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

FORM 10-K

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

FOR THE FISCAL YEAR ENDED DECEMBER 31, 2022

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:

Title of Each Class	Trading Symbol(s)	Name of Each Exchange on Which Registered
COMMON STOCK, $0.001 PAR VALUE	INO	Nasdaq Global Select Market

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 ☒

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 ☒

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 ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted 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 such files). Yes ☒ No ☐

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

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

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

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report.☐

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements. ☐

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to §240.10D-1(b). ☐

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

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, 2022 was approximately $425.5 million based on $1.73 per share, the closing price on that date of the Registrant's Common Stock on the Nasdaq Global Select Market.

The number of shares outstanding of the Registrant's Common Stock, $0.001 par value, was 260,131,986 as of February 24, 2023.

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 2023 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, 2022.

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PART I

ITEM 1. BUSINESS

This Annual Report on Form 10-K (including the following section regarding Management's Discussion and Analysis of Financial Condition and Results of Operations), or this Annual Report, contains forward-looking statements regarding our business, financial condition, results of operations and prospects. Words such as "expects," "anticipates," "intends," "plans," "believes," "seeks," "estimates" and 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.

This Annual Report includes trademarks and registered trademarks of INOVIO Pharmaceuticals, Inc. Products or service names of other companies mentioned in this Annual Report may be trademarks or registered trademarks of their respective owners. References herein to "we," "our," "us," "INOVIO" or the "Company" refer to INOVIO Pharmaceuticals, Inc. and its subsidiaries. References herein to "DNA medicines" refers to our product candidates in development for diseases associated with human papillomavirus (HPV), cancer, and infectious diseases.

Summary Risk Factors

Our business is subject to a number of risks, including risks that may prevent us from achieving our business objectives or may adversely affect our business, financial condition, results of operations, cash flows and prospects. These risks are discussed more fully in Part I, Item 1A., Risk Factors herein. These risk factors include, but are not limited to, the following:

- We have incurred significant losses in recent years, expect to incur significant net losses in the foreseeable future and may never become profitable.
- We have limited sources of revenue and our success is dependent on our ability to develop our DNA medicines and proprietary smart device technology.
- We will need substantial additional capital to develop our DNA medicines and proprietary smart device technology, which may prove difficult and costly to obtain.
- None of our DNA medicine candidates have been approved for sale, and we may never develop commercially successful DNA medicine products.
- We previously expended significant resources on the development of a COVID-19 vaccine candidate. We are currently pursuing third-party sponsored and funded development of this candidate, but there can be no assurance that it will ever receive regulatory approval as a vaccine booster in any country, whether by Emergency Use Authorization or otherwise.
- DNA medicines are a novel approach to treating and preventing disease, and negative perception of the efficacy, safety, or tolerability of any investigational medicines we develop could adversely affect our ability to conduct our business, advance our investigational medicines, or obtain regulatory approvals.
- If we and the contract manufacturers upon whom we rely fail to produce our proprietary smart devices and DNA medicine candidates in the volumes that we require on a timely basis, or at all, or if these contractors fail to comply with their obligations to us or with stringent regulations, we may face delays in the development and commercialization of our proprietary smart devices and DNA medicine candidates.
- 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 agreements with government agencies, which are subject to termination and uncertain future funding, which could have a negative impact on our ability to develop certain of our pipeline candidates and/or require us to seek alternative funding sources to advance product candidates.

- Our operating results may be harmed if our restructuring plans do not achieve the anticipated results or cause undesirable consequences.
- We are currently subject to litigation and may become subject to additional litigation, which could harm our business, financial condition and reputation.
- We face intense and increasing competition and steps taken by our competitors, such as the introduction of a new, disruptive technology may impede our ability to successfully commercialize our DNA medicines, if approved.
- We have entered into collaborations with Chinese companies and conduct certain research and development activities in China. Uncertainties regarding the interpretation and enforcement of Chinese laws, rules and regulations, a trade war, political unrest or unstable economic conditions in China could materially adversely affect our business, financial condition and results of operations.
- 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.
- 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.

Company Overview

We are a biotechnology company focused on developing and commercializing DNA medicines to help treat and protect people from diseases associated with HPV, cancer, and infectious diseases. Our goal is to advance our diverse pipeline of product candidates and deliver on the promise of DNA medicines technology in treating and preventing a wide array of diseases.

In clinical trials, our DNA medicine candidates have shown the ability to generate immune responses, especially $CD4^+$, $CD8^+$, and memory T-cell responses against targeted pathogens and cancers, via our precisely designed plasmids. These plasmids are delivered into cells using our investigational proprietary smart device, CELLECTRA.

Many of our lead candidates are focused on diseases associated with HPV. In 2022, we announced data from a Phase 1/2 clinical trial with INO-3107 for the treatment of HPV-6 and HPV-11 associated Recurrent Respiratory Papillomatosis (RRP). In this trial, treatment with INO-3107 resulted in a statistically significant reduction of the median number of surgeries, a result that reinforces our belief that DNA medicines may play a key role in the treatment of HPV-related diseases.

Characteristics of DNA Medicines

DNA medicines are optimized DNA plasmids containing a gene encoding for a target protein which is expressed once DNA medicines are delivered into cells. Characteristics of our DNA medicines include:

a. **T Cell Responses:** DNA medicines have demonstrated the ability to generate high levels of T cell ($CD4^+$, $CD8^+$, and memory) response along with antibody response. $CD8^+$ T cell responses are thought to play an important role in clearing tumors or infected cells.

b. **Tolerability:** DNA medicines appear to be well-tolerated when evaluated against multiple disease targets. Our DNA medicines have been administered over 15,000 times across more than 5,000 participants to date.

c. **Ability to Readminister:** DNA medicines have been used in clinical trials to boost immune response via repeat administration, offering the possibility for boosting without any concerns of generating an anti-vector response.

d. **Versatility:** Our gene encoding technology can target any disease or condition that is strongly associated with an antigen or protein.

e. **Stability of Product:** DNA medicines have been shown to be stable at room temperature for extended periods and do not require frozen storage or shipping. Certain of our DNA plasmids under development have been room temperature stable for over 6 months.

f. **Design and Manufacture:** DNA medicines can be rapidly designed and scaled. Ease of manufacture may provide a cost advantage.

g. **Delivery Mechanism:** Cell membranes can hinder the entry of large molecules such as DNA plasmids. To overcome this barrier, delivery mechanisms such as electroporation are used to increase cellular uptake.

Overview of Our DNA Medicines Platform

Our DNA medicines platform consists of DNA plasmids and our investigational proprietary smart device, CELLECTRA, which is used to deliver the DNA plasmids into the cell. These two components combine to create a versatile platform that has the potential to target any disease or condition that is associated with a specific antigen or protein.

SynCon® - DNA Plasmid Design Technology

Our precisely designed DNA plasmids are circular double-stranded DNA that have been optimized using our proprietary SynCon technology to express the target antigen or protein. In the areas of HPV-related diseases, cancer, and infectious diseases, the expressed proteins are the antigens that are strongly associated with the target disease. The expressed antigens, in turn, elicit antigen-specific antibody and T cell responses. We first identify one or more antigens that we believe are the best targets for directing the immune system toward a particular tumor or infectious disease. We then apply our SynCon design process, which analyzes the genetic make-up of the selected antigens from multiple variants of a tumor or strains of a virus.

For each antigen, SynCon technology creates a new genetic sequence that represents a nucleotide consensus sequence of the targeted antigen. In doing so, we believe we can create a differentiated SynCon sequence to help the immune system better recognize the target antigen and potentially variations of the target antigen. We have generated immune responses, including $CD4^+$, $CD8^+$, and memory T cells, with SynCon-designed DNA medicines against various tumor-associated antigens, as well as against different strains of certain infectious diseases in human clinical trials. Because the engineered SynCon sequences are substantially similar to the original sequences, without matching them exactly, we believe they are patentable.

Once a SynCon sequence is engineered, it is then inserted into a circular DNA plasmid with its own promoter. Promoters serve a vital role in "promoting" the expression of the target antigen once the DNA medicine has entered the cell. Through our SynCon technology, our DNA plasmids have been optimized 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 antigen expression compared to traditional approaches, potentially enhancing the overall ability to induce the desired immune response.

The plasmids are then manufactured in a bacterial fermentation process using scalable manufacturing technology. We have recently developed a high-yield manufacturing process which we anticipate using to manufacture our DNA medicines. The manufactured DNA medicines are designed to be stable under normal environmental conditions for extended periods of time.

CELLECTRA® Delivery Technology

Large molecules, like DNA plasmids, tend to be hindered by the cell membrane from entering the cell. To overcome this hurdle and allow for an efficient cellular uptake of our DNA plasmids, we have developed the CELLECTRA delivery technology, which delivers the DNA medicines directly into cells either intramuscularly (IM) or intradermally (ID). CELLECTRA devices use brief electrical pulses to reversibly open small pores in the cell membrane, allowing DNA plasmids to enter. Through this process, the cellular uptake of the DNA plasmids can be substantially increased compared to the injection of DNA plasmids alone. This improved cellular uptake has enabled the immune responses and efficacy results observed in our clinical trials to date.

Our CELLECTRA device portfolio currently consists of three models. CELLECTRA 2000 can perform both IM and ID injections and has been used in numerous clinical trials to date. CELLECTRA 5PSP is our new IM device utilizing a prefilled drug cartridge. CELLECTRA 5PSP has been used in our Phase 3 trials (REVEAL1/REVEAL2) for cervical high-grade squamous intraepithelial lesions (HSIL). We are also planning to use CELLECTRA 5PSP for the planned Phase 3 trial for INO-3107, our DNA medicines candidate for RRP. Finally, CELLECTRA 3PSP is our next-generation ID delivery device developed with support from the U.S. Department of Defense, which is ready for large volume production and application submission to regulatory agencies for review and approval.

CELLECTRA devices are validated and manufactured under Current Good Manufacturing Practices (cGMP). We have filed device master files with the U.S. Food and Drug Administration (FDA) covering the use of CELLECTRA smart devices in human clinical trials. CELLECTRA 2000 and 5PSP models have received CE mark certification in the EU.

The process for administration of our DNA medicines is illustrated in the following graphic.

DNA Medicines and HPV-related Diseases

Human papillomavirus (HPV) is a sexually-transmitted, persistent viral infection with one or more high-risk genotypes that can lead to warts, precancerous lesions and cancers, such as RRP, cervical, head and neck, anal and vulvar dysplasias, which are abnormal precancerous cells, and cancers. Approximately 90% of all HPV infections clear naturally and do not result in disease. However, for those not able to clear the virus naturally, persistent infection can lead to cancer and other debilitating, life-threatening diseases affecting quality of life.

HPV types fall into two groups. Low-risk HPV *(*e.g., HPV 6 and HPV 11) may lead to benign growths (warts or papillomas) that can develop into conditions such as RRP. High-risk (HR) HPV *(*e.g., HPV 16 and HPV 18) may lead to cell changes and lesions (i.e., precancerous dysplasia) that can become malignant and lead to cervical cancer. HPV causes nearly all cervical cancers and many cancers of the vagina, vulva, penis, anus, rectum, and oropharynx.

While there are currently vaccines available to prevent HPV infection, challenges with acceptance, accessibility, and patient compliance have resulted in many vaccine-eligible people remaining unvaccinated and at risk. It is estimated that even in the United States, only 50-60% of the eligible population has been vaccinated against HPV. In addition, current preventive HPV vaccines cannot treat or protect those already infected with the same HPV genotypes. As a result, there is still an urgent need for the development of HPV therapies that can treat existing infections and prevent the development of HPV-related diseases. The current standard of care for many HPV-related diseases, including cervical dysplasia, cancer, and RRP, is surgery. These surgeries can be invasive and may be needed repeatedly because the underlying HPV infection is not eliminated. This is especially true for chronic diseases such as RRP and anal dysplasia. In addition to surgery, other options are being explored to treat HPV-related diseases, including the usage of checkpoint inhibitors and other immunotherapies.

A summary of the key characteristics of DNA medicines that we believe are important for the treatment of HPV-related diseases are listed in the following graphic:

Topic	Attribute	Effect
Immunogenicity	Generates antibody, helper T cell, and killer T cell responses	Complete immune response with induction of antigen-specific long-lived memory, helper, and killer T cells
	Antigen expression optimized based on Inovio's proprietary technology	Potential for enhanced immunogenicity
Safety & Tolerability	Does not contain whole or weakened HPV virus	Cannot cause HPV infection
	No anti-vector responses have been observed and repeat administrations have been well-tolerated	Booster doses possible
	Substantial clinical trial experience	Favorable adverse event profile across programs

Our DNA Medicines in Development

The chart below provides an overview of our DNA medicines pipeline. Each of the programs identified are described in more detail below.

INO-3107 for HPV-related Recurrent Respiratory Papillomatosis (RRP)

RRP is a life-long, rare disease characterized by the growth of tumors in the respiratory tract primarily caused by HPV-6 and/or HPV-11 genotypes. Although mostly benign, such papillomas can cause severe, sometimes life-threatening airway obstruction and respiratory complications. A distinguishing aspect of RRP is the tendency for the papilloma to recur after surgical procedures to remove them. If RRP develops in the lungs, affected individuals can potentially experience recurrent pneumonia, chronic lung disease (bronchiectasis) and, ultimately, progressive pulmonary failure. In extremely rare cases, RRP can develop into squamous cell carcinoma. Additional symptoms of RRP can include a hoarse voice, difficulty in sleeping and swallowing, and chronic coughing. RRP symptoms are usually more severe in children than in adults.

Incidence and prevalence of RRP is variable and depends on several factors that vary based on geographic location. There are estimated to be approximately 14,000 active cases and approximately 1.8 new cases per 100,000 adults in the United States each year. Global data for RRP is even more scarce, but available studies show a burden of disease in almost every country studied, ranging from an incidence of 0.18 cases per 100,000 adults in Lesotho to 0.54 per 100,000 adults in Norway and 0.02 cases per 100,000 children in Australia to 2.8 per 100,000 children in Thailand. The average yearly cost of treatment for RRP is estimated to be approximately $72,000.

In October 2022, we announced preliminary results from an open-label, multicenter Phase 1/2 trial evaluating the efficacy, safety, tolerability and immunogenicity of INO-3107, a DNA medicine candidate targeting HPV-6 and HPV-11 associated RRP. For this trial, adult patients first underwent surgical removal of their papilloma(s) and then received up to four doses of INO-3107, once every three weeks. The study protocol also included the administration of INO-9112, which encodes for human interleukin-12 (IL-12) to help enhance the immune response. The primary endpoint of this trial was safety and tolerability. Interim results from the trial showed INO-3107 to be well-tolerated with all patients completing the trial follow-up. Treatment-emergent adverse events (TEAEs) observed in the trial were generally low-grade, with 86% of patients experiencing at least one TEAE, most of which were Grade 1. Three patients (14%) experienced a Grade 3 TEAE, but none were deemed related to treatment with INO-3107. The most commonly reported TEAEs were injection site pain (38%) and fatigue (19%). While two serious adverse events were reported, these were also deemed unrelated to INO-3107.

The trial also assessed the efficacy of INO-3107. Preliminary results from the initial cohort of 21 patients showed a statistically significant reduction in the number of RRP surgical interventions in the year following the administration of INO-3107 compared with the year prior to treatment, which was the clinical endpoint of the trial. Of the 21 patients, 16 (76%) had a decrease in surgical interventions in the year following the administration of INO-3107 relative to the number of surgeries in the year prior to the trial. Of those 16 patients, six required no surgical intervention during the trial period. There was a median decrease of three surgical interventions (95% CI 1, 3) across the initial cohort.

In the trial, INO-3107 generated cellular responses against both HPV 6 and HPV 11, spanning both CD4 and CD8 T cells, including killer T cells. T-cell activity against HPV 6 and HPV 11 was present at the study end, which was 43 weeks after completion of treatment, and is indicative of a persistent cellular memory response.

INO-3107 was granted Orphan Drug Designation (ODD) by the FDA in July 2020.

In February 2023, we announced positive preliminary results from the second cohort of our Phase 1/2 clinical trial evaluating INO-3107 for the treatment of HPV 6 and HPV 11-associated RRP in adults. In the second cohort of 11 patients who were administered INO-3107 via the exploratory side port needle, 10 of the 11 patients (91%) had a reduction in surgical interventions in the year following initial treatment, with measurement beginning at Day 0, the start of trial therapy. Of these 10 patients, four did not require surgery. There was a statistically significant median decrease of three surgical interventions when comparing the year following treatment to the year prior. In the year prior to treatment, the number of surgical interventions for these 11 patients ranged between 2 and 8, and the median was 5.

Treatment with INO-3107 induced cellular responses against both HPV 6 and HPV 11, inducing both activated CD4 and activated lytic CD8 T cells. T cell responses were also observed at Week 52, which was 43 weeks after final treatment with INO-3107, indicating a persistent cellular memory response.

INO-3107 was well-tolerated in the trial, with all 11 patients completing the trial follow-up. Treatment-emergent adverse events (TEAE) observed in the trial were generally low-grade, with five patients (46%) experiencing at least one TEAE; four patients (36%) reported at least one related TEAE, all of which were Grade 1 or 2. The only adverse events reported by more than one patient were injection site pain (two patients) and headache (two patients). The safety and efficacy results for the second cohort were consistent with results announced for the first cohort in October 2022.

VGX-3100 for the Treatment of HPV-related Cervical HSIL

Cervical HSIL is a pre-cancerous condition caused by HPV infection. While most genital HPV infections are cleared naturally by the body's own immune system, persistent cervical infection with one or more HR-HPV genotypes can eventually lead to cervical high-grade dysplasia (HSIL) and eventually to cervical cancer.

Current management options for cervical HSIL are limited and are associated with potential unwanted side effects. The “watch-and-wait” process associated with low-grade squamous intraepithelial lesions (LSIL, formerly called low-grade dysplasia or CIN 1), and in some young women with CIN2, can be a stressful approach. The current standard of care for cervical HSIL is surgery, which involves ablating or cutting into a women’s cervix to remove the pre-cancerous lesions. These treatments may lead to short-term adverse effects including excess bleeding, and infection, or to longer-term reproductive risks such as pre-term birth, miscarriage, and perhaps infertility. Recurrence of high-grade precancerous lesions can occur after surgery because surgery does not clear the underlying HPV infection.

Currently, there is no approved immunotherapy or drug available to treat persistent HPV infection or cervical HSIL.

VGX-3100 is designed to generate T cell immune responses against the E6 and E7 oncogenic proteins of high-risk HPV types 16 and 18 that can be present in both precancerous and cancerous cells transformed by these HPV types. E6 and E7 are oncogenes that play an integral role in transforming HPV-infected cells into precancerous and cancerous cells, thus making them appealing targets for T cell-directed immunotherapy. The goal of VGX-3100 is to stimulate the body's immune system to generate a T cell response to kill the cells producing the E6/E7 protein. The potential of such immunotherapy would be to treat HSIL caused by these HPV types.

We have completed randomized, blinded, placebo-controlled Phase 2b and Phase 3 clinical trials of VGX-3100 compared to placebo, in women with HPV-16 and HPV-18 cervical HSIL. In the Phase 2b trial, women treated with VGX-3100 were more likely to demonstrate resolution of cervical HSIL and HPV clearance from cervical lesions than those women receiving placebo. In addition, antigen-specific T cell levels in women treated with VGX-3100 were greater than those treated with placebo. All women were monitored for an additional 52 weeks following the primary endpoint to assess for safety; VGX-3100 was well-tolerated and there were no safety concerns observed. Immune endpoints were also assessed and women whose lesions regressed also 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. To our knowledge, this Phase 2b trial was the first study from which data was published indicating a direct correlation between antigen-specific CD8+ T cells generated in vivo and clinical efficacy.

VGX-3100 Immune Correlates and Biomarker Signatures

We are pursuing a biomarker signature for our VGX-3100 program. In May 2019, we entered into a collaboration with QIAGEN N.V. to co-develop a liquid biopsy-based diagnostic for this biomarker signature to identify women with HPV-16/18 cervical HSIL most likely to respond to VGX-3100. In February 2021, we announced an extension of our partnership with QIAGEN with a new master collaboration agreement to develop liquid biopsy-based companion diagnostic products based on

next-generation sequencing technology to complement our therapies. QIAGEN is utilizing the Illumina NextSeq™ 550Dx platform for this biomarker, the first development based on a partnership QIAGEN and Illumina entered into in October 2019.

In December 2021, we announced that we and QIAGEN had identified candidate biomarker signatures for VGX-3100 with the intent of selecting a final signature of a pre-treatment in vitro diagnostic to meet the specific characteristics desired to identify women with HPV-16/18 cervical HSIL most likely to respond to VGX-3100. This biomarker, if validated, may have the potential to identify those women who are more likely to have a favorable treatment outcome, specifically the regression of cervical HSIL and viral clearance.

Phase 3 Trials (REVEAL1 and REVEAL2)

Our Phase 3 program, named REVEAL, consists of a primary trial (REVEAL1; HPV-301) and confirmatory trial (REVEAL2; HPV-303). The REVEAL trials are prospective, randomized (2:1), double-blind, placebo-controlled trials evaluating adult women with HPV 16/18 positive biopsy-proven cervical HSIL (CIN 2/3). The primary endpoint is regression of cervical HSIL and virologic clearance of HPV-16 and/or HPV-18 in the cervix, which was a secondary endpoint that was achieved in our Phase 2b trial. Overall, the Phase 3 trials are evaluating cervical tissue changes at approximately 9 months after beginning a three-dose regimen of VGX-3100 administered at months 0, 1 and 3.

In March 2021, we announced the results of the REVEAL1 trial of VGX-3100. The trial protocol-defined intention to treat (ITT) population (N=201) included all randomized participants regardless of availability of endpoint data and defines those without endpoint data as non-responders. There were eight such participants (seven in the treatment group, one in the placebo group) in the ITT population. Including participants with missing endpoint data, the percentage of participants meeting the primary endpoint was 22.5% (31/138) in the treatment group, versus 11.1% (7/63) in the placebo group (p=0.029; 95%CI: -0.4,21.2), which was not statistically significant. All secondary endpoints were achieved except for regression of cervical HSIL alone (95%CI: -0.6,24.5).

For the protocol-defined mITT population (N=193), which included all participants with endpoint data, VGX-3100 achieved the primary and secondary endpoints among all evaluable participants. For the primary endpoint of histopathological regression of HSIL and virologic clearance of HPV-16 and/or HPV-18 at week 36, the percentage of responders was 23.7% (31/131) in the treatment group, versus 11.3% (7/62) in the placebo group (p=0.022; 95%CI: 0.4,22.5), which was statistically significant. All secondary efficacy endpoints were achieved in this population. These endpoints were: a) regression of cervical HSIL to normal tissue combined with HPV16/18 viral clearance, b) regression of cervical HSIL alone, c) regression of cervical HSIL to normal tissue, and d) HPV 16/18 viral clearance alone. There were no treatment-related serious adverse events (SAEs) and most adverse events (AEs) were self-resolving and were considered to be mild to moderate, consistent with earlier clinical trials. The data from REVEAL1 was presented at the 2021 American Society for Colposcopy and Cervical (ASCCP) annual scientific meeting, and at the 34th International Papillomavirus Conference (IPVC) in November 2021.

We completed the 52-week safety follow-up of participants in REVEAL1 and showed that VGX-3100 remained well-tolerated through Week 88. In addition, participants treated with VGX-3100 who met the primary endpoint at Week 36 remained clear of HPV-16 and/or HPV-18 at Week 88.

REVEAL2 is our second Phase 3 trial with VGX-3100. In April 2022, the trial protocol was amended to utilize a biomarker-selected population as the primary population, based on prior analysis of REVEAL1 results suggesting that this investigational biomarker had the potential to identify women more likely to respond to treatment with VGX-3100. We announced that this trial would no longer be considered to be a pivotal trial and would not lead to a BLA filing for a biomarker-selected population, as the FDA advised us that the biomarker-positive population would not be sufficient to support approval of a potential marketing application for VGX-3100. The FDA recommended using REVEAL2 as an exploratory trial and that conducting one or two additional well-controlled trials in the biomarker-selected population would be more likely to provide evidence to support approval of a marketing application.

Trial participants in REVEAL2 included 203 women, 18 years of age or older, who had histologically-confirmed cervical HSIL associated with HPV-16 and/or HPV-18, but who were otherwise healthy. Participants received either VGX-3100 or placebo at 0, 4 and 12 weeks (randomized 2:1). The primary endpoint, as amended, was the percentage of biomarker-selected participants with regression of cervical HSIL and virologic clearance of HPV-16 and/or HPV-18 in the cervix. A secondary endpoint was the percentage of all participants with regression and virologic clearance.

In March 2023, we announced data from our REVEAL2 trial. Statistical significance was not achieved in the investigational biomarker-selected population for the endpoint of lesion regression and viral clearance. However, statistical significance was achieved in the all-participants population for the endpoint of lesion regression and viral clearance.

The percentage of participants in the investigational biomarker-selected population meeting the endpoint was 28.6% (6/21) in the treatment group, versus 0% (0/4) in the placebo group (p=0.115; difference in percentage 28.6, 95%CI: -24.6, 50.4), which was not statistically significant.

The result of the all-participants population of 203 participants (134 participants in the treatment group, 69 in the placebo group) was statistically significant, with 27.6% (37/134) of the participants meeting the endpoint in the treatment group, versus 8.7% (6/69) in the placebo group (p=0.001; difference in percentage 18.9, 95%CI: 7.8, 28.6).

In particular, in the all-participants population of REVEAL2, viral clearance was observed in 37.3% (50/134) in the treatment group versus 8.7% (6/69) in the placebo group. Given the importance of viral clearance in removing the underlying cause of the HPV-related diseases, this data may have positive implications in our other HPV-related programs.

