxes, an update to ASC 740, Income Taxes ("Update"). Current GAAP requires an entity to separate deferred income tax liabilities and assets into current and noncurrent amounts in a classified statement of financial position. To simplify the presentation of deferred income taxes, the amendments in this Update require that deferred tax liabilities and assets be classified as noncurrent in a classified statement of financial position. The current requirement that deferred tax liabilities and assets of a tax-paying component of an entity be offset and presented as a single amount is not affected by the amendments in this Update.

For public business entities, the amendments in this update are effective for financial statements issued for annual periods beginning after December 15, 2016, and interim periods within those annual periods. The Board also decided to permit earlier application by all entities as of the beginning of any interim or annual reporting period. The Board further provides that this Update may be applied to all deferred tax liabilities and assets retrospectively to all periods presented. The Company chose to adopt the Update in fiscal year ended December 31, 2015 and apply this Update on a prospective basis.

As of December 31, 2016, the Company had federal, California and Pennsylvania tax net operating loss carry forwards of approximately $255.6 million, $73.6 million and $75.6 million, respectively, net of the net operating losses that will expire due to IRC Section 382 limitations. The federal and Pennsylvania net operating loss carry forwards will begin to expire in 2018 and 2021, respectively, unless previously utilized. The California net operating loss carry forwards will expire as follows:

	Amount (in millions)
2017	$ 5.8

2028 and beyond	67.8
Total	$ 73.6

In March 2016, the FASB issued ASU No. 2016-09, Compensation- Stock Compensation (Topic 718): Improvements to employee Shared-Based Payment Accounting ("ASU 2016-09"). ASU 2016-09 simplifies how several aspects of share-based payments are accounted for and presented in the financial statements. ASU 2016-09 is effective for public companies for annual reporting periods beginning after December 15, 2016. The Company will adopt this ASU in the first quarter of 2017. The Company has excess tax benefits for which a benefit could not be previously recognized of approximately $1.1 million. Upon adoption the balance of the unrecognized excess tax benefits will be reversed with the impact recorded to retained earnings including any change to the valuation allowance as a result of the adoption. Due to the full valuation allowance on the deferred tax assets, the Company does not expect any impact to the financial statements as a result of this adoption.

In addition, the Company had federal and state research tax credit carryforwards of approximately $7.6 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 will be 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 the Merger on June 1, 2009. 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 $20.8 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 our operations in the United States will not impact our effective tax rate. Any additional ownership changes, may further limit the ability to use the net operating losses and credits carryovers.

The following table summarizes the activity related to our unrecognized tax benefits:

	Year ended December 31,		
	2016	2015	2014
Balance at beginning of the year	$5,455,000	$2,759,000	$2,416,000
Increases related to current year tax positions	1,183,000	615,000	331,000
Increases related to prior year tax positions	217,000	2,081,000	12,000
Balance at end of the year	$6,855,000	$5,455,000	$2,759,000

The amount of unrecognized tax benefit that, if recognized and realized would affect the effective tax rate is $5.7 million as of December 31, 2016. 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 2013 and state and local income tax examinations before 2012. 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

In 1995, the Company adopted a 401(k) Profit Sharing Plan (the “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 $496,000, $328,000 and $275,000 for the years ended December 31, 2016, 2015 and 2014, respectively.

16. Related Party Transactions

GeneOne Life Sciences

On May 26, 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 Gene One entered into a First Amendment to the May 2015 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.

On September 23, 2014, the Company entered into a Collaborative Development Agreement with GeneOne to co-develop an Ebola vaccine through Phase 1 clinical trials. In July 2015, the Company amended the Agreement with an effective date of April 2015 to change control of development in return for the Company’s payment of certain development fees.

On October 7, 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 “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 Products in the licensed territories, retaining all commercial rights to the Products in all other territories. On August 21, 2013, the Company amended the Hep Agreement to grant back to the Company hepatitis B, along with all associated rights, from the collaboration in return for certain remuneration including a percentage of license fees. On October 7, 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.

On March 24, 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 Inovio’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 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 Inovio 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.

For the years ended December 31, 2016, 2015 and 2014, the Company recognized revenue from GeneOne of $1.2 million, $450,000 and $479,000, respectively, which consisted of licensing and other fees from the influenza and Zika collaborations. Operating expenses recorded from transactions with GeneOne for the years ended December 31, 2016, 2015 and 2014 include $2.8 million, $6.9 million and $4.2 million, respectively, related primarily to biologics manufacturing. At December 31, 2016 and 2015, the Company had an accounts receivable balance of $441,000 and

$4,000, respectively, and an accounts payable and accrued liability balance of $379,000 and $165,000, respectively, related to GeneOne and its subsidiaries. At December 31, 2016 and 2015, $571,000 and $373,000 of prepayments made to GeneOne were classified as long-term other assets on the consolidated balance sheet.

OncoSec Medical Incorporated

The Company's Chairman, Dr. Avtar Dhillon, is the non-executive Chairman of OncoSec.

At December 31, 2016, the Company holds a warrant to purchase 150,000 shares of common stock of OncoSec at an exercise price of $20.00 per share. On September 28, 2016, the Company's warrant expired to purchase 50,000 shares of common stock of OncoSec at an exercise price of $24.00 per share. (See Note 5 for further discussion.)