An ad hoc integrated efficacy analysis of the results for both REVEAL1 and REVEAL2 shows statistical significance in the biomarker-selected and all-participants populations for lesion regression and viral clearance. For the combined biomarker-selected population of 92 participants (68 participants in the treatment group, 24 in the placebo group), the percentage of participants meeting the primary endpoint was 54.4% (37/68 in the treatment group, versus 12.5% (3/24) in the placebo group (p=<0.001; difference in percentage 41.9, 95%CI: 20.4, 57.0). For the combined all-participants population of 404 participants (272 participants in the treatment group, 132 in the placebo group), the percentage of participants meeting the primary endpoint was 25.0% (68/272 in the treatment group, versus 9.8% (13/132) in the placebo group (p=<0.001; difference in percentage 15.2, 95%CI: 7.4, 22.1).

In both REVEAL1 and REVEAL2, VGX-3100 was well-tolerated. There were no treatment-related serious adverse events and most adverse events were considered to be mild to moderate.

This combined data set will be used as supportive data in any future regulatory interactions involving VGX-3100. We will continue to evaluate the results to determine next steps for VGX-3100 in our HPV programs. We plan to submit the data for publication in a peer-reviewed journal later this year.

VGX-3100 for the Treatment of Anal or Perianal HSIL

HPV-16 and HPV-18 can also cause precancerous lesions of the anus (anal HSIL). Left untreated, anal HSIL may progress to cancer. Spontaneous regression of anal HSIL is observed in approximately 20% of patients. Persistent infection with one or more high-risk HPV genotypes is responsible for a large portion of anal cancer. In the United States, about 55% to 80% of anal HSIL cases are associated with HPV-16/18, and worldwide about 80% of anal HSIL cases are associated with HPV-16/18. In the United States, over 90% of anal cancer is attributable to HPV, and about 87% of those HPV anal cancers are attributable to HPV-16/18 specifically.

There are no validated screening tests or a general consensus for screening recommendations for anal HSIL. Treatment usually consists of repeated ablation, most commonly radiofrequency ablation (RFA), resections or laser therapy. However, recurrence rates are high, up to 49% one year after treatment, as ablation does not clear the underlying HPV infection, resulting in an unmet medical need.

We have completed a Phase 2 clinical trial (HPV-203) to evaluate VGX-3100 in participants who are HIV-negative with histologically confirmed anal or perianal HSIL, or anal intraepithelial neoplasia (AIN), associated with HPV-16 and/or HPV-18. This open-label trial enrolled 24 participants who received three doses of VGX-3100 delivered by our CELLECTRA-5PSP device. The primary endpoint of the trial was histologic clearance of the high-grade lesions and virologic clearance of the HPV-16/18 virus in anal/perianal tissue samples. In December 2020, we announced Phase 2 efficacy results from this trial. One-half of participants treated with VGX-3100 (11/22) showed resolution of HPV-16/18-associated anal HSIL at six months following the start of treatment. VGX-3100 was well-tolerated in the trial.

In addition to the Phase 2 anal HSIL trial described above, a separate ongoing Phase 2 trial sponsored by the AIDS Malignancy Consortium (AMC-103) is evaluating VGX-3100 in participants with histologically confirmed anal or perianal HSIL associated with HPV-16 and/or HPV-18 who are HIV-positive. This open-label single-arm trial plans to enroll approximately 90 participants who will receive up to four doses of VGX-3100 delivered by CELLECTRA-5PSP smart device. The primary endpoint of the trial is histological regression of high-grade anal lesions to low-grade SIL or normal histology.

VGX-3100 for the Treatment of Vulvar HSIL

HPV-16 and HPV-18 can also cause precancerous and cancerous lesions of the vulva. These precancerous lesions, or vulvar HSIL, have less than a 5% rate of spontaneous or natural regression and there are no FDA-approved treatments. Surgery, the most common treatment, is associated with high rates of disease recurrence and can cause disfigurement, long-term pain, and psychological distress for women who undergo the procedure. Non-surgical options such as the off-label use of topical imiquimod are also available.

We have completed a Phase 2 trial (HPV-201) to evaluate the efficacy of VGX-3100 in participants with vulvar HSIL. This randomized, open-label Phase 2 clinical trial assessed the efficacy of VGX-3100 in 33 women with vulvar HSIL. VGX-3100 was administered with our CELLECTRA -5PSP smart device. The primary endpoint of the trial was histologic clearance of high-grade lesions and virologic clearance of the HPV virus in vulvar tissue samples. The trial also evaluated the safety and tolerability of VGX-3100. In January 2021, we announced efficacy results from this trial. A 25% or more reduction in HPV-16/18-associated vulvar HSIL was observed for 63% of trial participants (12 of 19) treated with VGX-3100 at six

months post-treatment. Three of the 20 participants with histology data (15%) resolved their vulvar HSIL and had no HPV-16/18 virus detectable in the healed area. VGX-3100 was well-tolerated in the Phase 2 trial.

INO-5401 for the Treatment of Glioblastoma Multiforme (GBM)

Glioblastoma multiforme (GBM) is the most common aggressive type of brain cancer. In the United States, the median age at diagnosis is 65 years, and the incidence rate increases thereafter. Prognosis is extremely poor, and a limited number of new therapies have been approved over the last 10 years; median overall survival for U.S. patients receiving standard of care therapy is approximately 10 months and the five-year survival is 6.8% for all ages combined. The annual incidence of GBM is estimated to be approximately 12,000 cases per year and increasing.

Our product candidate INO-5401 is an immunotherapy consisting of three DNA plasmids encoding for three tumor-associated antigens: human Telomerase Reverse Transcriptase (hTERT), Wilms Tumor gene-1 (WT1) and Prostate-Specific Membrane Antigen (PSMA).

We have completed a Phase 1/2 immuno-oncology trial of INO-5401 and INO-9012 (IL-12 plasmid) in participants with newly diagnosed GBM, in combination with cemiplimab (Libtayo®), a PD-1 inhibitor developed by Regeneron Pharmaceuticals. This open-label trial began in 2018 and enrolled 52 newly diagnosed GBM participants. The primary endpoint was safety and tolerability, and the trial also evaluated immunogenicity and efficacy (Overall Survival, or OS).

In May 2022, we presented OS data at the 2022 American Society of Clinical Oncology (ASCO) from GBM-001 Phase 2 trial. Median OS duration in patients with an unmethylated MGMT promoter (Cohort A) was 17.9 months, which compares favorably to historical comparisons (14.6-16 months). Median OS data in patients with a MGMT methylated promoter (Cohort B), was 32.5 months, which compares favorably to historical comparisons (23.2-25 months). Overall, INO-5401 + INO-9012 demonstrated tolerability and immunogenicity when administered with Libtayo and RT/TMZ (radiation and temozolomide) to newly diagnosed GBM patients. Notably, INO-5401 elicited antigen-specific T cells that may infiltrate GBM tumors.

INO-5151 (INO-5150 + INO-9012) for the Treatment of Prostate Cancer

INO-5151 consists of DNA plasmids targeting Prostate Specific Antigen (PSA) and Prostate Specific Membrane Antigen (PSMA), combined with INO-9112, the IL-12 plasmid, for the treatment of prostate cancer.

In 2019, we announced a clinical collaboration with Parker Institute for Cancer Immunotherapy (PICI) and the Cancer Research Institute (CRI) as part of which INO-5151 is being combined with an immune modulator (CDX-301, FLT3 ligand, a dendritic cell mobilizer) and a PD-1 immune checkpoint inhibitor (nivolumab) in participants with metastatic castration-resistant prostate cancer (mCRPC), in a PICI-sponsored platform trial (PORTER). This combination trial is an open-label, non-randomized, exploratory platform trial designed to assess the safety and antitumor activity of multiple immunotherapy-based combinations in participants with mCRPC who have received prior secondary androgen inhibition. The trial evaluated biomarkers of immune activity and clinical outcomes using a multi-omic, multi-parameter approach. Under the agreement, PICI designed and conducted the clinical trial, working in collaboration with its established network of clinical academic and industry cancer centers, with funding support from CRI.

In November 2022, at the Society for Immunotherapy of Cancer (SITC) 2022 annual meeting, PICI announced that while the treatment with INO-5151 induced antigen-specific T cell responses, the combination therapy of INO-5151 + nivolumab + CDX-301 was not deemed to have sufficient clinical activity by the study sponsors and will not be expanded for further study.

Infectious Disease Product Candidates

INO-4800 for COVID-19

Phase 2/3 Clinical Trial – INNOVATE

In 2022, we announced the discontinuance of all internally funded COVID-19 vaccine programs for INO-4800. The decision followed a comprehensive review of market conditions and global demand for COVID-19 vaccines. In May 2022, we announced the discontinuance of our INNOVATE program, which was focused on developing INO-4800 as a primary vaccine candidate against COVID-19. At that time, our intention was to continue our efforts to develop INO-4800 as a heterologous booster vaccine. However, in October 2022, we announced the discontinuance of these heterologous booster vaccine efforts for INO-4800 as market conditions continued to shift. While we believe that INO-4800 has attributes that could be beneficial as a potential vaccine and/or booster vaccine against COVID-19, such as its ability to elicit immune responses at the humoral and cellular level, including driving cross-reactive T cell responses against multiple variants of concern, our decision was driven by external factors. These included epidemiological trends, including reduced number of severe COVID-19 cases, difficulty in conducting heterologous booster trials in highly vaccinated populations, market conditions such as vaccine oversupply, lower

forecast projections for vaccine doses in the future, and vaccine fatigue, and changes in regulatory timelines and requirements, as well as diminishing government financial support.

Phase 2/3 Clinical Trial – SOLIDARITY TRIAL VACCINES (STV)

INO-4800 is one of two initial COVID-19 vaccine candidates included in the World Health Organization (WHO) sponsored Solidarity Trial Vaccines, which is designed to evaluate the efficacy and safety of promising new candidate vaccines selected by an independent vaccine prioritization advisory group composed of leading scientists and experts. Our decision to discontinue our internally funded efforts to develop INO-4800 as a COVID-19 heterologous booster vaccine does not affect the evaluation of INO-4800 in this trial.

INO-4800 in China

Our collaborator Advaccine has completed enrollment of its 200-participant homologous and 267-participant heterologous booster vaccine trials in China. The trials are designed to evaluate safety, tolerability and immunogenicity of INO-4800 as a homologous booster where INO-4800 was administered as the primary vaccine and as a heterologous booster where an inactivated vaccine was administered as the primary vaccine.

COVID-19 dMAb®

Using our SynCon technology, we are able to create a precisely designed DNA plasmid that encodes for a specific monoclonal antibody (mAb). We refer to these DNA plasmids as our dMAb product candidates. We deliver the plasmid directly into cells of the body using our CELLECTRA smart delivery system, enabling the electroporated cells to manufacture those mAbs in vivo (i.e. by the body itself), unlike conventional mAb technology that requires manufacture outside of the body. We believe this approach provides potentially significant advantages in terms of design simplicity, rapidity of execution and lower production costs. We expect to design dMAb product candidates not only for new disease targets that are not currently addressable with conventional recombinant mAbs, but also targets of existing, commercially available mAb products.

In December 2020, we, along with a team of scientists from The Wistar Institute, AstraZeneca, the University of Pennsylvania, and Indiana University, received a $37.6 million grant from the U.S. Defense Advanced Research Projects Agency (DARPA), a research and development agency of the DoD and the JPEO-CBRND, to use our dMAb technology to develop anti-SARS-CoV-2-specific dMAbs that function as both a therapeutic and preventive treatment for COVID-19.

As part of DARPA's two-year grant, the consortium constructed COVID-19 dMAb candidates mirroring AstraZeneca's traditional recombinant monoclonal antibody candidates currently being tested in clinical trials to treat COVID-19.

In July 2022, Wistar announced the dosing of the first participant in a Phase 1, open-label, single-center, 24-person dose escalation trial to evaluate the safety, tolerability and pharmacokinetic profile of two of our mAb product candidates , administered IM followed immediately by electroporation using our CELLECTRA 2000 device in a 1- and 2-dose regimen (Days 0 and 3) in healthy adults (NCT05293249).

INO-4201 for Ebola Virus Disease

The Ebola virus causes one of the most virulent viral diseases, with case fatality rates averaging approximately 50% but approaching up to 90% in past outbreaks in areas with no or under-developed health care. 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 2 to 21 days of exposure. In November 2019, the first conditional approval was issued for a preventive vaccine against Ebola virus. This approval was from the European Medicines Agency (EMA) for the vaccine ERVEBO®. That same month, the WHO pre-qualified that vaccine for use in high-risk countries. In the next month, the FDA approved that vaccine. However, there are no proven effective therapeutic treatments for Ebola. In addition, various experimental approaches have already been associated with undesirable side effects and limited ability to scale manufacturing.

In December 2021, we announced complete enrollment of a 46-participant Phase 1b trial in which our DNA medicine candidate INO-4201 was assessed as a heterologous booster in healthy volunteers previously vaccinated with rVSV-ZEBOV (ERVEBO®), an FDA- and EMA- approved viral vector-based Ebola vaccine (NCT04906629). To date, INO-4201 has been well-tolerated and has not demonstrated systemic SAEs, such as fever, joint pain, and low white blood cell counts, that have been reported in association with some viral vector-based Ebola vaccines currently in development.

In February 2022, we announced results from the Phase 1b trial. INO-4201 was well-tolerated and boosted humoral responses in 100% (36 of 36) of treated participants. We and our collaborators plan to publish the data in a peer-reviewed journal and provide updates on the next steps for INO-4201.

INO-4700 for Middle East Respiratory Syndrome (MERS)

The Middle East Respiratory Syndrome (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. In 2018, we announced a collaboration with CEPI under which CEPI would fund up to $56 million of costs to support our pre-clinical and clinical advancement through Phase 2 of our vaccine candidate INO-4700.

We dosed and completed enrollment for the first part (dose finding stage) of the Phase 2 trial (192 participants) of INO-4700. The multi-center Phase 2 trial was a randomized, double-blinded, placebo-controlled trial designed to evaluate the safety, tolerability, and immunogenicity of INO-4700 administered with CELLECTRA 2000 in approximately 500 healthy adult participants (NCT04588428). The trial was conducted at sites in Jordan, Lebanon, and Kenya.

Based on initial analysis of data from the studies, we and CEPI agreed to discontinue development of INO-4700 for MERS in November 2022. Although INO-4700 was well-tolerated by participants in our clinical trials and generated immune responses, the two-dose regimen did not meet CEPI's selection criteria for further development.

INO-4500 for Lassa Fever

Lassa fever, also known as Lassa hemorrhagic fever, is an acute viral disease which occurs mostly in West Africa.

In October 2021, we completed enrollment of a 220 participant Phase 1b trial for our vaccine candidate INO-4500 in Accra, Ghana, which was the first vaccine clinical trial for Lassa Fever conducted in West Africa, where the viral illness is endemic. The trial was funded by CEPI. The dosing regimen involved two intradermal vaccinations at 0 and 28 days with either 1.0 mg or 2.0 mg doses.

In November 2022, we announced that we and CEPI agreed to discontinue development of INO-4500 for Lassa Fever, following initial analyses of data from studies. Although INO-4500 was well tolerated by participants in our clinical trials and generated immune responses, the two-dose regimen did not meet CEPI's selection criteria for further development.

Collaboration and Alliances

Our partners and collaborators include Advaccine Biopharmaceuticals Suzhou Co, ApolloBio Corporation, AstraZeneca, The Bill & Melinda Gates Foundation (Gates), Coalition for Epidemic Preparedness Innovations (CEPI), Defense Advanced Research Projects Agency (DARPA), The U.S. Department of Defense (DoD), HIV Vaccines Trial Network, International Vaccine Institute (IVI), Kaneka Eurogentec, National Cancer Institute (NCI), National Institutes of Health (NIH), National Institute of Allergy and Infectious Diseases (NIAID), the Parker Institute for Cancer Immunotherapy, Plumbline Life Sciences, Regeneron Pharmaceuticals, Richter-Helm BioLogics, Thermo Fisher Scientific, the University of Pennsylvania, the Walter Reed Army Institute of Research, and The Wistar Institute.

Our most material collaboration arrangements are summarized below.

Advaccine

On December 31, 2020, we entered into a Collaboration and License Agreement with Advaccine Biopharmaceuticals Suzhou Co., Ltd. (“Advaccine”), which was amended and restated on June 7, 2021 (as amended and restated, the “Advaccine Agreement”). Under the terms of the Advaccine Agreement, we granted to Advaccine the exclusive right to develop, manufacture and commercialize our vaccine candidate INO-4800 within the territories of China, Taiwan, Hong Kong and Macau (referred to collectively as “Greater China”) and 33 additional countries in Asia. Advaccine does not have the right to grant sublicenses, other than to affiliated entities, without our express prior written consent. As part of the collaboration, Advaccine also granted to us a non-exclusive license to certain DNA vaccine manufacturing processes.

In certain instances, we will have the right to convert the exclusive license to a non-exclusive license in the licensed territories, other than Greater China, unless Advaccine agrees to pay us its full share of development costs in excess of a specified maximum. Notwithstanding the foregoing, Advaccine will be fully responsible for conducting the trial in Greater China, including its costs and expenses incurred in conducting the trial in Greater China.

Under the Agreement, Advaccine made an upfront payment to us of $3.0 million in January 2021. In addition to the upfront payment, we are entitled to receive up to an aggregate of $200.0 million, payable upon the achievement of specified milestones related to the development, regulatory approval and commercialization of INO-4800, including the achievement of specified net sales thresholds for INO-4800 in Greater China and the additional covered territories, if approved. In December 2020 we earned a $2.0 million milestone payment based on the enrollment of the first participant in the Phase 2 clinical trial for the product in the Advaccine territory. We are also entitled to receive a royalty equal to a high single-digit percentage of annual net sales in each region within the licensed territory, subject to reduction in the event of competition from biosimilar products in a particular region and in other specified circumstances. Advaccine’s obligation to pay royalties will continue, on a licensed product-by-licensed product basis and region-by-region basis, for ten years after the first commercial sale in a particular region

within Greater China or, if later, until the expiration of the last-to-expire patent covering a given licensed product in a given region.

Beginning in the first calendar year following the first commercial sale of INO-4800 in the licensed territory outside of Greater China, Advaccine will pay us an annual maintenance fee of $1.5 million for a period of five years, which fee will be creditable against any royalties payable by Advaccine with respect to sales outside of Greater China.

Under the Advaccine Agreement, we will supply Advaccine's clinical requirements of INO-4800 and devices, although Advaccine may manufacture INO-4800 for its clinical use and may procure alternate suppliers. Advaccine is responsible for the manufacture and supply of INO-4800 itself or through a contract manufacturer for commercial use. Upon Advaccine's reasonable request, the parties may negotiate a separate clinical and/or commercial supply agreement.

The Advaccine Agreement will continue in force on a region-by-region basis until Advaccine has no remaining royalty obligations in such region. Either party may terminate the Advaccine Agreement (i) in the event the other party shall have materially breached its obligations thereunder and such default shall have continued for a specified period after written notice thereof or (ii) upon the bankruptcy or insolvency of the other party. In addition, we may terminate the agreement, upon prior written notice, if Advaccine (i) ceases all development or commercialization activities for at least nine months, subject to certain exceptions, or (ii) challenges the validity, enforceability or scope of any of the patents licensed by us to Advaccine under the Advaccine Agreement, subject to certain conditions. Advaccine may terminate the Advaccine Agreement at any time for convenience upon nine months' written notice to us, if such notice is provided before the first commercial sale of INO-4800 in the licensed territory, or 18 months' written notice thereafter; provided that we may accelerate the effectiveness of such termination to the extent permitted by law.

ApolloBio

In December 2017, we entered into an Amended and Restated License and Collaboration Agreement with Beijing Apollo Saturn Biological Technology Limited, a corporation organized under the laws of China, or ApolloBio. Under the terms of this License and Collaboration Agreement, which became effective in March 2018, we granted to ApolloBio the exclusive right to develop and commercialize VGX-3100, our DNA immunotherapy product candidate designed to treat pre-cancers caused by HPV, within the agreed upon territories - Greater China (defined as China, Hong Kong, Macao and Taiwan). As part of the collaboration, ApolloBio will fund all clinical development costs within the licensed territory.

In addition to the upfront payment that we received in 2018, we are entitled to receive up to an aggregate of $20.0 million, less required income, withholding or other taxes, upon the achievement of specified milestones related to the regulatory approval of VGX-3100 in accordance with the Amended and Restated License and Collaboration Agreement. In the event that VGX-3100 is approved for marketing in these territories, we will be entitled to receive royalty payments based on a tiered percentage of annual net sales, with such percentage being in the low- to mid-teens, subject to reduction in the event of generic competition in a particular territory. ApolloBio's obligation to pay royalties will continue for 10 years after the first commercial sale in a particular territory or, if later, until the expiration of the last-to-expire patent covering the licensed products in the specified territory. The License and Collaboration Agreement, once effective, will continue in force until ApolloBio has no remaining royalty obligations. In December 2021, ApolloBio dosed its first participant in a separate Phase 3 trial in China (HPV-303CHN).

Competition

As we develop and seek to ultimately commercialize our product candidates, we face and will continue to encounter competition with an array of existing or development-stage drug and immunotherapy approaches targeting diseases we are pursuing. We are aware of various established enterprises, including major pharmaceutical companies, broadly engaged in vaccine/immunotherapy research and development. These include AbbVie, AstraZeneca, BioNTech, Bristol-Myers Squibb, GlaxoSmithKline plc, Janssen Pharmaceuticals (part of J&J), Merck, Moderna, Novartis, Pfizer, Roche, and Sanofi-Aventis. There are also various development-stage biotechnology companies involved in different vaccine and immunotherapy technologies, including but not limited to CureVac, Dynavax, GeneOne, Genexine, Hookipa, Imunon, Iovance, Nektar, Nykode, Precigen, Translate Bio, Vir Biotechnology, and Zydus. If these companies are successful in developing their technologies, it could materially and adversely affect our business and our future growth prospects.

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 dysplasia. Loop Electrosurgical Excision Procedure, commonly known as LEEP, is a surgical procedure and is the current standard of care for treating high-grade cervical dysplasia. In RRP caused by HPV subtypes 6 and 11, Precigen is working to develop a treatment based on a Gorilla adenovirus vector. Genexine and Gilead Sciences have therapeutic cervical cancer product candidates under development. Many companies are pursuing different approaches to pre-cancers and cancers we are targeting.

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

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

Viral Vaccine Delivery

This technology utilizes a virus as a carrier, or vector, to deliver genetic material into target cells. The method is efficient for delivering immunotherapy antigens and has the advantage of mimicking real viral infection so that the recipient will mount a broad immune response against the immunotherapy. The potential 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/RNA 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 significant progress in this field, including emergency use authorization of COVID-19 mRNA vaccines in 2020, lipid nanoparticle delivery of mRNA may have thermal stability issues as well as the potential of adverse events from the lipid nanoparticle formulations.

DNA Immunotherapy Delivery with Electroporation

There are other companies with electroporation intellectual property and devices. We believe we have 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 clinical trials assessing DNA-based immunotherapies and vaccines against cancers and infectious disease.
- We have a broad product line of electroporation instruments designed to enable DNA delivery, including our intradermal and intramuscular devices.
- We have been proactive in filing for patents, as well as acquiring and licensing additional patents, to expand our global patent estate.

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

Our competitive position will be affected by the disease indications addressed by our product candidates and those of our competitors, the timing of market introduction for these products and the stage of development of other technologies to address these disease indications. For us and our competitors, proprietary technologies, the ability to complete clinical trials on a timely basis and with the desired results, and the ability to obtain timely regulatory approvals to market these product candidates are likely to be significant competitive factors. Other important competitive factors will include 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.

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 HPV-related diseases, 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.

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.

As of December 31, 2022, our patent portfolio included approximately 100 issued U.S. patents and approximately 80 U.S. patent applications as well as approximately 800 issued foreign counterpart patents and approximately 700 counterpart foreign patent applications. These are comprised, in part, of:

- two U.S. patent applications and approximately 40 counterpart foreign patent applications, directed to treatment of RRP;
- seven issued U.S. patents and five U.S. patent applications, as well as approximately 80 issued foreign counterpart patents and approximately 50 counterpart foreign patent applications, directed to treatment of GBM;
- approximately 70 issued U.S. patents and approximately 50 U.S. patent applications, as well as approximately 400 issued foreign counterpart patents and approximately 500 counterpart foreign patent applications, directed to our other earlier-stage product candidates; and
- approximately 30 issued U.S. patents and approximately 20 U.S. patent applications, as well as approximately 30 issued foreign counterpart patents and approximately 125 counterpart foreign patent applications, directed to our device delivery systems.

Our pending patent applications directed to treatment of RRP, if issued, would expire between about 2040 and 2043. Our issued patents directed to treatment of GBM expire between about 2027 and 2037 and our pending patent applications, if issued, would expire between about 2027 and 2040. Our issued patents directed to our other product candidates expire between about 2023 and 2036 and our pending patent applications, if issued, would expire between about 2027 and 2042. Our issued patents directed to our device delivery systems expire between about 2023 and 2036 and our pending patent applications, if issued, would expire between about 2023 and 2042.

Individual patent terms extend for varying periods of time, depending upon the date of filing of the patent application, the date of patent issuance, and the legal term of patents in the countries in which they are obtained. In most countries in which we file patent applications, including the United States, the patent term is 20 years from the date of filing of the first non-provisional patent application to which priority is claimed. In some instances, a patent term can be extended under certain circumstances, such as patent term extension or patent term adjustment; alternatively, a patent term may be shortened, for example in the United States, if a patent is terminally disclaimed over an earlier-filed patent. Protection afforded by a patent varies on a product-by-product basis, from country-to-country, and depends upon many factors, including the type of patent, the scope of its coverage, the availability of regulatory-related extensions, the availability of legal remedies in a particular country, and the validity and enforceability of the patent.

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.

Government Regulation

Government authorities in the United States at the federal, state and local level and in other countries extensively regulate, among other things, the research, development, testing, manufacture, quality control, approval, labeling, packaging, storage, record-keeping, promotion, advertising, distribution, post-approval monitoring and reporting, marketing and export and import of biological products, or biologics, and medical devices, such as our product candidates. Generally, before a new biologic or medical device can be marketed, considerable data demonstrating its quality, safety and efficacy must be obtained, organized into a format specific to each regulatory authority, submitted for review and approved by the regulatory authority.

Review and Approval of Combination Products in the United States

Certain products may be comprised of components that would normally be regulated under different types of regulatory authorities, and frequently by different centers at the FDA. These products are known as combination products. Specifically, under regulations issued by the FDA, a combination product may be:

- a product comprised of two or more regulated components that are physically, chemically, or otherwise combined or mixed and produced as a single entity;
- two or more separate products packaged together in a single package or as a unit and comprised of drug and device products;
- a drug, device, or biological product packaged separately that according to its investigational plan or proposed labeling is intended for use only with an approved individually specified drug, device or biological where both are required to achieve the intended use, indication, or effect and where upon approval of the proposed product the labeling of the approved product would need to be changed, e.g., to reflect a change in intended use, dosage form, strength, route of administration, or significant change in dose; or
- any investigational drug, device, or biological packaged separately that according to its proposed labeling is for use only with another individually specified investigational drug, device, or biological product where both are required to achieve the intended use, indication, or effect.

Our product candidates are combination products comprising an electroporation device for delivery of a biologic. Under the Federal Food, Drug, and Cosmetic Act, or FDCA, the FDA is charged with assigning a center with primary jurisdiction, or a lead center, for review of a combination product. That determination is based on the "primary mode of action" of the combination product, which means the mode of action expected to make the greatest contribution to the overall intended therapeutic effects. Thus, if the primary mode of action of a device-biologic combination product is attributable to the biologic product, that is, if it acts by means of a virus, therapeutic serum, toxin, antitoxin, vaccine, blood, blood component or derivative, allergenic product, or analogous product, the FDA center responsible for premarket review of the biologic product would have primary jurisdiction for the combination product. We believe that all of our product candidates will have a biologic primary mode of action, with the device component reviewed under a Device Master File.

U.S. Biological Product Development

In the United States, the FDA regulates biologics under FDCA, and the Public Health Service Act, or PHSA, and their implementing regulations. Biologics are also subject to other federal, state, and local statutes and regulations. The process of obtaining regulatory approvals and the subsequent compliance with appropriate federal, state, local and foreign statutes and regulations require the expenditure of substantial time and financial resources. Failure to comply with the applicable U.S. requirements at any time during the product development process, approval process or after approval, may subject an applicant to administrative or judicial sanctions. These sanctions could include, among other actions, the FDA's refusal to approve pending applications, withdrawal of an approval, a clinical hold, untitled or warning letters, product recalls or withdrawals from the market, product seizures, total or partial suspension of production or distribution injunctions, fines, refusals of government contracts, restitution, disgorgement, or civil or criminal penalties. Any agency or judicial enforcement action could have a material adverse effect on us.

Our product candidates must be approved by the FDA through the Biologics License Application, or BLA, process before they may be legally marketed in the United States. The process required by the FDA before a biologic may be marketed in the United States generally involves the following:

- completion of extensive nonclinical, sometimes referred to as pre-clinical laboratory tests, pre-clinical animal studies and formulation studies in accordance with applicable regulations, including the FDA's Good Laboratory Practice, or GLP, regulations;
- submission to the FDA of an IND, which must become effective before human clinical trials may begin;
- performance of adequate and well-controlled human clinical trials in accordance with applicable IND and other clinical trial-related regulations, sometimes referred to as good clinical practices, or GCPs, to establish the safety and efficacy of the proposed product candidate for its proposed indication;
- submission to the FDA of a BLA;
- satisfactory completion of an FDA pre-approval inspection of the manufacturing facility or facilities where the product is produced to assess compliance with the FDA's current good manufacturing practice, or cGMP, requirements to assure that the facilities, methods and controls are adequate to preserve the product's identity, strength, quality, purity and potency;
- potential FDA audit of the pre-clinical and/or clinical trial sites that generated the data in support of the BLA; and
- FDA review and approval of the BLA prior to any commercial marketing or sale of the product in the United States.

The data required to support a BLA is generated in two distinct development stages: pre-clinical and clinical. The pre-clinical development stage generally involves laboratory evaluations of drug chemistry, formulation and stability, as well as studies to evaluate toxicity in animals, which support subsequent clinical testing. The conduct of the pre-clinical studies must comply with federal regulations, including GLPs. The sponsor must submit the results of the pre-clinical studies, together with manufacturing information, analytical data, any available clinical data or literature and a proposed clinical protocol, to the FDA as part of the IND. An IND is a request for authorization from the FDA to administer an investigational drug product to humans. The central focus of an IND submission is on the general investigational plan and the protocol(s) for human trials. The IND automatically becomes effective 30 days after receipt by the FDA, unless the FDA raises concerns or questions regarding the proposed clinical trials and places the IND on clinical hold within that 30-day time period. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns before the clinical trial can begin. The FDA may also impose clinical holds on a product candidate at any time before or during clinical trials due to safety concerns or non-compliance. Accordingly, we cannot be sure that submission of an IND will result in the FDA allowing clinical trials to begin, or that, once begun, issues will not arise that could cause the trial to be suspended or terminated.

The clinical stage of development involves the administration of the product candidate to healthy participants under the supervision of qualified investigators, generally physicians not employed by or under the trial sponsor's control, in accordance with GCPs, which include the requirement that all research participants provide their informed consent for their participation in any clinical trial. Clinical trials are conducted under protocols detailing, among other things, the objectives of the clinical trial, dosing procedures, participant selection and exclusion criteria, and the parameters to be used to monitor participant safety and assess efficacy. Each protocol, and any subsequent amendments to the protocol, must be submitted to the FDA as part of the IND. Further, each clinical trial must be reviewed and approved by an independent institutional review board, or IRB, at or servicing each institution at which the clinical trial will be conducted. An IRB is charged with protecting the welfare and rights of trial participants and considers such items as whether the risks to individuals participating in the clinical trials are minimized and are reasonable in relation to anticipated benefits. The IRB also approves the informed consent form that must be provided to each clinical trial participant or his or her legal representative and must monitor the clinical trial until completed.

There are also requirements governing the reporting of ongoing clinical trials and completed clinical trial results to public registries. Sponsors of certain clinical trials of FDA-regulated products, including biologics, are required to register and

disclose specified clinical trial information, which is publicly available at www.clinicaltrials.gov. Information related to the product, patient population, phase of investigation, trial sites and investigators, and other aspects of the clinical trial is then made public as part of the registration. Sponsors are also obligated to disclose the results of their clinical trials after completion.

Clinical trials are generally conducted in three sequential phases that may overlap, known as Phase 1, Phase 2 and Phase 3 clinical trials. Phase 1 clinical trials generally involve a small number of healthy volunteers who are initially exposed to a product candidate. The primary purpose of these clinical trials is to assess the action, side effect tolerability and safety of the product candidate and, if possible, to gain early evidence on effectiveness. Phase 2 clinical trials typically involve studies in patients to determine the dose required to produce the desired benefits. At the same time, safety and preliminary evaluation of efficacy is assessed. Phase 3 clinical trials generally involve large numbers of patients at multiple sites, in multiple countries (from several hundred to several thousand participants) and are designed to provide the data necessary to demonstrate the efficacy of the product for its intended use, its safety in use, and to establish the overall benefit/risk relationship of the product and provide an adequate basis for product approval. Phase 3 clinical trials may include comparisons with placebo and/or other comparator treatments. The duration of treatment is often extended to mimic the actual use of a product during marketing. Generally, two adequate and well-controlled Phase 3 clinical trials are required by the FDA for approval of a BLA.

Post-approval trials, sometimes referred to as Phase 4 clinical trials, may be conducted after initial marketing approval. These trials are used to gain additional experience from the treatment of patients in the intended therapeutic indication. In certain instances, FDA may grant conditional approval of a BLA on the sponsor's agreement to conduct additional clinical trials, such as these post-approval trials, to further assess the biologic's safety and effectiveness after BLA approval.

Progress reports detailing the results of the clinical trials must be submitted at least annually to the FDA and written IND safety reports must be submitted to the FDA and the investigators for serious and unexpected suspected adverse, findings from other studies suggesting a significant risk to humans exposed to the drug, findings from animal or in vitro testing suggesting a significant risk to humans, and any clinically important rate increase of a serious suspected adverse reaction over that listed in the protocol or investigator brochure. Phase 1, Phase 2 and Phase 3 clinical trials may not be completed successfully within any specified period, if at all. The FDA, the IRB, or the sponsor may suspend or terminate a clinical trial at any time on various grounds, including a finding that the research participants are being exposed to an unacceptable health risk. Similarly, an IRB can suspend or terminate approval of a clinical trial at its institution if the clinical trial is not being conducted in accordance with the IRB's requirements or if the drug has been associated with unexpected serious harm to patients. Additionally, some clinical trials are overseen by an independent group of qualified experts organized by the clinical trial sponsor, known as a data safety monitoring board or committee. This group provides authorization for whether or not a trial may move forward at designated intervals based on access to certain data from the trial. We may also suspend or terminate a clinical trial based on evolving business objectives and/or competitive climate. Concurrent with clinical trials, companies usually complete additional animal studies and must also develop additional information about the chemistry and physical characteristics of the product candidate as well as finalize a process for manufacturing the product in commercial quantities in accordance with cGMP requirements. The manufacturing process must be capable of consistently producing quality batches of the product candidate and, among other things, must develop methods for testing the identity, strength, quality and purity of the final product. Additionally, appropriate packaging must be selected and tested and stability studies must be conducted to demonstrate that the product candidate does not undergo unacceptable deterioration over its shelf life.

BLA and FDA Review Process

Following trial completion, trial data is analyzed to assess safety and efficacy. The results of pre-clinical studies and clinical trials are then submitted to the FDA as part of a BLA, along with proposed labeling for the product and information about the manufacturing process and facilities that will be used to ensure product quality, results of analytical testing conducted on the chemistry of the product candidate, and other relevant information. The BLA is a request for approval to market the biologic for one or more specified indications and must contain proof of safety, purity, potency and efficacy, which is demonstrated by extensive pre-clinical and clinical testing. The application includes positive findings from pre-clinical and clinical trials as well as ambiguous or negative results. Data may come from company-sponsored clinical trials intended to test the safety and efficacy of a use of a product, or from a number of alternative sources, including studies initiated by investigators. To support marketing approval, the data submitted must be sufficient in quality and quantity to establish the safety and efficacy of the investigational product to the satisfaction of the FDA.

Under the Prescription Drug User Fee Act, or PDUFA, as amended, each BLA must be accompanied by a significant user fee, which is adjusted on an annual basis. PDUFA also imposes an annual program fee for approved products. Fee waivers or reductions are available in certain circumstances, including a waiver of the application fee for the first application filed by a small business.

Once a BLA has been accepted for filing, which occurs, if at all, 60 days after the BLA's submission, the FDA's goal is to review BLAs within ten months of the filing date for standard review or six months of the filing date for priority review, if the application is for a product intended for a serious or life-threatening condition and the product, if approved, would provide a significant improvement in safety or effectiveness. The review process is often significantly extended by FDA requests for

additional information or clarification. If not accepted for filing, the sponsor must resubmit the BLA and begin the FDA's review process again, including the initial 60-day review to determine if the application is sufficiently complete to permit substantive review.

After the BLA submission is accepted for filing, the FDA reviews the BLA to determine, among other things, whether the proposed product candidate is safe and effective for its intended use, and whether the product candidate is being manufactured in accordance with cGMP to assure and preserve the product candidate's identity, strength, quality, purity and potency. The FDA may refer applications for novel drug product candidates or drug product candidates which present difficult questions of safety or efficacy to an advisory committee, typically a panel that includes clinicians and other experts, for review, evaluation and a recommendation as to whether the application should be approved and under what conditions. The FDA is not bound by the recommendations of an advisory committee, but it considers such recommendations carefully when making decisions. The FDA will likely re-analyze the clinical trial data, which could result in extensive discussions between the FDA and us during the review process. The review and evaluation of a BLA by the FDA is extensive and time consuming and may take longer than originally planned to complete, and we may not receive a timely approval, if at all.

Before approving a BLA, the FDA will conduct a pre-approval inspection of the manufacturing facilities for the new product to determine whether they comply with cGMPs. The FDA will not approve the product unless it determines that the manufacturing processes and facilities are in compliance with cGMP requirements and adequate to assure consistent production of the product within required specifications. In addition, before approving a BLA, the FDA may also audit data from clinical trials to ensure compliance with GCP requirements. After the FDA evaluates the application, manufacturing process and manufacturing facilities, it may issue an approval letter or a Complete Response Letter. An approval letter authorizes commercial marketing of the product with specific prescribing information for specific indications. A Complete Response Letter indicates that the review cycle of the application is complete and the application will not be approved in its present form. A Complete Response Letter usually describes all of the specific deficiencies in the BLA identified by the FDA. The Complete Response Letter may require additional clinical data and/or an additional pivotal Phase 3 clinical trial(s), and/or other significant and time-consuming requirements related to clinical trials, pre-clinical studies or manufacturing. If a Complete Response Letter is issued, the applicant may either resubmit the BLA, addressing all of the deficiencies identified in the letter, or withdraw the application. Even if such data and information is submitted, the FDA may ultimately decide that the BLA does not satisfy the criteria for approval. Data obtained from clinical trials are not always conclusive and the FDA may interpret data differently than we interpret the same data.

There is no assurance that the FDA will ultimately approve a product for marketing in the United States and we may encounter significant difficulties or costs during the review process. If a product receives marketing approval, the approval may be significantly limited to specific populations, severities of allergies, and dosages or the indications for use may otherwise be limited, which could restrict the commercial value of the product. Further, the FDA may require that certain contraindications, warnings or precautions be included in the product labeling or may condition the approval of the BLA on other changes to the proposed labeling, development of adequate controls and specifications, or a commitment to conduct post-market testing or clinical trials and surveillance to monitor the effects of approved products. For example, the FDA may require Phase 4 testing which involves clinical trials designed to further assess the product's safety and effectiveness and may require testing and surveillance programs to monitor the safety of approved products that have been commercialized. The FDA may also place other conditions on approvals including the requirement for a Risk Evaluation and Mitigation Strategy, or REMS, to assure the safe use of the product. If the FDA concludes a REMS is needed, the sponsor of the BLA must submit a proposed REMS. The FDA will not approve the BLA without an approved REMS, if required. A REMS could include medication guides, physician communication plans, or elements to assure safe use, such as restricted distribution methods, patient registries and other risk minimization tools. Any of these limitations on approval or marketing could restrict the commercial promotion, distribution, prescription or dispensing of products. Product approvals may be withdrawn for non-compliance with regulatory standards or if problems occur following initial marketing.

Post-Marketing Requirements

Following approval of a new product, a manufacturer and the approved product are subject to continuing regulation by the FDA, including, among other things, monitoring and recordkeeping activities, reporting to the applicable regulatory authorities of adverse experiences with the product, providing the regulatory authorities with updated safety and efficacy information, product sampling and distribution requirements, and complying with promotion and advertising requirements, which include, among others, standards for direct-to-consumer advertising, restrictions on promoting products for uses or in patient populations that are not described in the product's approved labeling, also known as off-label use, limitations on industry-sponsored scientific and educational activities, and requirements for promotional activities involving the internet. Although physicians may prescribe legally available drugs and biologics for off-label uses, manufacturers may not market or promote such off-label uses. Modifications or enhancements to the product or its labeling or changes of the site of manufacture are often subject to the approval of the FDA and other regulators, which may or may not be received or may result in a lengthy review process. Prescription drug promotional materials must be submitted to the FDA in conjunction with their first use.

In the United States, once a product is approved, its manufacture is subject to comprehensive and continuing regulation by the FDA. The FDA regulations require that products be manufactured in specific approved facilities and in accordance with cGMP. Moreover, the constituent parts of a combination product retain their regulatory status, for example, as a biologic or device, and as such, we may be subject to additional requirements in the Quality System Regulation, or QSR, applicable to medical devices, such as design controls, purchasing controls, and corrective and preventive action. We rely, and expect to continue to rely, on third parties for the production of clinical and commercial quantities of our products in accordance with cGMP regulations. cGMP regulations require, among other things, quality control and quality assurance as well as the corresponding maintenance of records and documentation and the obligation to investigate and correct any deviations from cGMP. Manufacturers and other entities involved in the manufacture and distribution of approved products are required to register their establishments with the FDA and certain state agencies, and are subject to periodic unannounced inspections by the FDA and certain state agencies for compliance with cGMP and other laws. Accordingly, manufacturers must continue to expend time, money, and effort in the area of production and quality control to maintain cGMP compliance. These regulations also impose certain organizational, procedural and documentation requirements with respect to manufacturing and quality assurance activities. BLA holders using contract manufacturers, laboratories or packagers are responsible for the selection and monitoring of qualified firms, and, in certain circumstances, qualified suppliers to these firms. These firms and, where applicable, their suppliers are subject to inspections by the FDA at any time, and the discovery of violative conditions, including failure to conform to cGMP, could result in enforcement actions that interrupt the operation of any such facilities or the ability to distribute products manufactured, processed or tested by them. Discovery of problems with a product after approval may result in restrictions on a product, manufacturer, or holder of an approved BLA, including, among other things, recall or withdrawal of the product from the market.

The FDA also may require post-approval testing, sometimes referred to as Phase 4 testing, REMS and post-marketing surveillance to monitor the effects of an approved product or place conditions on an approval that could restrict the distribution or use of the product. Discovery of previously unknown problems with a product or the failure to comply with applicable FDA requirements can have negative consequences, including adverse publicity, judicial or administrative enforcement, warning letters from the FDA, mandated corrective advertising or communications with doctors, and civil or criminal penalties, among others. Newly discovered or developed safety or effectiveness data may require changes to a product's approved labeling, including the addition of new warnings and contraindications, and also may require the implementation of other risk management measures. Also, new government requirements, including those resulting from new legislation, may be established, or the FDA's policies may change, which could delay or prevent regulatory approval of our products under development.

Coverage and Reimbursement

Patients in the United States and elsewhere generally rely on third-party payors to reimburse part or all of the costs associated with their prescription drugs and vaccines. Accordingly, a pharmaceutical company's ability to commercialize its products successfully depends in part on the extent to which private health insurers, other third-party payors, and governmental authorities, including Medicare and Medicaid, establish appropriate coverage and reimbursement levels for its product candidates and related treatments. As a threshold for coverage and reimbursement, third-party payors generally require that products be approved for marketing by the FDA.

Coverage decisions may not favor new products when more established or lower cost therapeutic alternatives are available. The process for obtaining coverage for a product or service is separate from the process to obtain the associated reimbursement. Reimbursement levels can affect the adoption of products and services by physicians and patients. Additionally, products used in connection with medical procedures may not be reimbursed separately, but their cost may instead be bundled as part of the payment received by the provider for the procedure only. Separate reimbursement for a product or the treatment or procedure in which the product is used may not be available.

Coverage and reimbursement policies for drug products and vaccines can differ significantly from payor to payor as there is no uniform policy of coverage and reimbursement for drug products among third-party payors in the United States. There may be significant delays in obtaining coverage and reimbursement as the process of determining coverage and reimbursement is often time consuming and costly which may require the provision of scientific and clinical support for the use of the product to each payor separately, with no assurance that coverage or adequate reimbursement will be obtained.

A significant trend in the U.S. healthcare industry and elsewhere is cost containment. Third-party payors have attempted to control costs by limiting coverage and the amount of reimbursement for particular products and services. Third-party payors are increasingly challenging the effectiveness of and prices charged for medical products and services. Moreover, the U.S. government, state legislatures and foreign governmental entities have shown significant interest in implementing cost containment programs to limit the growth of government paid healthcare costs, including price controls, restrictions on reimbursement and coverage and requirements for substitution of generic products for branded prescription drugs.

Healthcare Reform

In both the United States and certain foreign jurisdictions there have been, and continue to be, a number of legislative and regulatory changes to the healthcare system that impact the ability to sell pharmaceutical products profitably. In the United States, the federal government enacted the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act, or collectively, the ACA. Among the ACA's provisions of importance to the pharmaceutical industry are that it:

- Created an annual, nondeductible fee on any entity that manufactures or imports certain specified branded prescription drugs and biologic agents apportioned among these entities according to their market share in some government healthcare programs;
- Increased the statutory minimum rebates a manufacturer must pay under the Medicaid Drug Rebate Program, to 23.1% and 13% of the average manufacturer price for most branded and generic drugs, respectively and capped the total rebate amount for innovator drugs at 100% of the Average Manufacturer Price, or AMP;
- Created new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for certain drugs and biologics that are inhaled, infused, instilled, implanted or injected;
- Expanded eligibility criteria for Medicaid programs by, among other things, allowing states to offer Medicaid coverage to additional individuals and by adding new mandatory eligibility categories for individuals with income at or below 133% of the federal poverty level, thereby potentially increasing manufacturers' Medicaid rebate liability;
- Expanded the entities eligible for discounts under the Public Health program;
- Created a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical effectiveness research, along with funding for such research;
- Established a Center for Medicare & Medicaid Innovation at the Centers for Medicare & Medicaid Services, or CMS, to test innovative payment and service delivery models to lower Medicare and Medicaid spending, potentially including prescription drug spending that began on January 1, 2011; and
- Created a licensure framework for follow on biologic products.

There remain judicial and Congressional challenges to certain aspects of the ACA. While Congress has not passed comprehensive repeal legislation, it has enacted laws that modify certain provisions of the ACA such as removing penalties, starting January 1, 2019, for not complying with the ACA's individual mandate to carry qualifying health insurance coverage for all or part of a year. In addition, the 2020 federal spending package permanently eliminated, effective January 1, 2020, the ACA-mandated "Cadillac" tax on high-cost employer-sponsored health coverage and medical device tax, and, effective January 1, 2021, also eliminated the health insurer tax. On June 17, 2021 the U.S. Supreme Court dismissed a challenge on procedural grounds that argued the Affordable Care Act is unconstitutional in its entirety because the "individual mandate" was repealed by Congress. Further, on August 16, 2022, President Biden signed the Inflation Reduction Act of 2022, or IRA, into law, which among other things, extends enhanced subsidies for individuals purchasing health insurance coverage in ACA marketplaces through plan year 2025. The IRA also eliminates the "donut hole" under the Medicare Part D program beginning in 2025 by significantly lowering the beneficiary maximum out-of-pocket cost and by creating a newly established manufacturer discount program. It is unclear how any such challenges and the healthcare reform measures of the Biden administration will impact the ACA and our business. In addition, other legislative changes have been proposed and adopted since the ACA was enacted.

On August 2, 2011, the Budget Control Act of 2011 was signed into law, which, among other things, included reductions to Medicare payments to providers of 2% per fiscal year, which went into effect on April 1, 2013 and, due to subsequent legislative amendments to the statute will remain in effect until 2031 unless additional Congressional action is taken. Under current legislation, the actual reduction in Medicare payments will vary from 1% in 2022 to up to 4% in the final fiscal year of this sequester. Additionally, on March 11, 2021, President Biden signed the American Rescue Plan Act of 2021 into law, which eliminates the statutory Medicaid drug rebate cap, currently set at 100% of a drug's average manufacturer price, for single source and innovator multiple source drugs, beginning January 1, 2024. On January 2, 2013, the American Taxpayer Relief Act of 2012 was signed into law, which, among other things, reduced Medicare payments to several providers, including hospitals, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years.

Further there has been heightened governmental scrutiny in the United States of pharmaceutical pricing practices in light of the rising cost of prescription drugs and biologics. Such scrutiny has resulted in several recent Congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for products. At the federal level, in July 2021, the Biden administration released an executive order, "Promoting Competition in the American Economy," with multiple provisions aimed at prescription drugs. In response to Biden's executive order, on September 9, 2021, the U.S. Department of Health and Human Services, or HHS, released a Comprehensive Plan for Addressing High Drug Prices that outlines principles for drug pricing reform and sets out a variety of

potential legislative policies that Congress could pursue to advance these principles. In addition, the IRA, among other things (i) directs HHS to negotiate the price of certain high-expenditure, single-source drugs and biologics covered under Medicare and (ii) imposes rebates under Medicare Part B and Medicare Part D to penalize price increases that outpace inflation. These provisions will take effect progressively starting in fiscal year 2023, although they may be subject to legal challenges. It is currently unclear how the IRA will be implemented but it is likely to have a significant impact on the pharmaceutical industry. Further, the Biden administration released an additional executive order on October 14, 2022, directing HHS to report on how the Center for Medicare and Medicaid Innovation can be further leveraged to test new models for lowering drug costs for Medicare and Medicaid beneficiaries. At the state level, legislatures have increasingly passed legislation and implemented regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing.

Healthcare Laws

Certain federal, state, local and foreign healthcare laws and regulations pertaining to fraud and abuse, transparency, patients' rights, and privacy are applicable to the business of a pharmaceutical company. The laws that may affect a pharmaceutical company's 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 or reward either the referral of an individual, or the purchasing, ordering, or leasing of an item, good, facility or service, for which payment may be made by a federal healthcare program such as Medicare or Medicaid;
- Federal civil and criminal false claims laws, including the civil False Claims Act, 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 federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, which prohibits, among other things, executing a scheme to defraud any healthcare benefit program or making false statements relating to healthcare matters;
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, and their implementing regulations, which imposes certain requirements relating to the privacy, security and transmission of individually identifiable health information on certain individuals and entities;
- the Physician Payments Sunshine Act, created under the ACA, which requires certain manufacturers of drugs, devices, biologics and medical supplies for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program, with certain exceptions, to report annually to the Centers for Medicare & Medicaid Services, or CMS, information related to payments or other transfers of value made to physicians (defined to include doctors, dentists, optometrists, podiatrists, and chiropractors) and other healthcare professionals (such as physicians assistants and nurse practitioners) and teaching hospitals, as well as ownership and investment interests held by physicians and their immediate family members;
- the FDCA, 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, state and local laws requiring the registration of pharmaceutical sales and medical representatives, 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; and
- additional state and local laws such as laws in California and Massachusetts, which mandate implementation of compliance programs, compliance with industry ethics codes, and spending limits, and other state and local laws, such as laws in Vermont, Maine, and Minnesota which require reporting to state governments of gifts, compensation, and other remuneration to physicians.