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 of Korea. The assets transferred included an exclusive license with Inovio 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 16.8% of PLS common stock.

During each of the years ended December 31, 2016 and 2015, VGX Animal Health distributed the $1.0 million cash received to its shareholders, of which $149,559 went to minority shareholders.

As of December 31, 2016 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 $3.8 million as of December 31, 2016. The fair value is based on the market value of the 395,758 common shares owned, listed on the KONEX. The changes in carrying value of PLS are recorded in the consolidated statements of comprehensive loss as an unrealized gain (loss) on investment in affiliated entity.

In August 2016, we licensed a veterinary vaccine for foot and mouth disease (FMD) to PLS. PLS will fund all development activities for this FMD vaccine. We 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.

The Wistar Institute

The Company's director and chairman of the scientific advisory board, Dr. David B. Weiner, is the Executive Vice President and Director of the Vaccine Center of The Wistar Institute ("Wistar").

On March 16, 2016, the Company entered into collaborative research agreements with Wistar for preventive and therapeutic DNA-based immunotherapy applications and products for cancers and infectious diseases developed by Dr. Weiner and his Wistar laboratory. 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 collaboration.

For the year ended December 31, 2016, the Company recognized revenue from Wistar of $341,000, related to work performed on a research sub-award agreement. Operating expenses recorded from Wistar for the year ended December 31, 2016 were $985,000 related to the collaborative research agreements and sub-contract related to the DARPA Ebola grant. At December 31, 2016, the Company had an accounts receivable balance of $152,000 and an accounts payable and accrued liability balance of $671,000 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, 2016 and 2015 (unaudited):

	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)

	Quarter Ended December 31, 2015	Quarter Ended September 30, 2015	Quarter Ended June 30, 2015	Quarter Ended March 31, 2015
Consolidated Statements of Operations:				
Revenue:				
Revenue under collaborative research and development arrangements	$1,820,643	$16,475,083	$4,335,236	$4,245,571
Revenue under collaborative research and development arrangements with affiliated entity	375,000	125,000	166,667	112,500
Grants and miscellaneous revenue	3,739,919	7,583,151	784,775	808,566
Total revenues	5,935,562	24,183,234	5,286,678	5,166,637
Operating Expenses:				
Research and development	15,601,891	16,075,201	16,688,511	9,426,320
General and administrative	4,860,086	4,377,616	4,718,260	4,107,928
Gain on sale of assets	—	—	(1,000,000)	—
Total operating expenses	20,461,977	20,452,817	20,406,771	13,534,248
Income (Loss) from operations	(14,526,415)	3,730,417	(15,120,093)	(8,367,611)
Interest and other income, net	(194,519)	214,982	146,332	138,276
Change in fair value of common stock warrants	(290,316)	518,877	(49,773)	(1,227)
Gain (Loss) from investment in affiliated entity	(3,249,315)	(659,054)	8,861,145	(2,352,309)
Net income (loss) before income tax benefit	(18,260,565)	3,805,222	(6,162,389)	(10,582,871)
Income tax benefit	308,520	1,789,246	—	—
Net income (loss)	(17,952,045)	5,594,468	(6,162,389)	(10,582,871)
Net (income) loss attributable to non-controlling interest	—	—	(85,861)	1,092
Net income (loss) attributable to Inovio Pharmaceuticals, Inc.	$(17,952,045)	$5,594,468	$(6,248,250)	$(10,581,779)
Net income (loss) per common share attributable to Inovio Pharmaceuticals, Inc. stockholders				
Basic	$(0.25)	$0.08	$(0.09)	$(0.17)
Diluted	$(0.25)	$0.07	$(0.09)	$(0.18)

18. Subsequent Events

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 Collaborative, License, and Option Agreement.

On February 13, 2017, the Company announced that it has entered into a collaboration and license agreement ("the Agreement") providing ApolloBio Corporation ("ApolloBio") with the exclusive right to develop and commercialize VGX-3100, Inovio's DNA immunotherapy product designed to treat pre-cancers caused by human papillomavirus (HPV), within Greater China (China, Hong Kong, Macao, Taiwan). Under the Agreement, Inovio will receive $15.0 million in upfront and near term payments comprising an initial $3.0 million signing fee and a $12.0 million milestone upon lifting of the VGX-3100 Phase 3 pre-initiation clinical hold by the FDA. Under a separate equity agreement, ApolloBio will invest in Inovio common stock subsequent to lifting of the clinical hold at a volume weighted average price encompassing a trading period prior to and following the lifting of the clinical hold. The aggregate investment, which is expected to be completed in the first half of 2017, will not exceed $35.0 million and may be a lower amount such that ApolloBio will not be the largest shareholder in Inovio. ApolloBio will fund all clinical development costs within the licensed territory, and will pay Inovio up to $20.0 million based upon the achievement of certain regulatory milestones in the US, China and Korea, and double digit royalties on net sales of VGX-3100. The agreements are subject to People's Republic of China (PRC) corporate and regulatory approvals, and payments are subject to PRC currency approvals. While the Agreement has been executed by the parties, the Agreement by its terms will become

effective on the date that the ApolloBio board of directors and stockholders approve the Agreement.