A pharmaceutical company will need to spend substantial time and money to ensure that its business arrangements with third parties comply with applicable healthcare laws and regulations. Because of the breadth of these laws and the narrowness of the statutory exceptions and regulatory safe harbors available, which require strict compliance in order to offer protection, it is possible that governmental authorities may conclude that its business practices do not comply with current or future statutes, regulations, agency guidance or case law involving applicable healthcare laws. If a pharmaceutical company's operations are found to be in violation of any of the laws described above or any other governmental regulations that apply to it, it may be

subject to significant penalties, including administrative, civil and criminal penalties, damages, fines, disgorgement, possible exclusion from participation in Medicare, Medicaid and other federal healthcare programs, imprisonment, integrity and/or other oversight obligations, contractual damages, reputational harm and the curtailment or restructuring of operations.

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.

Significant Customers and Research and Development

During the year ended December 31, 2022, we derived 94% of our revenue from the procurement contract with the DoD that we entered into in June 2020. During the year ended December 31, 2021, we derived 43% of our revenue from the procurement contract with the DoD and 14% of our revenue from our collaborator Plumbline Life Sciences, a company of which we are an approximately 19% stockholder. During the year ended December 31, 2020, we derived 68% of our revenue from Advaccine and 18% of our revenue from Plumbline Life Sciences.

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 $187.7 million in 2022, $249.2 million in 2021 and $94.2 million in 2020.

Geographic Information

All of our revenue for the years ended December 31, 2022, 2021 and 2020 was earned in the United States. All of our long-lived assets are located in the United States.

Corporate Information

Our corporate headquarters are located at 660 W. Germantown Pike, Suite 110, Plymouth Meeting, Pennsylvania 19462, and our main telephone number is (267) 440-4200.

Available Information

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

We make our annual report on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, or the Exchange Act, available free of charge on our website as soon as reasonably practicable after we electronically file such material with, or furnish it to, the Securities and Exchange Commission, or the SEC. 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 Guidelines, and information for contacting our board of directors is available on our website.

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

Employees and Human Capital Resources

As of February 14, 2023, we employed 184 people on a full-time basis. Of the total, 136 were in product research, which includes research and development, quality assurance, clinical, engineering and manufacturing, and 48 were in general and administrative functions, which includes corporate development, information technology, legal, commercial, investor relations, finance and corporate administration. Approximately one-half of our workforce is comprised of women and approximately one-half is comprised of individuals with ethnically diverse backgrounds. In addition, four of the eight members of our board of directors are women. None of our employees are subject to collective bargaining agreements. We consider our relationship with our employees to be good.

We compete in the highly competitive biotechnology industry. Attracting, developing and retaining talented people in research, quality assurance, clinical, engineering, manufacturing and other positions is crucial to executing our strategy and our

ability to compete effectively. Our ability to recruit and retain such talent depends on several factors, including compensation and benefits, talent development and career opportunities, and work environment. To that end, we invest in our employees to be an employer of choice.

Employee Engagement

As we work to make an impact on how healthcare is delivered, we believe it is critical that our employees are informed and engaged. We communicate frequently and transparently with our employees through a variety of communication methods, including video and written communications, town hall meetings, employee surveys and our company intranet, and acknowledge individual contributions to INOVIO through several rewards and recognition initiatives. We believe these engagement efforts keep employees informed about our strategy, culture and purpose and motivated to do their best work.

Health, Safety and Wellness

The physical health, financial well-being, life balance and mental health of our employees is vital to our success. In 2021, we launched a Company-wide comprehensive wellness program inclusive of financial, physical, and mental well-being.

The environmental, health and safety team stays abreast of local, regional and global concerns and trends and ensures safety procedures are in place to mitigate workplace injuries and safety risks. Employees are required to complete training in various safety procedures for the laboratories and manufacturing facilities and specialized safety training based on particular job duties. Designated Safety Officers and response teams oversee safety-related initiatives and a safety committee provides input on safety procedures, practices, and policies. Employees are required to wear personal protective equipment relevant for their particular job duties. Occupational injuries at the workplace are extremely low and are always investigated to determine if any environmental or other changes need to be implemented.

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 Financial Position and Need for Additional Capital

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

We have experienced significant operating losses over the last several years. As of December 31, 2022 our accumulated deficit was $1.5 billion. We have generated limited revenues, primarily consisting of license revenue, grant funding 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 DNA medicine candidates or proprietary smart device 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 DNA medicines and proprietary smart device technology.

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 DNA medicine candidates, including securing regulatory approval for conducting clinical trials with DNA medicine candidates;
- developing our proprietary smart device technology; and
- commercializing any products for which we receive approval from the FDA and foreign regulatory authorities.

Our proprietary smart device and DNA medicine 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 proprietary smart device and DNA medicine 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 proprietary smart device and DNA medicine products, and we may not be able to continue our operations.

A small number of licensing partners and government contracts currently 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 upfront 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 will need substantial additional capital to develop our DNA medicines and proprietary smart device technology, which may prove difficult and costly to obtain.

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

- the progress of our current and new product development programs;
- the progress, scope and results of our pre-clinical and clinical testing;
- the time and cost involved in obtaining regulatory approvals;
- the cost of manufacturing our DNA medicine candidates;
- the cost of prosecuting, enforcing and defending against patent infringement claims and other intellectual property rights;
- debt service obligations;
- competing technological and market developments; and

- our ability and the related costs to establish and maintain collaborative and other arrangements with third parties to assist in potentially bringing our products to market.

Additional financing may not be available on acceptable terms, or at all. Domestic and international capital markets have from time to time experienced heightened volatility, particularly in light of geopolitical turmoil, inflation and rising interest rates, making it more difficult in many cases to raise capital through the issuance of equity securities. Volatility in the capital markets can also negatively impact the cost and availability of credit, creating illiquid credit markets and wider credit spreads. Concern about the stability of the markets generally and the strength of counterparties specifically has led many lenders and institutional investors to reduce, and in some cases cease to provide, funding to borrowers. To the extent we are able to raise additional capital through the sale of equity securities, or we issue securities in connection with another transaction in the future, 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. Rising 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.

Risks Related to Product Development, Manufacturing and Regulatory Approval

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

We need FDA approval prior to marketing our proprietary smart device and DNA medicine candidates in the United States. If we fail to obtain FDA approval to market our proprietary smart device and DNA medicine 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 preclinical 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 proprietary smart device and DNA medicine candidates are both safe and effective for each indication for which approval is sought. To the extent that our DNA medicine candidates are manufactured at multiple sites or using different processes, we will also need to demonstrate comparability across the manufacturing batches in order to obtain regulatory approval. 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 proprietary smart device and any of our DNA medicine 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 proprietary smart device and DNA medicine candidates. If the FDA does not consider or approve our application, it may require that we conduct additional clinical, preclinical 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 product candidates 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.

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, and the same risk applies for products approved outside the United States, with respect to regulatory approval in the United States.

In order to market any proprietary smart device and DNA medicine 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, and 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. Furthermore, 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 DNA medicine candidates may not be approved for all indications requested, which could limit the uses of our DNA medicine candidates and have an adverse effect on their commercial potential or require costly, post-marketing follow-up studies.

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 preclinical studies and early clinical trials of our product candidates 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 DNA medicine candidates in later stages of clinical trials may fail to show the desired safety and efficacy traits despite having progressed through preclinical 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 product candidates 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 proprietary smart device or product candidate is safe and effective for any indication;
- the results of clinical trials may not meet the level of clinical or statistical significance required by the FDA or comparable foreign regulatory authorities for approval;
- the FDA or comparable foreign regulatory authorities may disagree with the design or implementation of our clinical trials;
- we may not be successful in enrolling a sufficient number of participants in clinical trials;
- we may be unable to demonstrate that our proprietary smart device or DNA medicine candidates' clinical and other benefits outweigh their safety risks;
- we may be unable to demonstrate that our proprietary smart device or 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 preclinical studies or clinical trials;
- the data collected from clinical trials of our DNA medicine 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 our manufacturing processes or facilities or that of 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, conduct 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, conduct or completion of clinical testing could significantly affect our product development costs. We do not know whether planned clinical trials will begin on time or be completed on schedule, if at all. In addition, ongoing clinical trials may not be completed on schedule, or at all, and could be placed on a hold by the regulators for various reasons. The commencement and completion of clinical trials can be delayed for a number of reasons, including delays related to:

- obtaining regulatory approval to commence a clinical trial;

- adverse results from third party clinical trials involving gene-based therapies and the regulatory response thereto;
- reaching agreement on acceptable terms with prospective CROs and trial sites, the terms of which can be subject to extensive negotiation and may vary significantly among different CROs and trial sites;
- future bans or stricter standards imposed on clinical trials of gene-based therapy;
- manufacturing sufficient quantities of our proprietary smart device and DNA medicine candidates for use in clinical trials;
- obtaining Internal 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, including geopolitical risks emanating from countries such as Russia and China, global pathogen outbreaks or pandemics, terrorist activities, and economic and other external factors beyond our control.

With respect to clinical trials of product candidates for rare diseases, such as our clinical trial of INO-3107 for the treatment of recurrent respiratory papillomatosis, or RRP, we may encounter difficulties in recruiting a sufficient number of patients to enroll in the trial due to the small number of patients with the disease. Because RRP is caused by specific HPV types, 6 and 11, and there is currently no standard protocol for diagnostic/screening of RRP patients unless there are symptoms of respiratory distress, it may be difficult to identify and diagnose patients for whom INO-3107 may be a potential treatment.

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 proprietary smart device and our DNA medicine candidates may be harmed and our ability to generate product revenues will be delayed or eliminated altogether. For example, in November 2022 we announced the discontinuation of the development programs for our product candidates INO-4700 for MERS and INO-4500 for Lassa Fever. 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, conduct or completion of clinical trials may adversely affect the trading price of our common stock.

None of our DNA medicine candidates have been approved for sale, and we may never develop commercially successful DNA medicine products.

Our DNA medicines programs are in various stages of research and development, and currently include DNA medicine candidates in discovery, preclinical studies and Phase 1, 2 and 3 clinical trials. There are limited data regarding the efficacy of DNA medicine candidates compared with conventional vaccines, and we must conduct a substantial amount of additional research and development before the FDA or any comparable foreign regulatory authority will approve any of our DNA medicine candidates. The success of our efforts to develop and commercialize our DNA medicine candidates could be delayed or fail for a number of reasons. For example, we could experience delays in product development and clinical trials. Our DNA medicine candidates could be found to be ineffective or unsafe, or otherwise fail to receive necessary regulatory clearances to proceed with further clinical development or to be approved for marketing. Our products, even if they are deemed to be safe and effective by regulatory authorities, could be difficult to manufacture on a large scale or uneconomical to market, or our competitors could develop superior products more quickly and efficiently or more effectively market their competing products.

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

We previously expended significant resources on the development of a COVID-19 vaccine candidate. We are now only pursuing development in collaboration with third parties, as both a primary and heterologous booster vaccine, but there can be no assurance that our candidate will ever receive regulatory approval as a primary vaccine or a booster in any country, whether by Emergency Use Authorization or otherwise.

Beginning in 2020, we expended significant resources on the clinical development of a COVID-19 vaccine candidate, INO-4800. We were previously conducting a Phase 2/3 clinical trial of INO-4800 called INNOVATE. Based on regulatory feedback and the competitive landscape for COVID-19 vaccines, in 2022 we discontinued the INNOVATE trial and pursued a strategy to develop our COVID-19 vaccine as a potential heterologous booster following administration of other primary vaccines. Following an assessment of the current global demand for COVID-19 vaccines, changes in regulatory timelines and requirements, diminishing government financial support, and the overall growing uncertainty related to opportunities for heterologous booster vaccines, in the fourth quarter of 2022 we discontinued our internally funded efforts to develop INO-4800 as a COVID-19 heterologous booster vaccine.

We are no longer conducting any active clinical trials of INO-4800 and do not expect that it will ever receive regulatory approval in the United States. Our collaborator, Advaccine, is continuing the clinical development of INO-4800 in a Phase 2 clinical trial in China and may seek an Emergency Use Authorization, or EUA, from regulatory authorities in China and other countries in Asia for the use of INO-4800 as a heterologous booster. However, any such decision would be made by Advaccine, and there is no guarantee that Advaccine will apply for an EUA or other similar authorization or, if it does apply, that Advaccine will be able to obtain such authorization. An EUA may not be available if countries are no longer in a state of public health emergency, in which case full approval would need to be sought.

Our COVID-19 vaccine candidate continues to be evaluated as part of the World Health Organization's Solidarity Trial Vaccines. Depending on the results of that trial, we could also pursue a strategy of seeking EUA for the vaccine candidate in other countries outside of the United States. Even if an EUA or other authorization is ultimately granted, we will rely on the applicable regulatory authority policies and guidance governing vaccines authorized in this manner in connection with the marketing and sale of our vaccine candidate. If these policies and guidance change unexpectedly and/or materially or if we misinterpret them, potential sales of our product could be adversely impacted. Regulatory authorities may also terminate an EUA if safety issues or other concerns about our product arise or if we or Advaccine fail to comply with the conditions of authorization. If we or Advaccine apply for an EUA or similar authorization from regulatory authorities outside of the United States, the failure to obtain such authorization or the termination of such an authorization, if obtained, would adversely impact our and Advaccine's ability to market and sell our COVID-19 vaccine.

DNA medicines are a novel approach to treating and preventing disease, and negative perception of the efficacy, safety, or tolerability of any investigational medicines we develop could adversely affect our ability to conduct our business, advance our investigational medicines, or obtain regulatory approvals.

No DNA medicines have been granted EUA or have been approved to date by the FDA. Adverse events in clinical trials of our investigational medicines or in clinical trials of others developing similar products and the resulting publicity, as well as any other adverse events in the field of DNA medicine, or other products that are perceived to be similar to DNA medicines, such as those related to other nucleic acid based vaccines such as mRNA vaccines, gene therapy or gene editing, could result in a decrease in the perceived benefit of one or more of our programs, increased regulatory scrutiny, decreased confidence by patients and clinical trial collaborators in our investigational medicines, and less demand for any product that we may develop. Our pipeline of DNA medicine candidates could result in a greater quantity of reportable adverse events, including suspected unexpected serious adverse reactions, other reportable negative clinical outcomes, manufacturing reportable events or material clinical events that could lead to clinical delay or hold by the FDA or applicable regulatory authority or other clinical delays, any of which could negatively impact the perception of one or more of our programs, as well as our business as a whole. In addition, responses by U.S., state, or foreign governments to negative public perception may result in new legislation or regulations that could limit our ability to develop any investigational medicines or commercialize any approved products, obtain or maintain regulatory approval, or otherwise achieve profitability. More restrictive statutory regimes, government regulations, or negative public opinion would have an adverse effect on our business, financial condition, results of operations, and prospects and may delay or impair the development of our investigational medicines and commercialization of any approved products or demand for any products we may develop.

If we and the contract manufacturers upon whom we rely fail to produce our proprietary smart devices and DNA medicine candidates in the volumes that we require on a timely basis, or at all, or if these contractors fail to comply with their obligations to us or with stringent regulations, we may face delays in the development and commercialization of our proprietary smart device and DNA medicine candidates.

We manufacture some components of our proprietary smart devices and utilize the services of contract manufacturers to manufacture the remaining components of these devices. We also rely on third party contract manufacturers to produce our DNA medicine candidates for use in our clinical trials and potentially for commercial distribution, if any product candidate is approved by regulatory authorities. The manufacture of these devices and our DNA medicine candidates 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 DNA medicine 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 proprietary smart device to our partners and to supply DNA medicine candidates for clinical trials or to commercially launch a product would be jeopardized. For example, we previously relied on VGXI to manufacture DNA plasmids for our DNA medicine candidates, including INO-4800. In 2020, VGXI notified us that they would be unable to produce the necessary plasmids to meet this timeline due to a lack of manufacturing capacity. As a result, we had to engage several additional third-party contract manufacturers. However, there can be no assurance that we will be able to secure adequate additional manufacturing capacity for any of our DNA medicine candidates on commercially reasonable terms. Our inability to secure sufficient manufacturing capacity, or our inability to transfer necessary manufacturing know-how to third parties, would adversely affect our commercialization plans and could also harm our reputation.

Furthermore, any delay or interruption in the supply of clinical trial supplies for our DNA medicine candidates 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 product candidates are combination products regulated under both the biologic and device regulations of the Public Health Service Act and Federal Food, Drug, and Cosmetic Act. Third-party manufacturers may not be able to comply with cGMP regulations, regulations applicable to biologic/device combination products, including applicable provisions of the FDA's drug cGMP regulations, device cGMP requirements embodied in the quality system regulations or similar regulatory requirements outside the United States. Our failure, or the failure of our third-party manufacturers, to comply with applicable regulations could result in sanctions being imposed on us, including clinical holds, fines, injunctions, civil penalties, delays, suspension or withdrawal of approvals, license revocation, seizures or recalls of product candidates, operating restrictions and criminal prosecutions, any of which could significantly affect supplies of our product candidates.

We are dependent on single-source suppliers for some of the components and materials used in, and the processes required to develop, our product candidates and investigational medicines.

We currently depend on single-source suppliers for some of the components and materials used in, and manufacturing processes required to develop and commercialize, our product candidates and investigational medicines. We cannot ensure that these suppliers or service providers will remain in business, have sufficient capacity or supply to meet our needs, or that they will not be purchased by one of our competitors or another company that may not be interested in continuing to work with us. Our use of single-source suppliers of raw materials, components, key processes, and finished goods exposes us to several risks, including disruptions in supply, price increases, or late deliveries. There are, in general, relatively few alternative sources of supply for substitute components. These vendors may be unable or unwilling to meet our future demands for our clinical trials or commercial sale. Establishing additional or replacement suppliers for these components, materials, and processes could take a substantial amount of time and it may be difficult to establish replacement suppliers who meet regulatory requirements. Any disruption in supply from any single-source supplier or service provider could lead to supply delays or interruptions which would damage our business, financial condition, results of operations, and prospects.

If we have to switch to a replacement supplier, the manufacture and delivery of our product candidates or investigational medicines could be interrupted for an extended period, which could adversely affect our business. Establishing additional or replacement suppliers for any of the components or processes used in our product candidates or investigational medicines, if required, may not be accomplished quickly. If we are able to find a replacement supplier, the

replacement supplier would need to be qualified and may require additional regulatory authority approval, which could result in further delay. While we seek to maintain adequate inventory of the single-source components and materials used in our product candidates, any interruption or delay in the supply of components or materials, or our inability to obtain components or materials from alternate sources at acceptable prices in a timely manner, could impair our ability to supply our investigational medicines.

Our reliance on these suppliers, service providers, and manufacturers subjects us to a number of risks that could harm our reputation, business, and financial condition, including, among other things:

- delays to the development timelines for our development candidates or investigational medicines;
- interruption of supply resulting from modifications to or discontinuation of a supplier's operations;
- delays in product shipments resulting from uncorrected defects, reliability issues, or a supplier's variation in a component;
- a lack of long-term supply arrangements for key components with our suppliers;
- inability to obtain adequate supply in a timely manner, or to obtain adequate supply on commercially reasonable terms;
- difficulty and cost associated with locating and qualifying alternative suppliers for our components in a timely manner;
- production delays related to the evaluation and testing of components from alternative suppliers, and corresponding regulatory qualifications;
- delay in delivery due to our suppliers' prioritizing other customer orders over ours;
- damage to our reputation caused by defective components produced by our suppliers; and
- fluctuation in delivery by our suppliers due to changes in demand from us or their other customers.

If any of these risks materialize, costs could significantly increase and our ability to meet demand for our products could be impacted.

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

Even if United States regulatory approval is obtained, regulators 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. For example, the FDA strictly regulates the promotional claims that may be made about medical products. In particular, a product may not be promoted for uses that are not approved by the FDA as reflected in the product's approved labeling. Physicians, on the other hand, may prescribe products for off-label uses. Although the FDA and other regulatory agencies do not regulate a physician's choice of drug treatment made in the physician's independent medical judgment, they do restrict promotional communications from companies or their sales force with respect to off-label uses of products for which marketing clearance has not been issued. However, companies may in certain circumstances share truthful and not misleading information that is otherwise consistent with the product's FDA approved labeling. 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 DNA medicine candidates, or the manufacturing facilities for our DNA medicine 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 approvals;
- 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.

We are developing some of our investigational DNA medicines and sometimes using new endpoints or methodologies for the treatment of diseases in which there is little clinical experience. As a result, the FDA or other regulatory authorities may not consider the endpoints of our clinical trials to provide clinically meaningful results.

There are no pharmacologic therapies approved to treat the underlying causes of many diseases that we currently attempt to address or may address in the future. There has been limited clinical trial experience for the development of pharmaceuticals to treat these rare diseases in general, and we are not aware of a registrational trial that led to approval of a drug to treat these diseases. There have been some historical trials with other agents which may have utilized clinical endpoints that are less applicable to our efforts that address the underlying defect. As a result, the design and conduct of clinical trials of investigational medicines for the treatment of these disorders and other disorders may take longer, be more costly, or be less effective as part of the novelty of development in these diseases. For example, our product candidate INO-3107 is being developed for RRP, a rare condition for which there are no approved non-surgical treatments. In particular, there are challenges associated with agreeing to a primary endpoint with the FDA for the treatment of RRP where no precedent exists.

Even if the FDA does find our success criteria to be sufficiently validated and clinically meaningful, we may not achieve the pre-specified endpoint to a degree of statistical significance in any pivotal or other clinical trials we or our strategic collaborators may conduct for our programs. Further, even if we do achieve the pre-specified criteria, our trials may produce results that are unpredictable or inconsistent with the results of the more traditional efficacy endpoints in the trial. The FDA also could give overriding weight to other efficacy endpoints over a primary endpoint, even if we achieve statistically significant results on that endpoint, if we do not do so on our secondary efficacy endpoints. The FDA also weighs the benefits of a product against its risks and the FDA may view the efficacy results in the context of safety as not being supportive of licensure. Other regulatory authorities in Europe and other countries may make similar findings with respect to these endpoints.

We have obtained Orphan Drug Designation for one of our DNA medicine candidates. As part of our business strategy, we may continue to seek Orphan Drug Designation for additional DNA medicine candidates, and we may be unsuccessful in obtaining new designations or may be unable to obtain or maintain the benefits associated with Orphan Drug Designation, including the potential for orphan drug exclusivity.

We have obtained Orphan Drug Designation from the FDA for INO-3107 for the treatment of RRP. We have sought and may continue to seek Orphan Drug Designation for one or more of our other DNA medicine candidates, although we may be unsuccessful in doing so. Regulatory authorities in some jurisdictions, including the United States and Europe, may designate drugs for relatively small patient populations as orphan drugs. Under the Orphan Drug Act, the FDA may designate a drug as an orphan drug if it is a drug intended to treat a rare disease or condition, which is generally defined as a patient population of fewer than 200,000 individuals in the United States, or a patient population greater than 200,000 in the United States where there is no reasonable expectation that the cost of developing the drug will be recovered from sales in the United States. In the United States, Orphan Drug Designation entitles a party to financial incentives such as tax advantages and user fee waivers. Opportunities for grant funding toward clinical trial costs may also be available for clinical trials of drugs for rare diseases, regardless of whether the drugs are designated for the orphan use. In addition, if a product that has Orphan Drug Designation subsequently receives the first FDA approval for the disease for which it has such designation, the product is entitled to orphan drug exclusivity, which means that the FDA may not approve any other applications to market the same product for the same indication for seven years, except in limited circumstances.

Although we have obtained Orphan Drug Designation for INO-3107 for the treatment of RRP, and even if we obtain Orphan Drug Designation for our other DNA medicine candidates in specific indications, we may not be the first to obtain marketing approval of these DNA medicine candidates for the orphan-designated indication due to the uncertainties associated with developing pharmaceutical products. If a competitor with a product that is determined by the FDA to be the same as one of our DNA medicine candidates obtains marketing approval before us for the same indication we are pursuing and obtains orphan drug exclusivity, our product candidate may not be approved until the period of exclusivity ends unless we are able to demonstrate that our product candidate is clinically superior. Even after obtaining approval, we may be limited in our ability to market our product. In addition, exclusive marketing rights in the United States may be limited if we seek approval for an indication broader than the orphan-designated indication or may be lost if the FDA later determines that the request for designation was materially defective or if the manufacturer is unable to assure sufficient quantities of the product to meet the needs of patients with the rare disease or condition. Further, even if we obtain orphan drug exclusivity for a product, that exclusivity may not effectively protect the product from competition because different drugs with different principal molecular structural features can be approved for the same condition. Even after an orphan product is approved, the FDA can subsequently approve the same drug with the same principal molecular structural features for the same condition if the FDA concludes that the later drug is safer, more effective or makes a major contribution to patient care. Orphan Drug Designation neither shortens the development time or regulatory review time of a drug nor gives the drug any advantage in the regulatory review or approval process. In addition, while we may seek Orphan Drug Designation for some of our DNA medicine candidates, we may never receive such designations.

A breakthrough therapy designation or fast track designation by the FDA for a drug may not lead to a faster development or regulatory review or approval process, and it would not increase the likelihood that the drug will receive marketing approval.

We may seek a breakthrough therapy designation for one or more of our investigational medicines. A breakthrough therapy is defined as a drug that is intended, alone or in combination with one or more other drugs, to treat a serious or life-threatening disease or condition, and preliminary clinical evidence indicates that the drug may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. For drugs that have been designated as breakthrough therapies, interaction and communication between the FDA and the sponsor of the trial can help to identify the most efficient path for clinical development while minimizing the number of patients placed in ineffective control regimens. Drugs designated as breakthrough therapies by the FDA are also eligible for priority review if supported by clinical data at the time of the regulatory submission.

Designation as a breakthrough therapy is at the discretion of the FDA. Accordingly, even if we believe that one of our investigational medicines meets the criteria for designation as a breakthrough therapy, the FDA may disagree and instead determine not to make such designation. In any event, the receipt of a breakthrough therapy designation for a drug may not result in a faster development process, review, or approval compared to drugs considered for approval under conventional FDA procedures and it would not assure ultimate approval by the FDA. Even if we are successful in obtaining accelerated approval in the United States or under comparable pathways in other jurisdictions, we may face requirements and limitations that will adversely affect our prospects. For example, we may be approved only for a very limited indication, we may not successfully complete required post-approval trials, such trials may not confirm the clinical benefit of our drug, or approval of the drug may be withdrawn. In addition, even if one or more of our investigational medicines qualify as breakthrough therapies, the FDA may later decide that the investigational medicine no longer meets the conditions for qualification or it may decide that the time period for FDA review or approval will not be shortened.

Risks Related to Reliance on Third Parties

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, and may continue to 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 to develop, obtain regulatory approval for and commercialize our DNA medicine candidates for specified indications, including in jurisdictions outside of the United States. 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 strategically enter into agreements with other 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, implement and execute 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.

We have agreements with government agencies, which are subject to termination and uncertain future funding, which could have a negative impact on our ability to develop certain of our pipeline candidates and/or require us to seek alternative funding sources to advance product candidates.

We have entered into agreements with government agencies, such as the National Institutes of Health’s National Institute of Allergy and Infectious Diseases, DARPA, Medical CBRN Defense Consortium and the Department of Defense Joint Program Executive Office for Chemical, Biological, Radiological and Nuclear Defense, or DoD, and we intend to continue entering into these types of 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. For example, in April 2021 we were notified by the DoD that it discontinued funding for the Phase 3 segment of our INNOVATE trial, which resulted in increased expenditures by us.

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.

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 DNA medicine 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 proprietary smart device and DNA medicine 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 DNA medicine 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 DNA medicine candidates. As a result, our financial results and the commercial prospects for our DNA medicine 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.

We enter into various contracts in the normal course of our business in which we agree to indemnify the other party to the contract. In the event we have to perform under these indemnification provisions, it could have a material adverse effect on our business, financial condition and results of operations.

In the normal course of business, we periodically enter into academic, commercial, service, collaboration, licensing, consulting and other agreements that contain indemnification provisions. With respect to our academic and other research agreements, we typically agree to indemnify the institution and related parties from losses arising from claims relating to the products, processes or services made, used, sold or performed pursuant to the agreements for which we have secured licenses, and from claims arising from our or our sub licensees' exercise of rights under the agreement. With respect to our commercial agreements, we have agreed to indemnify our vendors from any third-party product liability claims that could result from the production, use or consumption of the product, as well as for alleged infringements of any patent or other intellectual property right by a third party. With respect to consultants, we typically agree to indemnify them from claims arising from the good faith performance of their services.

Should our obligation under an indemnification provision exceed applicable insurance coverage or if we were denied insurance coverage or not covered by insurance, our business, financial condition and results of operations could be adversely affected. Similarly, if we are relying on a collaborator or other third party to indemnify us and the collaborator or other third party is denied insurance coverage or otherwise does not have assets available to indemnify us, our business, financial condition and results of operations could be adversely affected.

Risks Related to Commercialization of Our DNA Medicine Candidates

We currently have only a small marketing organization and no 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, if approved, we may not be able to generate product revenues.

We currently have only a small commercial organization to support pre-commercial activities for our proprietary smart device and DNA medicine candidates, if approved, and we do not currently have a sales organization. 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 DNA medicine candidates which would negatively impact our ability to generate product revenues.

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

The commercial success of our proprietary smart device and DNA medicine 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 DNA medicine 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, including the acceptance and usage of our proprietary smart device by the medical community;
- 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;
- the public perception of new therapies and the reputational challenges that the vaccine industry is facing related to the growing momentum of the anti-vaccine movement;
- our ability to obtain sufficient third-party coverage and adequate reimbursement; and
- the willingness of patients to pay out of pocket in the absence of third-party coverage.

If our proprietary smart device and DNA medicine candidates are approved but do not achieve an adequate level of acceptance by physicians, healthcare 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 DNA medicine candidates may require significant resources and may never be successful.

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

Patients in the United States and elsewhere generally rely on third-party payors to reimburse part or all of the costs associated with their prescription drugs and medical treatments. Accordingly, our ability to commercialize our proprietary smart device and DNA medicine candidates successfully will depend in part on the extent to which governmental authorities, including Medicare and Medicaid, private health insurers and other third-party payors establish appropriate coverage and reimbursement levels for our DNA medicine candidates and related treatments. As a threshold for coverage and reimbursement, third-party payors in the United States generally require that drug products and vaccines have been approved for marketing by the FDA.

Significant uncertainty exists as to the coverage and reimbursement status of any products for which we may obtain regulatory approval. Coverage decisions may not favor new products when more established or lower cost therapeutic alternatives are already available. Even if we obtain coverage for a given product, the associated reimbursement rate may not be adequate to cover our costs, including research, development, intellectual property, manufacture, sale and distribution expenses, or may require co-payments that patients find unacceptably high. Patients are unlikely to use our products unless reimbursement is adequate to cover all or a significant portion of the cost of our drug products.

Additionally, some of our products, if approved, will be provided under the supervision of a physician. When used in connection with medical procedures, our DNA medicine candidates may not be reimbursed separately but their cost may instead be bundled as part of the payment received by the provider for the procedure only. Separate reimbursement for the

product itself or the treatment or procedure in which our product is used may not be available. A decision by a third-party payor not to cover or separately reimburse for our DNA medicine candidates or procedures using our DNA medicine candidates, could reduce physician utilization of our products once approved.

Coverage and reimbursement policies for products can differ significantly from payor to payor as there is no uniform policy of coverage and reimbursement for products among third-party payors in the United States. There may be significant delays in obtaining coverage and reimbursement as the process of determining coverage and reimbursement is often time-consuming and costly which will require us to provide scientific and clinical support for the use of our products to each payor separately, with no assurance that coverage or adequate reimbursement will be obtained. It is difficult to predict at this time what government authorities and third-party payors will decide with respect to coverage and reimbursement for our products.

A significant trend in the U.S. healthcare industry and elsewhere is cost containment. Third-party payors have attempted to control costs by limiting coverage and the amount of reimbursement for particular products and services. Third-party payors are increasingly challenging the effectiveness of and prices charged for medical products and services. Moreover, the U.S. government, state legislatures and foreign governmental entities have shown significant interest in implementing cost containment programs to limit the growth of government-paid healthcare costs, including price controls, restrictions on reimbursement and coverage and requirements for substitution of generic products for branded prescription drugs. We may not be able to obtain third-party payor coverage or reimbursement for our products in whole or in part.

Risks Related to Employee and Operational Matters

Our operating results may be harmed if our restructuring plans do not achieve the anticipated results or cause undesirable consequences.

In July 2022 and again in January 2023, we undertook restructuring plans that resulted in a total reduction in headcount of approximately 79 employees and a significant majority of our contractors. Restructuring plans may yield unintended consequences, such as attrition beyond our intended reduction in workforce and reduced employee morale, which may cause our employees who were not affected by the reduction in workforce to seek alternate employment. During the second half of 2022, we experienced increased attrition after conducting the first reduction in force. Additional attrition could impede our ability to meet our operational goals, which could have a material adverse effect on our financial performance. In addition, as a result of the reductions in our workforce, we may face an increased risk of employment litigation.

Furthermore, employees whose positions have been or will be eliminated in connection with these restructuring plans may seek future employment with our competitors. Although all our employees are required to sign a confidentiality agreement with us at the time of hire, we cannot be certain that the confidential nature of our proprietary information will be maintained in the course of such future employment. We cannot be certain that any of our restructuring efforts will be successful, or that we will be able to realize the cost savings and other anticipated benefits from our current or any future restructuring plans. In addition, if we continue to reduce our workforce, it may adversely impact our ability to respond rapidly to any new growth or revenue opportunities. Any restructuring activities we undertake may take longer than expected and may require changes to our business that we are unable to implement. If we are unsuccessful in implementing our cost saving initiatives and restructuring plans or if we do not achieve our expected results, our results of operations and cash flows could be adversely affected.

We are currently subject to litigation and may become subject to additional litigation, which could harm our business, financial condition and reputation.

We may have actions brought against us by stockholders relating to past transactions, changes in our stock price or other matters. For example, numerous purported shareholder class action complaints have been filed against us, naming us and our directors and executive officers as defendants, and alleging that we made materially false and misleading statements regarding the development of INO-4800 in violation of certain federal securities laws. Although we have settled the current class action securities litigation, there can be no guarantee that we will not become subject to similar claims in the future. We may also become party to litigation with third parties as a result of our business activities. In 2020, we filed a lawsuit against one of our contract manufacturers, who then filed a counterclaim against us alleging that we had breached our contract with them, among other claims. There can be no assurance that we will ultimately prevail in the ongoing litigation matters described in this report or in future litigation matters. These and any potential future actions against us could give rise to substantial damages, which could have a material adverse effect on our financial position, liquidity or results of operations. Even if an action is not resolved against us, the uncertainty and expense associated with litigation could harm our business, financial condition and reputation, as litigation is often costly, time-consuming and disruptive to business operations. The defense of our existing and potential future lawsuits could also result in diversion of our management's time and attention away from business operations, which could harm our business.

We have experienced changes to our senior leadership team, which creates uncertainty and could harm our business.

We have experienced changes to our senior leadership team over the past year. Our former President and Chief Executive Officer, Dr. J. Joseph Kim, who served in those roles since 2009, resigned in May 2022, and Dr. Jacqueline Shea, previously our Chief Operating Officer, was appointed to those roles. Although Dr. Shea has served with our Company since 2019, the management transition had the potential to create uncertainty and disrupt our operations and relationships with employees, suppliers and partners and result in operational inefficiencies, decreased employee morale and productivity and increased turnover. Any departure at a senior level could be particularly disruptive given that we are already experiencing leadership transitions and, to the extent we experience additional turnover, competition for top management is high such that it may take some time to find a candidate that meets our requirements. In addition, our competitors may seek to use this management transition and the related potential disruptions to gain a competitive advantage over us. If we are unable to successfully navigate the transition of our chief executive officer, our business could suffer.

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 DNA medicine 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 DNA medicine candidates.

Our business could be adversely affected by the effects of health epidemics, including the global COVID-19 pandemic.

In response to the COVID-19 pandemic, in 2020 a number of governmental orders and other public health guidance measures were implemented across much of the United States, including in the locations of our offices, laboratories, clinical trial sites and third parties on whom we rely. As a result, our expected clinical development timelines were negatively impacted. These or similar events could result in future business and manufacturing disruption, or in reduced operations, any of which would materially affect our business, financial condition and results of operations. The COVID-19 pandemic also caused supply chain disruptions and supply shortages globally. As a result, we experienced delays and disruptions in obtaining clinical supplies, manufacturing supplies and components, and had to secure new vendors for certain supplies and components at higher prices. There can be no assurance that we will not encounter similar difficulties in the future.

The spread of COVID-19, which caused a broad impact globally, could also affect us economically. While the potential economic impact brought by COVID-19 may be difficult to assess or predict, it has resulted in significant disruption of global financial markets, which could reduce our ability to access capital. Although we raised significant funds from the sale of our common stock in the public markets during the pandemic, there can be no guarantee that we will be able to continue to so, which could negatively affect our future liquidity.

Future health epidemics could adversely affect our clinical trial operations, including our ability to initiate and conduct our planned trials on their expected timelines and to recruit and retain participants and principal investigators and site staff who, as healthcare providers, may have heightened exposure if an outbreak occurs in their geography. Trial participants may not be able to or may not feel safe going into healthcare facilities, which is necessary for the collection and completion of data samples for our clinical trials. Further, future epidemics could also result in delays in our clinical trials due to prioritization of hospital resources toward the disease, restrictions in travel, potential unwillingness of participants to enroll in trials, participants withdrawing from trials following enrollment as a result of contracting disease or other health conditions. In addition, we rely on independent clinical investigators, contract research organizations and other third-party service providers to assist us in managing, monitoring and otherwise carrying out our preclinical studies and clinical trials, and the outbreak may affect their ability to devote sufficient time and resources to our programs or to travel to sites to perform work for us.

We face intense and increasing competition and steps taken by our competitors such as the introduction of a new, disruptive technology may impede our ability to successfully commercialize our DNA medicines, if approved.

If any of our competitors develop products with efficacy or safety profiles significantly better than our product candidates and introduce new, disruptive technology, we may not be able to commercialize our products, if approved, 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 product candidates obsolete or noncompetitive, or result in treatments or cures superior to ours.

Our competitors and potential competitors include large pharmaceutical companies broadly engaged in vaccine/immunotherapy research and development, such as Janssen Pharmaceuticals (part of J&J), Sanofi-Aventis, GlaxoSmithKline plc, Merck, Pfizer, Roche, AbbVie, Novartis, Bristol-Myers Squibb, and AstraZeneca, as well as various development-stage biotechnology companies involved in different vaccine and immunotherapy technologies, such as CureVac, Dynavax, Genexine, Hookipa, Iovance, Nektar, Nykode, Precigen, Translate Bio, Zydus, and Vir Biotechnology. 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, preclinical 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.

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 dysplasia. Loop Electrosurgical Excision Procedure, commonly known as LEEP, is a surgical procedure and is the current standard of care for treating high-grade cervical dysplasia. In RRP caused by HPV subtypes 6 and 11, Precigen is working to develop a treatment based on a gorilla adenovirus vector. Advaxis, Genexine, and Gilead Sciences have therapeutic cervical cancer product candidates under development. Many companies are pursuing different approaches to pre-cancers and cancers we are targeting.

We also compete more specifically with companies seeking to utilize antigen-encoding DNA delivered with electroporation or other 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.

Small biotechnology 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. See “Business—Competition” for additional information on our competitive landscape.

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.

Changes in funding for the FDA and other government agencies could prevent new products from being developed or commercialized in a timely manner, which could negatively impact our business.

The ability of the FDA to review and approve new products can be affected by a variety of factors, including government budget and funding levels, ability to hire and retain key personnel and accept the payment of user fees, and statutory, regulatory, and policy changes. Average review times at the agency have fluctuated in recent years as a result. In addition, government funding of other government agencies that fund research and development activities is subject to the political process, which is inherently fluid and unpredictable.

Disruptions at the FDA and other agencies may also slow the time necessary for new drugs to be reviewed and/or approved by necessary government agencies, which would adversely affect our business. For example, in recent years, including for 35 days from December 2018 to January 2019, the U.S. government has shut down several times and certain regulatory agencies, such as the FDA, have had to furlough critical FDA employees and stop critical activities. If a prolonged government shutdown occurs, it could significantly impact the ability of the FDA to timely review and process our regulatory submissions, which could have a material adverse effect on our business.

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 (including personal information and pseudonymized 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, interruption, or unavailability of critical information technology systems or infrastructure, by our workforce, others with authorized access to our systems or unauthorized persons could negatively impact operations. Hardware, software, or applications we develop or obtain from third parties may contain defects in design or manufacture or other supply chain problems that could unexpectedly compromise our information and network security. 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 (including ransomware), 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. In addition, as the regulatory environment related to information security, data collection and use, and privacy becomes increasingly rigorous, with new and constantly changing requirements applicable to our business, compliance with those requirements could also result in additional costs.

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

The use of our proprietary smart device and DNA medicine 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, healthcare 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 DNA medicine 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.

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, as amended by the Health Care and Education Reconciliation Act, or collectively, the ACA. Among the ACA's provisions of importance to the pharmaceutical industry are that it:

- imposed an annual excise tax of 2.3% on any entity that manufactures or imports medical devices offered for sale in the United States, with limited exceptions, although the effective rate paid may be lower. However, the 2020 federal spending package permanently eliminated, effective January 1, 2020, this ACA-mandated medical device tax;
- created an annual, nondeductible fee on any entity that manufactures or imports certain specified branded prescription drugs and biologic agents apportioned among these entities according to their market share in some government healthcare programs;
- increased the statutory minimum rebates a manufacturer must pay under the Medicaid Drug Rebate Program, to 23.1% and 13% of the average manufacturer price for most branded and generic drugs, respectively and capped the total rebate amount for innovator drugs at 100% of the Average Manufacturer Price, or AMP;
- created new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for certain drugs and biologics that are inhaled, infused, instilled, implanted or injected;
- expanded eligibility criteria for Medicaid programs by, among other things, allowing states to offer Medicaid coverage to additional individuals and by adding new mandatory eligibility categories for individuals with income at or below 133% of the federal poverty level, thereby potentially increasing manufacturers' Medicaid rebate liability;
- expanded the entities eligible for discounts under the Public Health program;
- created a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical effectiveness research, along with funding for such research;
- established a Center for Medicare & Medicaid Innovation at the Centers for Medicare & Medicaid Services, or CMS, to test innovative payment and service delivery models to lower Medicare and Medicaid spending, potentially including prescription drug spending; and
- created a licensure framework for follow on biologic products.

There have been executive, judicial, and Congressional challenges to certain aspects of the ACA. While Congress has not passed comprehensive repeal legislation, it has enacted laws that modify certain provisions of the ACA such as removing penalties for not complying with the ACA's individual mandate to carry qualifying health insurance coverage for all or part of a year. In addition, the ACA-mandated "Cadillac" tax on high-cost employer-sponsored health coverage was eliminated, along with the health insurer tax. On June 17, 2021 the U.S. Supreme Court dismissed a challenge on procedural grounds that argued the ACA is unconstitutional in its entirety because the "individual mandate" was repealed by Congress. On August 16, 2022, President Biden signed the Inflation Reduction Act of 2022, or IRA, into law, which among other things, extends enhanced subsidies for individuals purchasing health insurance coverage in ACA marketplaces through plan year 2025. The IRA also eliminates the "donut hole" under the Medicare Part D program beginning in 2025 by significantly lowering the beneficiary maximum out-of-pocket cost and creating a new manufacturer discount program. It is unclear how such challenges, and the healthcare reform measures of the Biden administration will impact the ACA and our business. Additionally, on March 11, 2021, President Biden signed the American Rescue Plan Act of 2021 into law, which eliminates the statutory Medicaid drug rebate cap, currently set at 100% of a drug's average manufacturer price, for single source and innovator multiple source drugs, beginning January 1, 2024.

In addition, other legislative changes have been proposed and adopted since the ACA was enacted. The Budget Control Act of 2011 included reductions to Medicare payments to providers of 2% per fiscal year, which, due to subsequent legislative amendments to the statute will remain in effect until 2031, unless Congressional action is taken. Under current legislation the actual reduction in Medicare payments will vary from 1% in 2022 to up to 4% in the final fiscal year of this sequester. The American Taxpayer Relief Act of 2012 reduced Medicare payments to several providers, including hospitals,

and increased the statute of limitations period for the government to recover overpayments to providers from three to five years.

There has also been heightened governmental scrutiny in the United States of pharmaceutical pricing practices in light of the rising cost of prescription drugs and biologics. Such scrutiny has resulted in several recent Congressional inquiries and proposed and enacted federal and state legislation designed to, among other things, bring more transparency to product pricing, review the relationship between pricing and manufacturer patient programs, and reform government program reimbursement methodologies for products. For example, at the federal level, in July 2021, the Biden administration released an executive order, "Promoting Competition in the American Economy," with multiple provisions aimed at prescription drugs. In response to Biden's executive order, on September 9, 2021, HHS released a Comprehensive Plan for Addressing High Drug Prices that outlines principles for drug pricing reform and sets out a variety of potential legislative policies that Congress could pursue as well as potential administrative actions HHS can take to advance these principles. In addition, the IRA, among other things (i) directs HHS to negotiate the price of certain high-expenditure, single-source drugs and biologics covered under Medicare and (ii) imposes rebates under Medicare Part B and Medicare Part D to penalize price increases that outpace inflation. These provisions will take effect progressively starting in fiscal year 2023, although they may be subject to legal challenges. It is currently unclear how the IRA will be implemented but it is likely to have a significant impact on the pharmaceutical industry. In addition, the Biden administration released an additional executive order on October 14, 2022, directing HHS to report on how the Center for Medicare and Medicaid Innovation can be further leveraged to test new models for lowering drug costs for Medicare and Medicaid beneficiaries. At the state level, legislatures have increasingly passed legislation and implemented regulations designed to control pharmaceutical and biological product pricing, including price or patient reimbursement constraints, discounts, restrictions on certain product access and marketing cost disclosure and transparency measures, and, in some cases, designed to encourage importation from other countries and bulk purchasing.

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, state, local and foreign healthcare laws and regulations pertaining to fraud and abuse, transparency, patients' rights, and privacy are applicable to our business. 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 or reward either the referral of an individual, or ordering, or leasing of an item, good, facility or service, for which payment may be made by a federal healthcare program such as Medicare or Medicaid. The intent standard under the federal healthcare program Anti-Kickback Statute was amended by the ACA to a stricter standard such that a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation. Further, the ACA codified case law that a claim including items or services resulting from a violation of the federal healthcare program Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the civil False Claims Act;
- federal civil and criminal false claims laws, including the civil False Claims Act, 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;
- HIPAA, which prohibits, among other things, executing a scheme to defraud any healthcare benefit program or making false statements relating to healthcare matters. Similar to the federal healthcare program Anti-Kickback Statute, a person or entity does not need to have actual knowledge of the statute or specific intent to violate it in order to have committed a violation;
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, and related regulations, which impose certain requirements relating to the privacy, security and transmission of individually identifiable health information on certain individuals and entities;
- the Physician Payments Sunshine Act, created under the ACA, which requires certain manufacturers of drugs, devices, biologics and medical supplies for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program, with certain exceptions, to report annually to CMS, information related to payments or other transfers of value made to physicians (defined to include doctors, dentists, optometrists, podiatrists, and

chiropractors), other healthcare professionals (such as physicians assistants and nurse practitioners) and teaching hospitals, as well as ownership and investment interests held by physicians and their immediate family members;

- the FDCA, 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;
- 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, state and local laws requiring the registration of pharmaceutical sales and medical representatives, 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; and
- additional state and local laws such as laws in California and Massachusetts, which mandate implementation of compliance programs, compliance with industry ethics codes, and spending limits, and other state and local laws, such as laws in Vermont, Maine, and Minnesota which require reporting to state governments of gifts, compensation, and other remuneration to physicians.

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.

We will be required to spend substantial time and money to ensure that our business arrangements with third parties comply with applicable healthcare laws and regulations. Because of the breadth of these laws and the narrowness of the statutory exceptions and regulatory safe harbors available, which require strict compliance in order to offer protection, it is possible that governmental authorities may conclude that our business practices do not comply with current or future statutes, regulations, agency guidance or case law involving applicable healthcare 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 significant penalties, including administrative, civil and criminal penalties, damages, fines, disgorgement, possible exclusion from participation in Medicare, Medicaid and other federal healthcare programs, imprisonment, integrity and/or other oversight obligations, contractual damages, reputational harm, and the curtailment or restructuring of our operations. Any such penalties 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.

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 DNA medicine 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 have entered into collaborations with Chinese companies and conduct certain research and development activities in China. Uncertainties regarding the interpretation and enforcement of Chinese laws, rules and regulations, a trade war, political unrest or unstable economic conditions in China could materially adversely affect our business, financial condition and results of operations.

We are party to a license and collaboration agreement with a China-based company ApolloBio, pursuant to which ApolloBio has the exclusive right to develop and commercialize VGX-3100 in China, Hong Kong, Macao and Taiwan. The Chinese legal system is a civil law system based on written statutes. Unlike the common law system, prior court decisions may be cited for reference but have limited precedential value. In addition, the Chinese legal system is based in part on government policies and internal rules, some of which are not published on a timely basis or at all, and which may have a retroactive effect. As a result, we may not be aware of our violation of these policies and rules until after the occurrence of the violation. Any administrative and court proceedings in China may be protracted, resulting in substantial costs and diversion of resources and management attention. Because Chinese administrative and court authorities have significant discretion in interpreting and implementing statutory and contractual terms, it may be more difficult to evaluate the outcome of administrative and court proceedings and the level of legal protection we enjoy than in more developed legal systems.

Furthermore, we are exposed to the possibility of disruption of our research and development activities in the event of changes in the policies of the United States or Chinese governments, political unrest or unstable economic conditions in China. For example, China's "zero COVID" policy has caused delays in Advaccine’s conduct of clinical trials for INO-4800 in China under our collaboration with them, which has in turn resulted in delays in obtaining clinical data to evaluate the

safety and potential efficacy of INO-4800. Further, the threat of a trade war between the United States and China could lead to supply chain disruptions or increased costs for clinical materials manufactured in China that are necessary for our development efforts. These interruptions or failures could then impede commercialization of our DNA medicine candidates and impair our competitive position. We may also be exposed to fluctuations in the value of the local currency in China. These uncertainties may impede our ability to enforce the contracts we have entered into and our ability to continue our research and development activities and could materially and adversely affect our business, financial condition and results of operations.

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

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

Employee litigation and unfavorable publicity could negatively affect our future business.

Our employees may, from time to time, bring lawsuits against us regarding injury, creating a hostile work place, discrimination, wage and hour disputes, sexual harassment, or other employment issues. In recent years there has been an increase in the number of discrimination and harassment claims generally. Coupled with the expansion of social media platforms and similar devices that allow individuals access to a broad audience, these claims have had a significant negative impact on some businesses. Certain companies that have faced employment- or harassment-related lawsuits have had to terminate management or other key personnel, and have suffered reputational harm that has negatively impacted their business. If we were to face any employment-related claims, our business could be negatively affected.

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 proprietary smart device and DNA medicine candidates, as well as successfully defending these intellectual property rights against third-party challenges.

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

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

- we, or the parties from whom we have acquired or licensed patent rights, may not have been the first to file the underlying patent applications or the first to make the inventions covered by such patents;
- the named inventors or co-inventors of patents or patent applications that we have licensed or acquired may be incorrect, which may give rise to inventorship and ownership challenges;

- others may develop similar or alternative technologies, or duplicate any of our products or technologies that may not be covered by our patents, including design-arounds;
- pending patent applications may not result in issued patents;
- the issued patents covering our products and technologies may not provide us with any competitive advantages or have any commercial value;
- the issued patents may be challenged and invalidated, or rendered unenforceable;
- governments in the United States or abroad may prevent us from enforcing patents on our vaccines, which could prevent us from excluding competitors from those markets;
- 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 DNA medicine 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.

We have not yet registered our trademarks in all of our potential markets, and failure to secure those registrations could adversely affect our business.

Our trademark applications may not be allowed for registration, and our registered trademarks may not be maintained or enforced. During trademark registration proceedings, we may receive rejections. Although we are given an opportunity to respond to those rejections, we may be unable to overcome such rejections. In addition, in the USPTO and in comparable agencies in many foreign jurisdictions, third parties are given an opportunity to oppose pending trademark applications and to seek to cancel registered trademarks. Opposition or cancellation proceedings may be filed against our trademarks, and our trademarks may not survive such proceedings. If we do not secure registrations for our trademarks, we may encounter more difficulty in enforcing them against third parties than we otherwise would.

Risks Related to an Investment in Our Common Stock

An active trading market for our common stock may not be sustained.

Although our common stock is listed on the Nasdaq Global Select Market, we cannot be certain that an active trading market for our shares will continue to be sustained. If an active market for our common stock is not sustained, it may be difficult for investors in our common stock to sell shares without depressing the market price for the shares or to sell the shares at all.

The price of our common stock has been and may continue 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 has been and may continue to be highly volatile and has been and may in the future 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, which are not exhaustive, in addition to the other risk factors described in this 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 our vaccines or other DNA medicine 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;
- changes in the structure of healthcare payment systems;
- 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;
- perceptions 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 including geopolitical risks emanating from countries such as Russia and China, terrorist activities, and economic and other external factors; and
- catastrophic weather and/or global disease pandemics, including COVID-19.

The stock market in general can experience relatively large price and volume fluctuations from time to time. 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 our common stock, which could cause a decline in the value of our common stock. In addition, price volatility may increase if the trading volume of our common stock remains limited or declines.

We have broad discretion in the use of our cash, cash equivalents, and investments, and may not use them effectively.

Our management has broad discretion in the application of our cash, cash equivalents, and investments, and could spend the proceeds in ways that do not improve our results of operations or enhance the value of our common stock. For example, our operating expenses during the period from 2020 to 2022 significantly increased due to development and manufacturing activities for our COVID-19 vaccine program, for which we discontinued internal funding in the fourth quarter of 2022. We may not deploy our current capital resources effectively. The failure by our management to apply our funds effectively could result in financial losses that could have a material adverse impact on our business, cause the price of our common stock to decline, and delay the development of our investigational medicines. Pending their use, we may invest our cash, cash equivalents, and investments in a manner that does not produce income or that loses value.

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 the sole source of potential gain for the foreseeable future.

Our ability to utilize our net operating loss carryforwards and certain other tax attributes may be limited.

Under Sections 382 and 383 of the revised Internal Revenue Code of 1986, as amended, or the Code, if a corporation undergoes an “ownership change” (generally defined as a greater than 50 percentage point change (by value) in the ownership of its equity by certain significant shareholders over a rolling three year period), the corporation’s ability to use its pre-change net operating loss carryforwards and certain other pre-change tax attributes to offset its post-change income and taxes may be limited. We may have experienced such ownership changes in the past, and we may experience ownership changes in the future as a result of shifts in our share ownership, some of which would be outside our control. If our ability to use our net operating losses and other tax attributes is limited by ownership changes, we may be unable to utilize a material portion of our net operating losses and other tax attributes to offset our future taxable income. In addition, there is also a risk that due to changes in laws and regulations, such as alternative minimum taxes or suspensions on the use

of net operating losses, or other unforeseen reasons, our existing net operating losses could expire or otherwise become unavailable to offset future income tax liabilities.

General Risk Factors

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 proprietary smart device, DNA medicine 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 proprietary smart device and DNA medicine candidates or those of our competitors;
- debt service obligations;
- changes in the fair value of our investments, including investments in affiliated entities;
- 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 DNA medicine candidates receive 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.

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, global pathogen outbreaks or pandemics, including COVID-19, and the availability and cost of credit have in the past and may continue to contribute to increased volatility and diminished expectations for the economy and the markets going forward. Market upheavals may have an adverse effect on us. In the event of a market downturn, our results of operations could be adversely affected. Our future cost of equity or debt capital and access to the capital markets could be adversely affected, and our stock price could decline. There may be disruption or delay in the performance of our third-party contractors and suppliers. If our contractors, suppliers and partners are unable to satisfy their contractual commitments, our business could suffer. In addition, we maintain significant amounts of cash and cash equivalents at one or more financial institutions that are in excess of federally insured limits, and we may experience losses on these deposits.

If equity research analysts do not publish research or reports, or publish unfavorable research or reports, about us, our business or our market, our stock price and trading volume could decline.

The trading market for our common stock is influenced by the research and reports that equity research analysts publish about us and our business, and we have limited research coverage by equity research analysts. Equity research analysts may elect not to initiate or continue to provide research coverage of our common stock, and such lack of research coverage may adversely affect the market price of our common stock. Even if we have equity research analyst coverage, we will not have any control over the analysts or the content and opinions included in their reports. The price of our stock could decline if one or more equity research analysts downgrade our stock or issue other unfavorable commentary or research. If one or more equity research analysts ceases coverage of our company or fails to publish reports on us regularly, demand for our stock could decrease, which in turn could cause our stock price or trading volume to decline.

The issuance of additional stock in connection with financings, acquisitions, investments, our stock incentive plans or otherwise will dilute all other stockholders.

Our certificate of incorporation authorizes us to issue up to 600,000,000 shares of common stock and up to 10,000,000 shares of preferred stock with such rights and preferences as may be determined by our board of directors. Subject to compliance with applicable rules and regulations, we may issue our shares of common stock or securities convertible into our common stock from time to time in connection with a financing, acquisition, investment, our stock incentive plans or

otherwise. Any such issuance could result in substantial dilution to our existing stockholders and cause the trading price of our common stock to decline.

We incur significant costs and demands upon management as a result of being a public company.

As a public company listed in the United States, we incur significant legal, accounting and other costs that could negatively affect our financial results. In addition, changing laws, regulations and standards relating to corporate governance and public disclosure, including regulations implemented by the SEC and stock exchanges, may increase legal and financial compliance costs and make some activities more time-consuming. These laws, regulations and standards are subject to varying interpretations and, as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. We intend to invest resources to comply with evolving laws, regulations and standards, and this investment may result in increased general and administrative expenses and a diversion of management's time and attention from revenue-generating activities to compliance activities. If notwithstanding our efforts to comply with new laws, regulations and standards, we fail to comply, regulatory authorities may initiate legal proceedings against us and our business may be harmed.

Failure to comply with these rules might also make it more difficult for us to obtain some types of insurance, including director and officer liability insurance, and we might be forced to accept reduced policy limits and coverage or incur substantially higher costs to obtain the same or similar coverage. The impact of these events could also make it more difficult for us to attract and retain qualified persons to serve on our board of directors, on committees of our board of directors or as members of senior management.

Changes in tax laws could adversely affect our business and financial condition.

The tax regimes to which we are subject or under which we operate are unsettled and may be subject to significant change. In December 2017, tax legislation commonly known as the Tax Cuts and Jobs Act was enacted, which significantly revised the Internal Revenue Code of 1986, as amended, or the Code. The Tax Cuts and Jobs Act, among other things, contains significant changes to corporate taxation, including reduction of the corporate tax rate from a top marginal rate of 35 percent to a flat rate of 21 percent, limitation of the tax deduction for interest expense to 30 percent of adjusted earnings (except for certain small businesses), limitation of the deduction for net operating losses to 80 percent of current-year taxable income and elimination of net operating loss carrybacks, one time taxation of offshore earnings at reduced rates regardless of whether they are repatriated, immediate deductions for certain new investments instead of deductions for depreciation expense over time, and modifying or repealing many business deductions and credits (including reducing the business tax credit for certain clinical testing expenses incurred in the testing of certain drugs for rare diseases or conditions). Notwithstanding the reduction in the corporate income tax rate, the overall impact of the federal tax law is uncertain and our business and financial condition could be adversely affected. In addition, it is uncertain if and to what extent various states will conform to the federal tax law. The issuance of additional regulatory or accounting guidance related to the Tax Act, or changes proposed or implemented by the current U.S. presidential administration or otherwise, could materially affect our tax obligations and effective tax rate.

The increasing use of social media platforms presents new risks and challenges.

Social media is increasingly being used to communicate about our research, development candidates, investigational medicines, and the diseases our development candidates and investigational medicines are being developed to treat. Social media practices in the biopharmaceutical industry continue to evolve and regulations relating to such use are not always clear. This evolution creates uncertainty and risk of noncompliance with regulations applicable to our business, resulting in potential regulatory actions against us. For example, participants may use social media channels to comment on their experience in an ongoing blinded clinical trial or to report an alleged adverse event. When such disclosures occur, there is a risk that we fail to monitor and comply with applicable adverse event reporting obligations or we may not be able to defend our business or the public’s legitimate interests in the face of the political and market pressures generated by social media due to restrictions on what we may say about our development candidates and investigational medicines. There is also a risk of inappropriate disclosure of sensitive information or negative or inaccurate posts or comments about us on any social networking website. If any of these events were to occur or we otherwise fail to comply with applicable regulations, we could incur liability, face regulatory actions, or incur other harm to our business.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

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

San Diego Leases

In April 2013, we entered into a lease, or the First San Diego Lease, for office space in San Diego, California. The term of the First San Diego Lease commenced on December 1, 2013. The initial term of the First San Diego Lease is ten years, with an option to extend the term by five years, subject to specified conditions. In June 2015, we amended the First San Diego Lease to increase the total leased space to 31,207 square feet and occupy the entire building. The commencement of the amended First San Diego Lease was in January 2016. As of December 31, 2022, rent payments under the First San Diego Lease include base rent with an annual increase of approximately 3 percent, and additional monthly fees to cover our share of certain facility expenses, including utilities, property taxes, insurance and maintenance. We had an option to terminate the First San Diego Lease on December 1, 2019, which we did not exercise.

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

The base rent adjusts periodically throughout the term of the Second San Diego Lease. As of December 31, 2022, rent payments under the Second San Diego Lease include base rent with an annual increase of approximately 3 percent, and additional monthly fees to cover our share of certain facility expenses, including utilities, property taxes, insurance and maintenance. In addition, we have paid a security deposit of $95,000.

Plymouth Meeting Lease

In March 2014, we entered into a lease, or the Plymouth Meeting Lease, for our corporate headquarters in Plymouth Meeting, Pennsylvania. We occupied the space in June 2014. The initial term of the Plymouth Meeting Lease was 11.5 years, with a right to extend the term by five years, subject to specified conditions. We use the space for office purposes.

The base rent adjusts periodically throughout the term of the Plymouth Meeting Lease. As of December 31, 2022, rent payments under the Plymouth Meeting Lease include base rent with an annual increase of approximately 2 percent, and additional monthly fees to cover our share of certain facility expenses, including utilities, property taxes, insurance and maintenance. In addition, we have paid a security deposit of $49,000. In July 2015, we amended the Plymouth Meeting Lease to increase the total leased space to 27,583 square feet.

In June 2017, we entered into another amendment to the Plymouth Meeting Lease to increase the total leased space to 57,361 square feet and extend the lease term through December 31, 2029. In connection with this amendment, we paid the landlord an additional security deposit of $75,000.

In the fourth quarter of 2019, we entered into two agreements to sublease a total of approximately 13,500 square feet in our Plymouth Meeting headquarters with one period through March 31, 2025 and the other month-to-month after December 31, 2022.

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

Securities Litigation

Securities Class Action Litigation

On March 12, 2020, a purported shareholder class action complaint, McDermid v. Inovio Pharmaceuticals, Inc. and J. Joseph Kim, was filed in the United States District Court for the Eastern District of Pennsylvania, naming us and J. Joseph Kim, our former President and Chief Executive Officer, as defendants. The lawsuit alleges that we made materially false and misleading statements regarding our development of a vaccine for COVID-19 in our public disclosures in violation of certain federal securities laws. The plaintiff seeks unspecified monetary damages on behalf of the putative class and an award of costs and expenses, including reasonable attorneys' fees. On June 18, 2020, the court appointed Manuel Williams to serve as lead plaintiff. On August 3, 2020, Mr. Williams filed a consolidated complaint, naming us and three of our officers as defendants.

On September 21, 2020, Mr. Williams and another purported stockholder, Andrew Zenoff filed a first amended complaint, naming us and three of our officers as defendants. Defendants filed a motion to dismiss plaintiff's first amended complaint on November 5, 2020. On February 16, 2021, the court issued an order granting in part, and denying in part, Defendants' motion to dismiss. The court granted Defendants' motion to dismiss, and dismissed with prejudice, the claims premised on the April 30 and June 30, 2020 statements. The court denied Defendants' motion to dismiss as to the remaining statements. On March 9, 2021, Defendants filed their answer to the complaint. After additional motions were filed in the case, in June 2022 the parties negotiated an agreement in principle to settle the shareholder class action complaint. Under the settlement, we will pay $30.0 million in cash and $14.0 million in shares of our common stock to settle all outstanding claims. Our insurance carriers have paid the $30.0 million cash component of the settlement. On August 31, 2022, the court granted preliminary approval of the settlement, and on January 18, 2023, the court entered an order granting final approval of the settlement, as set forth in a stipulation of settlement.

In February 2023, pursuant to the securities class action settlement, we issued 7,000,000 shares of common stock. Following the expiration of the appeal period or resolution of an appeal if one is filed, we will make another contribution of common stock to the settlement fund with a value of approximately $2.1 million. The number of shares will be calculated based on the average trading price of our common stock for the 10 trading days preceding the determination date pursuant to the terms of the securities class action settlement.

Shareholder Derivative Litigation

On April 20, 2020, a purported shareholder derivative complaint, Behesti v. Kim, et al., was filed in the United States District Court for the Eastern District of Pennsylvania, naming eight current and former directors as defendants. The lawsuit asserts state and federal claims and is based on the same alleged misstatements as the shareholder class action complaint. The lawsuit accuses our board of directors of failing to exercise reasonable and prudent supervision over our management, policies, practices, and internal controls. The plaintiff seeks unspecified monetary damages on behalf of us as well as governance reforms. On June 5, 2020, the court stayed the Beheshti action pending resolution of a forthcoming motion to dismiss the McDermid securities class action or until any party provides notice that they no longer consent to the stay. On June 12 and June 15, 2020, two additional shareholder derivative complaints were filed in the United States District Court for the Eastern District of Pennsylvania, captioned Isman v. Benito, et al. and Devarakonda et al. v. Kim, et. al. The complaints assert substantially similar claims as the Beheshti action and name our current directors as defendants. The Devarakonda complaint also names one of our former directors as a defendant. On July 21, 2020, the court consolidated the three derivative cases under the caption In re Inovio Pharmaceuticals, Inc. Derivative Litigation. The consolidated action is stayed.

On July 7, 2020, a fourth shareholder derivative complaint, Fettig v. Kim et al., was filed in the United States District Court for the Eastern District of Pennsylvania, naming eight current and former directors as defendants. The complaint asserts substantially similar claims as those in the consolidated derivative action. On August 27, 2020, the Fettig action was consolidated with the other derivative cases, which remain stayed as explained above.

On March 28, 2022, a fifth shareholder derivative complaint, Schumacher v. Benito et al., was filed in the Delaware Court of Chancery, naming eight current and former directors as defendants. The complaint asserts substantially similar claims as those in the consolidated derivative action. On May 4, 2022, the Delaware Court of Chancery entered a stay of the litigation.

VGXI Litigation

On June 3, 2020, we filed a complaint in the Court of Common Pleas of Montgomery County, Pennsylvania against VGXI, Inc. and GeneOne Life Science, Inc., or GeneOne, and together with VGXI, Inc. collectively referred to as VGXI, alleging that VGXI had materially breached our supply agreement with them. The complaint seeks declaratory judgments, specific performance of the agreement, injunctive relief, an accounting, damages, attorneys' fees, interest, costs and other relief from VGXI. On June 3, 2020, we filed a petition for preliminary injunction, which was denied on June 25, 2020. On June 26, 2020, we filed notice of appeal of the denial of the petition with the Pennsylvania Superior Court.

On July 7, 2020, VGXI filed an answer, new matter and counterclaims against us, alleging that we had breached the supply agreement, as well as misappropriation of trade secrets and unjust enrichment. The counterclaims seek injunctive relief, damages, attorneys' fees, interest, costs and other relief from us. Also, on July 7, 2020, VGXI filed a third-party complaint against Ology Bioservices, Inc., a contract manufacturing organization that we had engaged to provide services similar to those that were being provided by VGXI. On July 27, 2020, we filed an answer to VGXI's counterclaims, disputing the allegations and the claims raised in VGXI's filing. On October 1, 2020, we filed a notice of discontinuance of appeal with the Pennsylvania Superior Court. A trial date for the litigation has not been set.

We intend to aggressively prosecute the claims set forth in our complaint against VGXI and to vigorously defend ourselves against VGXI's counterclaims.

GeneOne Litigation

On December 7, 2020, GeneOne filed a complaint in the Court of Common Pleas of Montgomery County, Pennsylvania against us, alleging that we had breached the CELLECTRA Device License Agreement, or the Agreement, between us and GeneOne. We terminated the Agreement on October 9, 2020. The complaint asserts claims for breach of contract, declaratory judgment, unfair competition, and unjust enrichment. The complaint seeks injunctive relief, an accounting, damages, disgorgement of profits, attorneys' fees, interest, and other relief from us. On January 29, 2021, we filed preliminary objections to the complaint. On August 23, 2021, the Court overruled our preliminary objections to the complaint. On September 13, 2021, we filed an answer to the complaint, new matter, and counterclaims. The Company's counterclaims allege that GeneOne breached the Agreement, and assert claims for breach of contract and declaratory judgment. The counterclaims seek damages, interest, expenses, attorney's fees, and costs. On October 18, 2021, GeneOne filed its answer to our counterclaims and new matter. On November 8, 2021, we filed our answer to GeneOne's new matter. A trial date for this litigation has not been set.

We intend to aggressively prosecute the claims set forth in our counterclaims against GeneOne and to vigorously defend ourselves against the claims in GeneOne's complaint.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

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

Market Information

Our common stock, par value $0.001 per share, began trading on the Nasdaq Global Select Market on September 15, 2014 under the symbol "INO," having previously traded on the NYSE MKT exchange.

As of February 24, 2023, we had approximately 100 common stockholders of record. The actual number of stockholders is greater than this number of record holders and includes stockholders who are beneficial owners but whose shares are held in street name by brokers and other nominees. This number of holders of record also does not include stockholders whose shares may be held in trust by other entities.

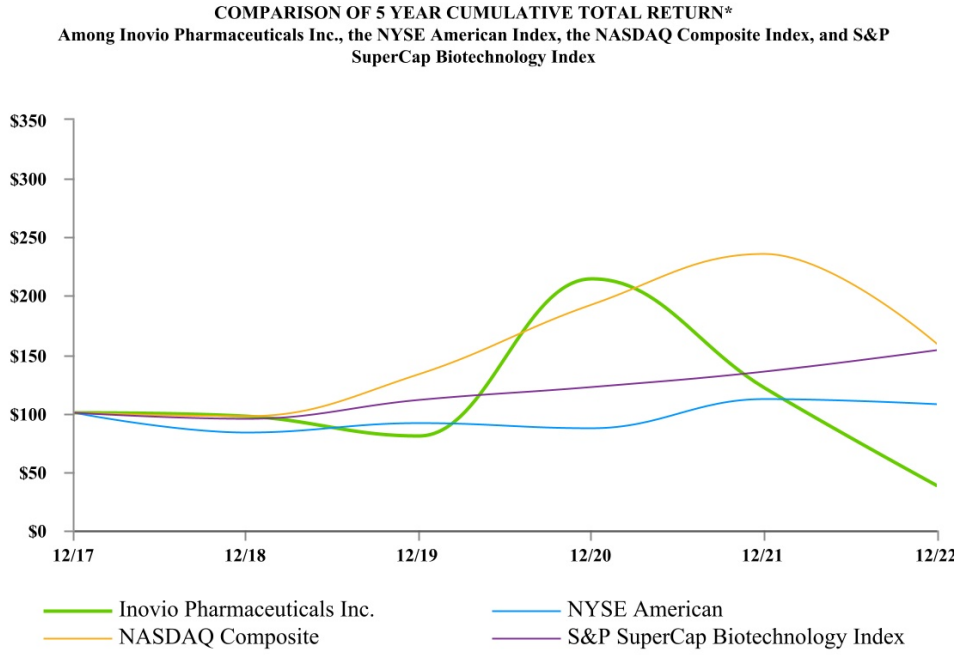
The closing price per share of our common stock on February 24, 2023 was $1.28, as reported on the Nasdaq Global Select Market.

Dividends

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

Performance Graph

The graph below compares the performance of our common stock with the performance of the NYSE American Index, the S&P SuperCap Biotechnology index and the Nasdaq Composite Index for the five years ended December 31, 2022. The graph assumes a $100 investment on December 31, 2017 in our common stock and in each index, with the reinvestment of all dividends, if any.



*$100 invested on 12/31/17 in stock or index, including reinvestment of dividends.
Fiscal year ended December 31.

	12/17	12/18	12/19	12/20	12/21	12/22
Inovio Pharmaceuticals, Inc.	100.00	96.85	79.90	214.29	120.82	37.77
NYSE American	100.00	82.80	91.24	86.80	111.40	107.09
Nasdaq Composite	100.00	97.16	132.81	192.47	235.15	158.65
S&P SuperCap Biotechnology Index	100.00	94.71	110.80	121.76	134.95	153.42

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

Recent Sales of Unregistered Securities

None.

Purchases of Equity Securities by the Issuer and Affiliated Parties

None.

ITEM 6. RESERVED

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

This report contains forward-looking statements, as defined in Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. 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 based on our current expectations and projections, 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 the studies or trials may not be successful or achieve desired results, that preclinical studies and clinical trials may not commence, have sufficient enrollment or be completed in the time periods anticipated, 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 proprietary smart device technology and DNA medicine candidates may fail to show the desired safety and efficacy traits in clinical trials; the availability of funding; the ability to manufacture our DNA medicine 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; our ability to receive development, regulatory and commercialization event-based payments under our collaborative agreements; 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 laws and proposals.

Overview

We are a biotechnology company focused on developing and commercializing DNA medicines to help treat and protect people from diseases associated with HPV, cancer, and infectious diseases. Our goal is to advance our diverse pipeline of product candidates and deliver on the promise of DNA medicines technology in treating and preventing a wide array of diseases.

In clinical trials, our DNA medicine candidates have shown the ability to generate immune responses, especially $CD4^+$, $CD8^+$, and memory T-cell responses against targeted pathogens and cancers, via our precisely designed plasmids. These plasmids are delivered into cells using our investigational proprietary smart device, CELLECTRA.

Many of our lead candidates are focused on diseases associated with HPV. In 2022, we announced data from a Phase 1/2 clinical trial with INO-3107 for the treatment of HPV-6 and HPV-11 associated RRP. In this trial, treatment with INO-3107 resulted in a statistically significant reduction of the median number of surgeries, a result that reinforces our belief that DNA medicines may play a key role in the treatment of HPV-related diseases.

Our partners and collaborators include Advaccine Biopharmaceuticals Suzhou Co, ApolloBio Corporation, AstraZeneca, The Bill & Melinda Gates Foundation (Gates), Coalition for Epidemic Preparedness Innovations (CEPI), Defense Advanced Research Projects Agency (DARPA), The U.S. Department of Defense (DoD), HIV Vaccines Trial Network, International Vaccine Institute (IVI), Kaneka Eurogentec, National Cancer Institute (NCI), National Institutes of Health (NIH), National Institute of Allergy and Infectious Diseases (NIAID), the Parker Institute for Cancer Immunotherapy, Plumbline Life Sciences, Regeneron Pharmaceuticals, Richter-Helm BioLogics, Thermo Fisher Scientific, the University of Pennsylvania, the Walter Reed Army Institute of Research, and The Wistar Institute.

We or our collaborators are currently evaluating the feasibility of, or conducting or planning clinical studies of, our DNA medicines for Ebola HPV-related precancers, including cervical, vulvar, and anal dysplasia; HPV-related cancers, including head & neck, cervical, anal, penile, vulvar, and vaginal; other HPV-related disorders, such as RRP; and GBM.

All of our DNA medicine candidates are in the research and development phase. We have not generated any revenues from the sale of any products, and we do not expect to generate any such revenues for at least the next several years. We earn revenue from license fees and milestone revenue and collaborative research and development agreements and contracts. Our DNA medicine candidates will require significant additional research and development efforts, including extensive preclinical and clinical testing. All DNA medicine 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.

As of December 31, 2022, we had an accumulated deficit of $1.5 billion. 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.

VGX-3100 Update

REVEAL2 is our second Phase 3 trial with VGX-3100. In April 2022, the trial protocol was amended to utilize a biomarker-selected population as the primary population, based on prior analysis of REVEAL1 results suggesting that this investigational biomarker had the potential to identify women more likely to respond to treatment with VGX-3100. We announced that this trial would no longer be considered to be a pivotal trial and would not lead to a BLA filing for a biomarker-selected population, as the FDA advised us that the biomarker-positive population would not be sufficient to support approval of a potential marketing application for VGX-3100. The FDA recommended using REVEAL2 as an exploratory trial and that conducting one or two additional well-controlled trials in the biomarker-selected population would be more likely to provide evidence to support approval of a marketing application.

Trial participants in REVEAL2 included 203 women, 18 years of age or older, who had histologically-confirmed cervical HSIL associated with HPV-16 and/or HPV-18, but who were otherwise healthy. Participants received either VGX-3100 or placebo at 0, 4 and 12 weeks (randomized 2:1). The primary endpoint, as amended, was the percentage of biomarker-selected participants with regression of cervical HSIL and virologic clearance of HPV-16 and/or HPV-18 in the cervix. A secondary endpoint was the percentage of all participants with regression and virologic clearance.

In March 2023, we announced data from our REVEAL2 trial. Statistical significance was not achieved in the investigational biomarker-selected population for the endpoint of lesion regression and viral clearance. However, statistical significance was achieved in the all-participants population for the endpoint of lesion regression and viral clearance.

The percentage of participants in the investigational biomarker-selected population meeting the primary endpoint was 28.6% (6/21) in the treatment group, versus 0% (0/4) in the placebo group (p=0.115; difference in percentage 28.6, 95%CI: -24.6, 50.4), which was not statistically significant.

The result of the all-participants population of 203 participants (134 participants in the treatment group, 69 in the placebo group) was statistically significant, with 27.6% (37/134) of the participants meeting the endpoint in the treatment group, versus 8.7% (6/69) in the placebo group (p=0.001; difference in percentage 18.9, 95%CI: 7.8, 28.6).

In particular, in the all-participants population of REVEAL2, viral clearance was observed in 37.3% (50/134) in the treatment group versus 8.7% (6/69) in the placebo group. Given the importance of viral clearance in removing the underlying cause of the HPV-related diseases, this data may have positive implications in our other HPV-related programs.

An ad-hoc integrated efficacy analysis of the results for both REVEAL1 and REVEAL2 achieved statistical significance in the biomarker-selected and all-participants populations for lesion regression and viral clearance. For the combined biomarker-selected population of 92 participants (68 participants in the treatment group, 24 in the placebo group), the percentage of participants meeting the primary endpoint was 54.4% (37/68 in the treatment group, versus 12.5% (3/24) in the placebo group (p=<0.001; difference in percentage 41.9, 95%CI: 20.4, 57.0). For the combined all-participants population of 404 participants (272 participants in the treatment group, 132 in the placebo group), the percentage of participants meeting the primary endpoint was 25.0% (68/272 in the treatment group, versus 9.8% (13/132) in the placebo group (p=<0.001; difference in percentage 15.2, 95%CI: 7.4, 22.1).

In both REVEAL1 and REVEAL2, VGX-3100 was well-tolerated. There were no treatment-related serious adverse events and most adverse events were considered to be mild to moderate.

This combined data set will be used as supportive data in future regulatory interactions involving VGX-3100. We will continue to evaluate the results to determine next steps for VGX-3100 in our HPV programs. We plan to submit the data for publication in a peer-reviewed journal later this year.

INO-4800 Update

On October 27, 2022, we announced that we have discontinued our internally funded efforts to develop INO-4800 as a COVID-19 heterologous booster vaccine. The decision was based on our assessment of the current global demand for COVID-19 vaccines, changes in regulatory timelines and requirements, diminishing government financial support, and the overall growing uncertainty related to opportunities for heterologous booster vaccines.

INO-4800 continues to be evaluated as part of the World Health Organization's Solidarity Trial Vaccines and we continue preclinical development of a potential pan-COVID-19 vaccine candidate. In addition, our clinical collaborator Advaccine is continuing to develop INO-4800 as a potential COVID-19 heterologous booster vaccine in Greater China using its own resources.

Reductions in Force

On January 31, 2023, we committed to and communicated a corporate reorganization plan, including a reduction in force, or the Reduction. The purpose of the Reduction was to decrease expenses and maintain a streamlined organization to support key clinical programs that are expected to drive long-term growth. As part of the Reduction, we reduced overall headcount by approximately 24 employees, which represented 11% of our full-time employees. Along with other planned cost-saving measures, the Reduction is expected to provide annual savings of approximately $4.3 million. We expect to incur a one-time pre-tax charge of approximately $1.1 million in the first quarter of 2023 related to the Reduction, consisting primarily of one-time severance payments upon termination, continued benefits for a specific period of time, and outplacement services.

In the third quarter of 2022, we undertook a separate reorganization and reduced overall headcount by approximately 55 employees, which represented 18% of our full-time employees. We also terminated agreements with approximately 86% of our contractors. We incurred a one-time pre-tax charge of $1.6 million in the third quarter of 2022 related to these actions, consisting primarily of one-time severance payments upon termination, continued benefits and outplacement services.

Securities Class Action Settlement

In January 2023, the United States District Court for the Eastern District of Pennsylvania, or the Court, entered an order, or the Order, granting final approval for the settlement of the class action securities litigation described in this report under "Legal Proceedings." The settlement includes $30.0 million in cash and $14.0 million in shares of our common stock to settle all outstanding claims. Our insurance carriers have paid the cash component of the settlement and we will therefore not incur any material cash expenses associated with the litigation, other than legal fees and related expenses, which were approximately $11.0 million through December 31, 2022.

In February 2023, pursuant to the securities class action settlement, we issued 7,000,000 shares of common stock. Following the expiration of the appeal period or resolution of an appeal if one is filed, we will make another contribution of common stock to the settlement fund with a value of approximately $2.1 million.

Critical Accounting Policies and Estimates

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. Our significant accounting policies are outlined in Note 2 to the consolidated financial statements included in this report.

The preparation of these consolidated 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. We believe the following accounting policies to be critical to the judgments and estimates used in the preparation of our consolidated financial statements:

Collaboration Agreements and Revenue Recognition

We assess whether our collaboration agreements are subject to Accounting Standards Codification ("ASC") Topic 808: Collaborative Arrangements ("Topic 808") based on whether they involve joint operating activities and whether both parties have active participation in the arrangement and are exposed to significant risks and rewards. To the extent that the arrangement falls within the scope of Topic 808 and we conclude that our collaboration partner is not a customer, we present such payments as a reduction of research and development expense. If payments from our collaboration partner to us represent consideration from a customer, then we account for those payments within the scope of Accounting Standards Update ("ASU") 2014-09, Revenue from Contracts with Customers ("Topic 606").

We enter into collaborative arrangements with partners that typically include payment of one or more of the following: (i) license fees; (ii) product supply services; (iii) milestone payments related to the achievement of developmental, regulatory, or

commercial goals; and (iv) royalties on net sales of licensed products. At contract inception, we assess the goods or services agreed upon within each contract and assess whether each good or service is distinct and determine those that are performance obligations. We then recognize as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) the performance obligation is satisfied.

As part of the accounting for these arrangements, we must develop estimates and assumptions that require judgment of management to determine the underlying stand-alone selling price for each performance obligation which determines how the transaction price is allocated among the performance obligation. The standalone selling price may include items such as forecasted revenues, development timelines, discount rates and probabilities of technical and regulatory success. We evaluate each performance obligation to determine if it can be satisfied at a point in time or over time. In addition, variable consideration must be evaluated to determine if it is constrained and, therefore, excluded from the transaction price. Differences in the allocation of the transaction price between delivered and undelivered performance obligations can impact the timing of revenue recognition but do not change the total revenue recognized under any agreement.

For collaboration arrangements that include license fees, we recognize revenues from non-refundable, upfront fees allocated to the license when the license is transferred to the licensee and the licensee is able to use and benefit from the license. For licenses that are bundled with other promises, we utilize judgment to assess the nature of the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress for purposes of recognizing revenue. We evaluate the measure of progress each reporting period and, if necessary, adjust the measure of performance and related revenue recognition.

For collaboration arrangements that include milestone payments (variable consideration), we evaluate whether the milestones are considered probable of being reached and estimate the amount to be included in the transaction price using the most likely amount method. If it is probable that a significant revenue reversal would not occur, the associated milestone value is included in the transaction price. This assessment is based on our past experience with our collaboration partner, market insight and partner communication. Milestone payments that are not within our or our collaboration partner's control, such as regulatory approvals, are generally not considered probable of being achieved until those approvals are received. At the end of each subsequent reporting period, we re-evaluate the probability of achieving such milestones and any related constraint, and if necessary, adjust our estimate of the overall transaction price. Any such adjustments are recorded on a cumulative catch-up basis, which would affect license, collaboration or other revenues and earnings in the period of adjustment and could be material.

For collaboration arrangements that include sales-based royalties, including milestone payments based on the level of sales, and for which the license is deemed to be the predominant item to which the royalties relate, we recognize revenue in the period the underlying sales occur. To date, we have not recognized any royalty revenue resulting from any of our collaborative arrangements.

Research and Development Expenses - Clinical Trial Accruals

Our activities have largely consisted of research and development efforts related to developing proprietary smart device technologies, DNA medicine candidates and dMABs. For clinical trial expenses, judgments used in estimating accruals rely on estimates of total costs incurred based on participant enrollment, completion of studies and other events. Accrued clinical trial costs are subject to revisions as trials progress. Revisions are charged to expense in the period in which the facts that give rise to the revision become known. Historically, revisions have not resulted in material changes to research and development expense; however a modification in the protocol of a clinical trial or cancellation of a trial could result in a charge to our results of operations.

Recent Accounting Pronouncements

Information regarding recent accounting pronouncements is contained in Note 2 to the consolidated financial statements, included elsewhere in this report.

Results of Operations

The consolidated financial data for the years ended December 31, 2022, 2021 and 2020 is presented in the following table and the results of these periods are used in the discussion thereafter.

	Year Ended December 31,			Increase/(Decrease) 2022 vs. 2021		Increase/(Decrease) 2021 vs. 2020	
	2022	2021	2020	$	%	$	%
Revenue from collaborative arrangements and other contracts, including affiliated entity	$ 10,262,268	$ 1,774,758	$ 7,411,220	$ 8,487,510	478 %	$ (5,636,462)	(76)%
Operating expenses:							
Research and development	187,650,503	249,240,324	94,245,436	(61,589,821)	(25)	154,994,888	164
General and administrative	90,185,285	53,752,353	37,247,828	36,432,932	68	16,504,525	44
Total operating expenses	277,835,788	302,992,677	131,493,264	(25,156,889)	(8)	171,499,413	130
Loss from operations	(267,573,520)	(301,217,919)	(124,082,044)	33,644,399	11	(177,135,875)	(143)
Interest income	4,782,030	3,363,080	3,311,846	1,418,950	42	51,234	2
Interest expense	(1,253,952)	(1,936,447)	(8,702,450)	682,495	(35)	6,766,003	(78)
Change in fair value of derivative liability	—	—	(75,670,977)	—	*	75,670,977	*
(Loss) gain on investment in affiliated entity	(1,899,654)	(553,570)	36,556,658	(1,346,084)	*	(37,110,228)	*
Net unrealized (loss) gain on available-for-sale equity securities	(7,846,172)	(3,222,838)	1,695,497	(4,623,334)	*	(4,918,335)	*
Other (expense) income, net	(3,861,584)	343,371	(704,896)	(4,204,955)	*	1,048,267	*
Gain on deconsolidation of Geneos	—	—	4,121,075	—	*	(4,121,075)	*
Loss on extinguishment of convertible bonds	—	—	(8,177,043)	—	*	8,177,043	*
Gain on extinguishment of convertible senior notes	—	—	8,762,030	—	*	(8,762,030)	*
Net loss before share in net loss of Geneos	(277,652,852)	(303,224,323)	(162,890,304)	25,571,471	8	(140,334,019)	(86)
Share in net loss of Geneos	(2,165,213)	(434,387)	(4,584,610)	(1,730,826)	*	4,150,223	*
Net loss	(279,818,065)	(303,658,710)	(167,474,914)	23,840,645	(8)	(136,183,796)	81
Net loss attributable to non-controlling interest	—	—	1,063,757	—	*	(1,063,757)	(100)
Net loss attributed to Inovio Pharmaceuticals, Inc.	$ (279,818,065)	$ (303,658,710)	$ (166,411,157)	$ 23,840,645	8 %	$ (137,247,553)	(82)%

*Not meaningful

Comparison of Years Ended December 31, 2022 and 2021

Revenue

Revenue was primarily derived under collaborative arrangements and contracts, including arrangements with affiliated entities, for the years ended December 31, 2022 and 2021. The $8.5 million increase in revenue was primarily due to higher revenue earned from our Procurement Contract with the DoD.

Research and Development Expenses

Research and development expenses consist of expenses incurred in performing research and development activities, including compensation and benefits for full-time research and development employees, facilities expenses, overhead expenses, cost of laboratory supplies, clinical trial and related clinical manufacturing expenses, fees paid to contract research organizations and other consultants, and outside expenses. We utilize a labor reporting system to record employee compensation on a project-by-project basis. Unallocated research and development expenses include engineering and device-related expenses that are not allocable to a specific project, as well as stock-based compensation, other employee-related expenses that are not related to a specific project, and facilities and depreciation expenses.

Research and development costs are expensed as incurred. Non-refundable advance payments for goods or services to be received in the future for use in research and development activities are deferred and capitalized. The capitalized amounts are expensed as the related goods are delivered or the services are performed.

The following tables summarize our research and development expense by product candidate for the years ended December 31, 2022 and 2021:

(dollars in thousands)	Years Ended December 31, 2022	2021	Increase (Decrease) $	%
INO-4800 and other Covid-19	$ 93,464	$ 109,587	$ (16,123)	(15)%
VGX-3100	15,989	30,873	(14,884)	(48)
INO-3107	8,133	9,109	(976)	(11)
INO-5401 and other Immuno-oncology	2,775	2,404	371	15
Other research and development programs	6,227	4,442	1,785	40
Engineering and device-related	25,187	47,889	(22,702)	(47)
Stock-based compensation	9,059	13,378	(4,319)	(32)
Other unallocated expenses	26,817	31,558	(4,741)	(15)
Research and development expense	$ 187,651	$ 249,240	$ (61,589)	(25)%

The $61.6 million overall decrease in research and development expenses year over year was primarily the result of:

- $45.9 million in lower drug manufacturing and outside services related to INO-4800;
- $21.9 million of costs related to the acquisition and installation of manufacturing equipment for INO-4800 during 2021 that did not recur in 2022;
- $15.6 million in lower engineering services and expensed equipment related to our CELLECTRA 3PSP device and array automation project;
- $11.8 million in lower clinical study, outside services and immunology expenses related to VGX-3100;
- $4.9 million in lower expensed inventory related to the CELLECTRA 2000 device; and
- $4.6 million in lower employee stock-based compensation primarily from lower weighted average grant date fair values for the awards granted during 2022.

These decreases were partially offset by:

- $29.2 million of lower contra-research and development expense recorded from grant agreements; and
- $14.4 million of increased drug manufacturing costs related to our COVID-19 variant studies and DARPA COVID-19 dMAb grant.

Contributions received from current grant agreements and recorded as contra-research and development expense were $24.5 million and $53.7 million for the years ended December 31, 2022 and 2021, respectively. The decrease year over year was primarily due to decreases of $21.0 million, $5.8 million, $3.3 million and $3.2 million earned under the DoD 3PSP device development grant, CEPI grants related to INO-4800 and device development activities, reimbursements from Advaccine and the CEPI Lassa and MERS grant, respectively. These decreases were offset by an increase of $5.3 million, earned primarily under the sub-grant through Wistar for DARPA COVID-19 dMAb.

General and Administrative Expenses

General and administrative expenses, which include business development expenses, the amortization of intangible assets and patent expenses, were $90.2 million for the year ended December 31, 2022 as compared to $53.8 million in 2021. The $36.4 overall increase year over year was primarily the result of:

- $44.0 million related to the class action securities litigation settlement, which was reduced by $30.0 million of insurance recoveries, resulting in a net $14.0 million expense, which is the value of our common stock to be issued in connection with the settlement;
- $14.3 million in higher legal expenses, primarily related to litigation matters;
- $6.9 million in severance expenses related to the separation of our former President and Chief Executive Officer in May 2022, including $4.2 million of stock-based compensation expense related to equity award modifications (see Note 10 to our consolidated financial statements included in this report for additional information); and
- $1.6 million in overall higher employee compensation.

Employee stock-based compensation cost is measured at the grant date, based on the fair value of the award, and is recognized as expense over the employee's requisite service period. Total employee stock-based compensation cost for the

years ended December 31, 2022 and 2021 was $22.2 million and $25.0 million, of which $8.8 million and $13.4 million was included in research and development expenses and $13.4 million and $11.6 million was included in general and administrative expenses, respectively.

Interest Income

The $1.4 million increase in interest income for the year ended December 31, 2022 as compared to 2021 was primarily due to higher interest rates.

Interest Expense

The $682,000 decrease in interest expense for the year ended December 31, 2022 as compared to 2021 was primarily due to lower non-cash interest expense related to the $78.5 million aggregate principal amount of our 6.50% convertible senior notes due 2024 as a result of the adoption of ASU-2020-06, and no interest expense recorded on the convertible promissory notes issued in December 2019 due to their full conversion into shares of our common stock in March 2021.

Loss on Investment in Affiliated Entity

The loss on investment in affiliated entity resulted from the declines in the fair market value of our investment in PLS of $1.9 million and $554,000 for the years ended December 31, 2022 and 2021, respectively. We record our investment in PLS at its market value based on the closing price of the shares on the Korea New Exchange Market at each balance sheet date, with changes in fair value reflected in the consolidated statements of operations.

Net Unrealized Loss on Available-for-Sale Equity Securities

The net unrealized loss on available-for-sale equity securities for the years ended December 31, 2022 and 2021 was $7.8 million and $3.2 million, respectively, which resulted from a change in the fair market value of the investments.

Share in Net Loss of Geneos

The share in net loss of Geneos represents our share of Geneos' losses during the period after deconsolidation in June 2020.

Income Taxes

Since inception, we have incurred operating losses and accordingly have not recorded a provision for U.S. income taxes for any of the periods presented. Utilization of net operating losses and tax credits are subject to a substantial annual limitation due to ownership change limitations provided by the Internal Revenue Code of 1986, as amended, or IRC. As of December 31, 2022, we had net operating loss carry forwards for U.S. federal, California and Pennsylvania income tax purposes of $920.6 million, $210.3 million and $89.6 million, respectively, net of the net operating losses that will expire due to IRC Section 382 limitations. We also had U.S. federal and state research and development tax credits of $40.5 million and $4.7 million, respectively, net of the federal research and development credits that will expire due to IRC Section 383 limitations. The net operating losses and credits began to expire during 2022.

Comparison of Years Ended December 31, 2021 and 2020

For a comparison of the years ended December 31, 2021 and 2020, you may refer to Part II, Item 7 of our Annual Report on Form 10-K for the year ended December 31, 2021 filed with the SEC on March 1, 2022.

Liquidity and Capital Resources

Historically, our primary uses of cash have been to finance research and development activities including clinical trial activities for the advancement of DNA medicine candidates. Since inception, we have satisfied our cash requirements principally from proceeds from the sale of equity securities, indebtedness and grants and government contracts.

Working Capital and Liquidity

As of December 31, 2022, we had cash and short-term investments of $253.0 million and working capital of $218.4 million, as compared to $401.3 million and $382.7 million as of December 31, 2021, respectively.

Cash Flows

Operating Activities

Net cash used in operating activities was $216.2 million and $215.7 million for the years ended December 31, 2022 and 2021, respectively. The variance was primarily due to the timing and changes in working capital balances, offset by decreased operating expenses.

Investing Activities

Net cash provided by (used in) investing activities was $109.6 million and $(175.3) million for the years ended December 31, 2022 and 2021, respectively. The variance was primarily the result of timing differences in short-term investment purchases, sales and maturities.

Financing Activities

Net cash provided by financing activities was $81.8 million and $211.5 million for the years ended December 31, 2022 and 2021, respectively. The variance was primarily due to the proceeds from the January 2021 underwritten public offering, partially offset by an increase in the proceeds from the sale of common stock under the Sales Agreement (defined below) in 2022 compared to 2021.

Issuances of Common Stock

On November 9, 2021, we entered into an ATM Equity Offering℠ Sales Agreement (the "Sales Agreement") with outside sales agents (collectively, the "Sales Agents") under which we may offer and sell, from time to time at our sole discretion, shares of our common stock with aggregate gross proceeds of up to $300.0 million, through the Sales Agents.

Subject to the terms and conditions of the Sales Agreement, the Sales Agents may sell the common stock by any method permitted by law deemed to be an "at the market offering". The Sales Agents will use commercially reasonable efforts to sell the common stock from time to time, based upon instructions from us, including any price, time or size limits or other customary parameters or conditions we may impose. We will pay the Sales Agents a commission of up to three percent (3.0%) of the gross sales proceeds of any common stock sold through the Sales Agents under the Sales Agreement, and we have provided the Sales Agents with certain indemnification rights. During the year ended December 31, 2022, we sold 34,445,743 shares of common stock under the Sales Agreement for aggregate net proceeds of $83.0 million. During the year ended December 31, 2021, we sold 6,955,341 shares of common stock under the Sales Agreement for aggregate net proceeds of $47.7 million.

During the year ended December 31, 2020, we sold 66,064,887 shares of common stock for aggregate net proceeds of $454.5 million under previous ATM sales agreements.

On January 25, 2021, we closed an underwritten public offering of 20,355,000 shares of our common stock at a public offering price of $8.50 per share. The net proceeds, after deducting the underwriters' discounts and commissions and other estimated offering expenses payable by us, were $162.1 million.

During the year ended December 31, 2022, stock options to purchase 118,694 shares of common stock were exercised for aggregate net proceeds of $283,000, which proceeds were offset by tax payments made related to net share settlement of RSU awards of $1.4 million. During the year ended December 31, 2021, stock options to purchase 1,310,263 shares of common stock were exercised for aggregate net proceeds of $6.7 million, which proceeds were offset by tax payments made related to net share settlement of RSU awards of $4.6 million. During the year ended December 31, 2020, stock options to purchase 2,178,252 shares of common stock were exercised for aggregate net proceeds of $12.3 million, which proceeds were offset by tax payments made related to net share settlement of RSU awards of $4.0 million.

Funding Requirements

As of December 31, 2022, we had an accumulated deficit of $1.5 billion 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. Our current cash resources, including amounts that we may be able to obtain through sales of common stock under our "at the market" equity facility, will not be sufficient to complete the clinical development of any of our product candidates, and we anticipate that additional financing will be required in order to commercialize and generate revenues from the sale of any product candidates that receive regulatory approval. If these activities are successful and if we receive approval from the FDA to market our DNA medicine candidates, then we will need to raise additional funding to market and sell the approved products and equipment. In addition to the potential issuance of equity or debt securities in order to raise capital, we are also evaluating potential collaborations as an additional way to fund our operations. We believe that our current cash and short-term investments are sufficient to meet our planned working capital requirements for at least the next twelve months from the date of this report.

As described above, in January 2023 and July 2022, we undertook corporate reorganization plans to decrease our expenses, extend our cash runway, and maintain a streamlined organization to support key clinical programs that we expect to drive our long-term growth. Also, in October 2022, we announced that we have discontinued our internally funded efforts to develop INO-4800 as a COVID-19 heterologous booster vaccine. We expect these actions to reduce our operating expenses incrementally and extend our cash runway into the first quarter of 2025, without giving effect to any further capital raising activities, whether under the Sales Agreement or otherwise.

Contractual Obligations

As of December 31, 2022, future minimum payments due under our contractual obligations are set forth in the table below. We expect to be able to satisfy these obligations, both in the short-term and in the longer-term, with cash on hand and proceeds from sales of our common stock under the Sales Agreement.

	Payments Due by Period				
	Total	Less than 1 year	1 – 3 years	3 – 5 years	More than 5 years
Convertible senior notes (1)	$ 18,015,000	$ 1,067,000	$ 16,948,000	$ —	$ —
Operating lease obligations (2)	$ 20,090,000	$ 4,089,000	$ 6,113,000	$ 5,665,000	$ 4,223,000
Manufacturing commitments (3)	$ 11,515,000	$ 11,515,000	$ —	$ —	$ —

(1) Amounts represent remaining contractual amounts due under our Notes, including interest based on the fixed rate of 6.5% per year. Although these Notes mature in March 2024, they may be converted into shares of our common stock prior to maturity if certain conditions are met. We may also redeem the Notes prior to their maturity if certain conditions are met. Any redemption prior to maturity would result in repayments of the principal amounts sooner than the scheduled repayments as indicated in the table. See Note 9, Convertible Debt, to the consolidated financial statements in this report for additional information.

(2) We have entered into operating leases for our facilities, which expire from 2023 to 2029, and operating leases for office equipment, which expire in 2024. In the fourth quarter of 2019, we entered into two subleases for a portion of our Plymouth Meeting corporate headquarters facility with one period through March 31, 2025 and the other month-to-month after December 31, 2022. As of December 31, 2022, we expect to receive aggregate future minimum lease payments totaling $434,000 (non-discounted) over the duration of the sublease agreements, which expected payments are not included in the table above.

(3) Remaining purchase obligations from supply agreements with contract manufacturers.

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. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Interest Rate Risk

Our primary exposure to market risk is interest rate sensitivity, which is affected by changes in the general level of U.S. interest rates. 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 short-term investment-grade securities. During the year ended December 31, 2022, there was a pronounced increase in prevailing interest rates in the United States, which contributed to a loss of $7.8 million in the market value of our investment portfolio during the period.

The interest rate on our indebtedness is fixed and not subject to fluctuations in interest rates.

Foreign Currency Risk

We have operated primarily in the United States and most transactions during the year ended December 31, 2022 were made in United States dollars. Accordingly, we have not had any material exposure to foreign currency rate fluctuations, with the exception of certain cash and cash equivalents held in South Korea that are denominated in South Korean Won and the valuation of our equity investment in PLS, which is denominated in South Korean Won and then translated into United States dollars.

Certain transactions are denominated primarily in foreign currencies, including South Korean Won, Euros, British Pounds and Canadian Dollars. These transactions give rise to monetary assets and liabilities that are denominated in currencies other than the U.S. dollar. The value of these monetary assets and liabilities are subject to changes in currency exchange rates from the time the transactions are originated until settlement in cash. As a result, our financial results could be affected by factors such as changes in foreign currency exchange rates or weak economic conditions in foreign markets where we conduct business.

We do not use derivative financial instruments for speculative purposes and do not engage in exchange rate hedging or hold or issue foreign exchange contracts for trading purposes.

Inflation Risk

Inflation generally affects us by increasing our cost of labor. Although inflation has increased generally in the United States in recent months, we do not believe that inflation has had a material effect on our business, financial condition or results of operations during the year ended December 31, 2022.

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

We maintain disclosure controls and procedures, which are designed to ensure that information required to be disclosed in the reports we file or submit under the Securities Exchange Act of 1934, as amended, is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms, and that such information is accumulated and communicated to our management, including our Chief Executive Officer, or CEO, and Chief Financial Officer, or CFO, as appropriate to allow timely decisions regarding required disclosures.

In designing and evaluating our disclosure controls and procedures, management recognizes that disclosure controls and procedures, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the disclosure controls and procedures are met. Additionally, in designing disclosure controls and procedures, our management necessarily was required to apply its judgment in evaluating the cost-benefit relationship of possible disclosure controls and procedures. The design of any system of controls also is based in part upon certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions; over time, controls may become inadequate because of changes in conditions, or the degree of compliance with policies or procedures may deteriorate. Because of the inherent limitations in a control system, misstatements due to error or fraud may occur and not be detected.

Based on an evaluation carried out as of the end of the period covered by this Annual Report, under the supervision and with the participation of our management, including our CEO and CFO, our CEO and CFO have concluded that, as of the end of such period, our disclosure controls and procedures (as defined in Rule 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934) were effective as of December 31, 2022 at the reasonable assurance level.

Internal Control Over Financial Reporting

Management's Report on Internal Control Over Financial Reporting and Attestation Report of Registered Public Accounting Firm

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, 2022, 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, 2022.

This Annual Report does not include an attestation report of our registered public accounting firm regarding the effectiveness of internal control over financial reporting as required by Section 404(b) of the Sarbanes-Oxley Act of 2002. Management's report was not subject to attestation by our registered public accounting firm pursuant to rules of the SEC that permit smaller reporting companies to provide only management's report in this Annual Report.

Changes in Internal Control over Financial Reporting

There have not been any changes in our internal control over financial reporting that occurred during the fourth quarter of our fiscal year ended December 31, 2022, that materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

ITEM 9B. OTHER INFORMATION

Not applicable.

ITEM 9C. DISCLOSURE REGARDING FOREIGN JURISDICTIONS THAT PREVENT INSPECTIONS

Not applicable.

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 2022 fiscal year, under the captions “Election of Directors” and “Executive Officers and Other Information.”

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 2022 fiscal year, under the captions “Compensation Discussion and Analysis,” “Executive Compensation,” “Compensation of Directors” and “Director Compensation Table.”

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 2022 fiscal year, under the captions “Security Ownership of Certain Beneficial Owners and Management” and “Equity Compensation Plan Information.”

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 2022 fiscal year, under the captions “Certain Relationships and Related Party Transactions” and “Election of Directors.”

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 2022 fiscal year, under the caption “Ratification of Appointment of Registered Public Accounting Firm.”

PART IV

ITEM 15. EXHIBITS, FINANCIAL STATEMENT SCHEDULES

1. Financial Statements

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

2. Financial Statement Schedules

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

3. Exhibits

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

Exhibit Number	Description of Document
3.1	Certificate of Incorporation with all amendments (incorporated by reference to Exhibit 3.1 of the registrant's Form S-3 registration statement, filed on July 23, 2014).
3.2	Amended and Restated Bylaws of Inovio Pharmaceuticals, Inc. dated August 10, 2011 (incorporated by reference to Exhibit 3.2 to the registrant's Form 8-K current report filed on August 12, 2011).
4.1	Indenture, dated as of February 19, 2019, by and between the registrant and U.S. Bank National Association, as trustee (incorporated by reference to Exhibit 4.1 to the registrant's current report on Form 8-K filed with the SEC on February 20, 2019).
4.2	Form of Note representing the registrant's 6.50% Convertible Senior Notes due 2024 (included as Exhibit A to the Indenture filed as Exhibit 4.1).
4.3	Description of the Registrant's Securities Registered Pursuant to Section 12 of the Securities Exchange Act of 1934, as amended (incorporated by reference to Exhibit 4.9 to the registrant's annual report on Form 10-K filed with the SEC on March 12, 2020).
10.1†	R&D Alliance Agreement dated December 19, 2005 by and between Ganial Immunotherapeutics, Inc. and VGX Pharmaceuticals, Inc., as amended by Novation and Amendment Agreement by and between VGX Pharmaceuticals, Inc., Ganial Immunotherapeutics, Inc., and Onconox (incorporated by reference to Exhibit 10.31 as filed with the registrant's Registration Statement on Form S-4 (File No. 333-156035) on April 27, 2009).
10.2†	R&D Collaboration and License Agreement dated December 18, 2006 by and between VGX International, Inc. and VGX Pharmaceuticals, Inc., as amended by First Amendment dated October 31, 2007 and as amended by Second Amendment dated August 4, 2008 (incorporated by reference to Exhibit 10.39 as filed with the registrant's Registration Statement on Form S-4 (File No. 333-156035) on April 27, 2009).
10.3†	Patent License Agreement dated April 27, 2007 by and between The Trustees of the University of Pennsylvania and VGX Pharmaceuticals, Inc., as amended by First Amendment dated June 12, 2008 (incorporated by reference to Exhibit 10.50 as filed with the registrant's Registration Statement on Form S-4 (File No. 333-156035) on April 27, 2009).
10.4†	License Agreement dated May 9, 2007 by and between Baylor University and VGX Pharmaceuticals, Inc. (incorporated by reference to Exhibit 10.34 as filed with the registrant's registration statement on Form S-4 (File No. 333-156035) on April 27, 2009).
10.5	ATM Equity Offering℠ Sales Agreement dated November 9, 2021 by and among Inovio Pharmaceuticals, Inc., BofA Securities, Inc., RBC Capital Markets, LLC and Oppenheimer & Co. Inc. (incorporated by reference to Exhibit 10.1 as filed with the registrants Form 10-Q quarterly report for the quarter ended September 30, 2021 filed on November 9, 2021).
10.6†	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).

10.7†	Collaborative Development and License Agreement dated October 7, 2011 between VGX International, Inc. and Inovio Pharmaceuticals, Inc., as amended by First Amendment dated August 21, 2013, and Second Amendment dated October 7, 2013 (incorporated by reference to Exhibit 10.1 as filed with the registrant's Form 10-Q quarterly report for the quarter ended September 30, 2011 filed on November 7, 2011).
10.8	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).
10.9	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).
10.10†	Amended and Restated License and Collaboration Agreement, dated December 29, 2017, by and between Inovio Pharmaceuticals, Inc. and Beijing Apollo Saturn Biological Technology Limited (incorporated by reference to Exhibit 10.12 as filed with the registrant's Form 10-K annual report for the year ended December 31, 2017 filed on March 14, 2018).
10.11††	Amended and Restated Collaboration and License Agreement dated June 7, 2021 between Inovio Pharmaceuticals, Inc. and Advaccine Biopharmaceuticals Suzhou Co., Ltd. (incorporated by reference to Exhibit 10.1 as filed with the registrants Form 10-Q quarterly report for the quarter ended June 30, 2021 filed on August 9, 2021).
10.12	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).
10.13	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).
10.14	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).
10.15	Sublease dated June 21, 2017 between Accolade, Inc. and Inovio Pharmaceuticals, Inc. (incorporated by reference to Exhibit 10.2 as filed with the registrant's Form 10-Q quarterly report for the quarter ended June 30, 2017 filed on August 8, 2017).
10.16	Second Amendment to the Lease Agreement dated June 22, 2017 between Brandywine Operating Partnership, L.P. and Inovio Pharmaceuticals, Inc. (incorporated by reference to Exhibit 10.1 as filed with the registrant's Form 10-Q quarterly report for the quarter ended June 30, 2017 filed on August 8, 2017).
10.17+	Employment Agreement dated March 31, 2008 by and between J. Joseph Kim, Ph.D. and VGX Pharmaceuticals, Inc., as amended by First Amendment of Employment Agreement dated March 31, 2008 (incorporated by reference to Exhibit 10.43 as filed with the registrant's Registration Statement on Form S-4 (File No. 333-156035) on April 27, 2009).
10.18+	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).
10.19+	Separation Agreement, dated as of May 10, 2022, by and between the registrant and J. Joseph Kim (incorporated by reference to Exhibit 10.1 of the registrant's Form 10-Q quarterly report for the quarter ended June 30, 2022 filed on August 9, 2022).

10.20+	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).
10.21+	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).
10.22+	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).
10.23+	Employment Agreement dated March 8, 2019 between Inovio Pharmaceuticals, Inc. and Jacqueline E. Shea (incorporated by reference to Exhibit 10.26 of the registrant's Form 10-K annual report for the year ended December 31, 2019 filed on March 12, 2020).
10.24+	Employment Agreement dated as of March 4, 2019 between Inovio Pharmaceuticals, Inc. and Laurent M. Humeau (incorporated by reference to Exhibit 10.27 of the registrant's Form 10-K annual report for the year ended December 31, 2019 filed on March 12, 2020).
10.25+	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).
10.26+	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).
10.27+	Form of Incentive and Non-Qualified Stock Option Grants under the 2007 Omnibus Stock Incentive Plan (incorporated by reference to Exhibit 4.4 to the registrant's Registration Statement on Form S-8 filed on May 14, 2007).
10.28+	Inovio Pharmaceuticals, Inc. 2016 Omnibus Incentive Plan, as amended to date (incorporated by reference to Exhibit 10.1 to the registrant's Form 8-K filed on May 10, 2019).
10.29+	Form of Incentive Stock Option Agreement under 2016 Omnibus Incentive Plan (incorporated by reference to Exhibit 10.55 as filed with the registrant's Form 10-K annual report for the year ended December 31, 2016 filed on March 15, 2017.)
10.30+	Form of Nonqualified Stock Option Agreement under 2016 Omnibus Incentive Plan (incorporated by reference to Exhibit 10.56 as filed with the registrant's Form 10-K annual report for the year ended December 31, 2016 filed on March 15, 2017.)
10.31+	Form of Restricted Stock Unit Award Agreement under 2016 Omnibus Incentive Plan (incorporated by reference to Exhibit 10.54 as filed with the registrant's Form 10-K annual report for the year ended December 31, 2016 filed on March 15, 2017.)
10.32+	Inovio Pharmaceuticals, Inc. 2022 Inducement Plan (incorporated by reference to Exhibit 99.1 of the registrant's Form S-8 registration statement, filed on June 30, 2022).
10.33+	Form of Option Grant Package under 2022 Inducement Plan (incorporated by reference to Exhibit 99.2 of the registrant's Form S-8 registration statement, filed on June 30, 2022).
10.34+	Form of RSU Grant Package under 2022 Inducement Plan (incorporated by reference to Exhibit 99.3 of the registrant's Form S-8 registration statement, filed on June 30, 2022).
21.1	Subsidiaries of the registrant (filed herewith).
23.1	Consent of Independent Registered Public Accounting Firm (filed herewith).

24.1	Power of Attorney (included on signature page).
31.1	Certification of the Principal Executive Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002 (filed herewith).
31.2	Certification of the Principal Financial Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002 (filed herewith).
32.1^	Certification of the Principal Executive Officer and Principal Financial Officer pursuant to 18 U.S.C. 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002 (furnished herewith).
101.INS	XBRL Instance Document (the instance document does not appear in the Interactive Data File because its XBRL tags are embedded within the Inline XBRL 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.
104	Cover Page Interactive Data File (formatted as Inline XBRL and contained in Exhibit 101)

+ Designates management contract, compensatory plan or arrangement.

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

†† Certain confidential portions of this exhibit (indicated by asterisks) were omitted because the identified confidential portions are not material and are of the type that the registrant treats as private or confidential.

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

ITEM 16. FORM 10-K SUMMARY

Not applicable.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized on March 1, 2023.

Inovio Pharmaceuticals, Inc.

By: /s/ JACQUELINE E. SHEA
Jacqueline E. Shea
President, Chief Executive Officer and Director (On Behalf of the Registrant)

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints Jacqueline E. Shea 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/ JACQUELINE E. SHEA **Jacqueline E. Shea**	President, Chief Executive Officer and Director (Principal Executive Officer)	March 1, 2023
/s/ SIMON X. BENITO **Simon X. Benito**	Chairman of the Board of Directors	March 1, 2023
/s/ PETER KIES **Peter Kies**	Chief Financial Officer (Principal Accounting Officer and Principal Financial Officer)	March 1, 2023
/s/ ROGER D. DANSEY **Roger D. Dansey**	Director	March 1, 2023
/s/ ANN C. MILLER **Ann C. Miller**	Director	March 1, 2023
/s/ JAY SHEPARD **Jay Shepard**	Director	March 1, 2023
/s/ DAVID B. WEINER **David B. Weiner**	Director	March 1, 2023
/s/ WENDY L. YARNO **Wendy L. Yarno**	Director	March 1, 2023
/s/ LOTA S. ZOTH **Lota S. Zoth**	Director	March 1, 2023

INOVIO PHARMACEUTICALS, INC.

Index to Consolidated Financial Statements

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Shareholders and the Board of Directors of Inovio Pharmaceuticals, Inc.

Opinion on the Financial Statements

We have audited the consolidated balance sheets of Inovio Pharmaceuticals, Inc. (the "Company") as of December 31, 2022 and 2021, 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, 2022, and the related notes (collectively referred to as the "consolidated financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2022 and 2021, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2022, in conformity with U.S. generally accepted accounting principles.

Basis for Opinion

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

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

Critical Audit Matter

The critical audit matter communicated below is a matter arising from the current period audit of the financial statements that was communicated or required to be communicated to the audit committee and that: (1) relates to accounts or disclosures that are material to the financial statements and (2) involved our especially challenging, subjective or complex judgments. The communication of the critical audit matter does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing separate opinions on the critical audit matter or on the accounts or disclosures to which it relates.

	Accrual of Clinical Trial Expenses
Description of the Matter	During 2022, the Company incurred $187.7 million for research and development expenses and as of December 31, 2022 accrued $10.6 million for clinical study costs. A substantial portion of the Company's ongoing research and development activities are conducted by third-party service providers, including clinical research organizations ("CROs"). External costs to be paid to CROs are accrued and expensed based upon actual work completed in accordance with signed agreements. Auditing management's accounting for accrued clinical study costs is especially challenging because the evaluation is dependent upon a high-volume of data and input exchanged between clinical personnel and third-party service providers, such as the number of sites activated, the number of patients enrolled, and the number of patient visits, which is tracked in spreadsheets and other end user computing programs.
How We Addressed the Matter in our Audit	We obtained an understanding of the accounting for accrued clinical trial expenses including management's process for measuring estimated accrued clinical study costs such as patient enrollment and total cost incurred to date from third-parties. To test the completeness of the Company's accrued clinical trial expenses, we obtained from third-parties confirmation of patient enrollment and direct service cost to date for significant clinical trials. We attended internal clinical trial and project status meetings with accounting personnel and the clinical project manager to understand the status of significant clinical trial activities. To assess the appropriate measurement of accrued clinical trial expenses, we inspected key terms, timelines of completion, activities and costs for a sample of vendor contracts, including amendments, and compared these to management's analyses used in tracking the progress of service agreements. We also tested a sample of subsequent payments by agreeing the invoice to the original accrual and the invoice payments to bank statements.

/s/ Ernst & Young LLP
We have served as the Company's auditor since 2002.

San Diego, California
March 1, 2023

Inovio Pharmaceuticals, Inc.

CONSOLIDATED BALANCE SHEETS

	December 31,	
	2022	**2021**
ASSETS		
Current assets:		
Cash and cash equivalents	$ 46,329,359	$ 71,143,778
Short-term investments	206,669,397	330,170,940
Accounts receivable	1,701,726	5,466,850
Accounts receivable from affiliated entities	10,036,490	2,565,194
Prepaid expenses and other current assets	50,130,481	38,836,991
Prepaid expenses and other current assets from affiliated entities	375,227	261,192
Total current assets	315,242,680	448,444,945
Fixed assets, net	7,727,997	17,453,206
Investments in affiliated entity	2,007,142	3,906,796
Intangible assets, net	2,129,861	2,626,355
Goodwill	10,513,371	10,513,371
Operating lease right-of-use assets	10,228,207	11,571,026
Other assets	684,044	1,425,794
Total assets	$ 348,533,302	$ 495,941,493
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable and accrued expenses	$ 79,686,885	$ 47,644,530
Accounts payable and accrued expenses due to affiliated entities	1,220,439	548,032
Accrued clinical trial expenses	10,594,073	10,326,266
Deferred revenue	—	21,628
Operating lease liability	2,803,973	2,603,956
Grant funding liability	2,475,031	4,559,721
Grant funding liability from affiliated entities	87,673	37,500
Total current liabilities	96,868,074	65,741,633
Deferred revenue, net of current portion	—	64,361
Convertible senior notes	16,614,840	14,959,647
Operating lease liability, net of current portion	12,655,586	15,459,559
Deferred tax liabilities	32,046	32,046
Other liabilities	—	14,826
Total liabilities	126,170,546	96,272,072
Commitments and contingencies		
Inovio Pharmaceuticals, Inc. stockholders' equity:		
Preferred stock—par value $0.001; Authorized shares: 10,000,000, issued and outstanding shares: 9 at December 31, 2022 and 2021	—	—
Common stock—par value $0.001; Authorized shares: 600,000,000 at December 31, 2022 and 2021, issued and outstanding: 253,091,319 at December 31, 2022 and 217,382,887 at December 31, 2021	253,090	217,382
Additional paid-in capital	1,710,656,191	1,609,589,797
Accumulated deficit	(1,487,847,784)	(1,209,855,522)
Accumulated other comprehensive loss	(698,741)	(282,236)
Total Inovio Pharmaceuticals, Inc. stockholders' equity	222,362,756	399,669,421
Total liabilities and stockholders' equity	$ 348,533,302	$ 495,941,493

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,		
	2022	**2021**	**2020**
Revenue from collaborative arrangements and other contracts, including affiliated entity	$ 10,262,268	$ 1,774,758	$ 7,411,220
Operating expenses:			
Research and development	187,650,503	249,240,324	94,245,436
General and administrative	90,185,285	53,752,353	37,247,828
Total operating expenses	277,835,788	302,992,677	131,493,264
Loss from operations	(267,573,520)	(301,217,919)	(124,082,044)
Other income (expense):			
Interest income	4,782,030	3,363,080	3,311,846
Interest expense	(1,253,952)	(1,936,447)	(8,702,450)
Change in fair value of derivative liability	—	—	(75,670,977)
(Loss) gain on investment in affiliated entities	(1,899,654)	(553,570)	36,556,658
Net unrealized (loss) gain on available-for-sale equity securities	(7,846,172)	(3,222,838)	1,695,497
Other (expense) income, net	(3,861,584)	343,371	(704,896)
Gain on deconsolidation of Geneos	—	—	4,121,075
Loss on extinguishment of convertible bonds	—	—	(8,177,043)
Gain on extinguishment of convertible senior notes	—	—	8,762,030
Net loss before share in net loss of Geneos	(277,652,852)	(303,224,323)	(162,890,304)
Share in net loss of Geneos	(2,165,213)	(434,387)	(4,584,610)
Net loss	(279,818,065)	(303,658,710)	(167,474,914)
Net loss attributable to non-controlling interest	—	—	1,063,757
Net loss attributable to Inovio Pharmaceuticals, Inc.	$ (279,818,065)	$ (303,658,710)	$ (166,411,157)
Net loss per share attributable to Inovio Pharmaceuticals, Inc. stockholders			
Basic and diluted	$ (1.17)	$ (1.45)	$ (1.07)
Weighted average number of common shares outstanding			
Basic and diluted	238,622,188	208,829,801	155,126,857

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,		
	2022	**2021**	**2020**
Net loss	$ (279,818,065)	$ (303,658,710)	$ (167,474,914)
Other comprehensive (loss) income:			
Foreign currency translation	(25,556)	(30,134)	27,205
Unrealized (loss) gain on short-term investments, net of tax	(390,949)	4,048	(755,963)
Comprehensive loss	$ (280,234,570)	$ (303,684,796)	$ (168,203,672)
Comprehensive loss attributable to non-controlling interest	—	—	1,063,757
Comprehensive loss attributable to Inovio Pharmaceuticals, Inc.	$ (280,234,570)	$ (303,684,796)	$ (167,139,915)

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

Inovio Pharmaceuticals, Inc.

CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY

	Preferred stock		Common stock		Additional paid-in capital	Accumulated deficit	Accumulated other comprehensive income (loss)	Non-controlling interest	Total stockholders' equity
	Number of shares	Amount	Number of shares	Amount					
Balance at December 31, 2019	23	—	101,361,034	$ 101,361	$ 742,646,785	$ (739,785,655)	$ 472,608	$ 1,969,759	$ 5,404,858
Issuance of common stock for cash, net of financing costs	—	—	66,064,886	66,065	454,420,335	—	—	—	454,486,400
Conversion of preferred stock to common stock	(14)	—	5,147	5	(5)	—	—	—	—
Conversion of senior notes to common stock	—	—	11,535,660	11,536	43,682,850	—	—	—	43,694,386
Conversion of August 2019 Bonds to common stock	—	—	4,962,364	4,961	102,666,349	—	—	—	102,671,310
Exercise of stock options for cash and vesting of RSUs, net of tax payments	—	—	2,922,402	2,923	8,238,701	—	—	—	8,241,624
Stock-based compensation	—	—	—	—	15,655,585	—	—	(8,062)	15,647,523
Acquisition of non-controlling interest in Geneos, net	—	—	—	—	—	—	—	2,379,969	2,379,969
Deconsolidation of Geneos	—	—	—	—	—	—	—	(3,181,640)	(3,181,640)
Net loss attributable to common stockholders	—	—	—	—	—	(166,411,157)	—	(1,063,757)	(167,474,914)
Dissolution of majority-owned subsidiary VGX Animal Health, Inc.	—	—	—	—	96,269	—	—	(96,269)	—
Unrealized loss on short-term investments, net of tax	—	—	—	—	—	—	(755,963)	—	(755,963)
Foreign currency translation	—	—	—	—	—	—	27,205	—	27,205
Balance at December 31, 2020	9	—	186,851,493	$ 186,851	$ 1,367,406,869	$ (906,196,812)	$ (256,150)	$ —	$ 461,140,758
Issuance of common stock for cash, net of financing costs	—	—	27,310,341	27,310	209,414,100	—	—	—	209,441,410
Conversion of December 2019 Bonds to common stock	—	—	1,009,450	1,009	4,376,883	—	—	—	4,377,892
Exercise of stock options for cash and vesting of RSUs, net of tax payments	—	—	2,211,603	2,212	2,055,181	—	—	—	2,057,393
Stock-based compensation	—	—	—	—	26,336,764	—	—	—	26,336,764
Net loss	—	—	—	—	—	(303,658,710)	—	—	(303,658,710)
Unrealized gain on short-term investments, net of tax	—	—	—	—	—	—	4,048	—	4,048
Foreign currency translation	—	—	—	—	—	—	(30,134)	—	(30,134)
Balance at December 31, 2021	9	—	217,382,887	$ 217,382	$ 1,609,589,797	$ (1,209,855,522)	$ (282,236)	$ —	$ 399,669,421
Cumulative adjustment from adoption of ASU 2020-06	—	—	—	—	(3,294,019)	1,825,803	—	—	(1,468,216)
Issuance of common stock for cash, net of financing costs	—	—	34,445,743	34,447	82,920,864	—	—	—	82,955,311
Exercise of stock options for cash and vesting of RSUs, net of tax payments	—	—	1,262,689	1,261	(1,115,870)	—	—	—	(1,114,609)
Stock-based compensation	—	—	—	—	22,555,419	—	—	—	22,555,419
Net loss	—	—	—	—	—	(279,818,065)	—	—	(279,818,065)
Unrealized loss on short-term investments, net of tax	—	—	—	—	—	—	(390,949)	—	(390,949)
Foreign currency translation	—	—	—	—	—	—	(25,556)	—	(25,556)
Balance at December 31, 2022	9	$ —	253,091,319	$ 253,090	$ 1,710,656,191	$ (1,487,847,784)	$ (698,741)	$ —	$ 222,362,756

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,		
	2022	**2021**	**2020**
Cash flows from operating activities:			
Net loss	$ (279,818,065)	$ (303,658,710)	$ (167,474,914)
Adjustments to reconcile net loss to net cash used in operating activities:			
Depreciation	3,656,713	3,040,096	3,038,996
Amortization of intangible assets	496,494	520,415	547,081
Amortization of operating lease right-of-use assets	1,342,819	1,170,270	1,041,713
Change in fair value of derivative liability	—	—	75,670,977
Non-cash stock-based compensation	22,555,419	26,336,764	15,647,523
Non-cash interest expense	186,977	858,644	4,077,686
Amortization of (discounts) premiums on investments	(1,320,546)	1,633,286	—
Loss on short-term investments	4,029,961	5,397	588,270
Settlement of receivable with shares of common stock from affiliated entity (PLS)	—	—	(1,713,770)
Gain on deconsolidation of Geneos	—	—	(4,121,075)
Gain on remeasurement of investment in Geneos	(165,215)	—	—
Loss on disposal of fixed assets	1,074,830	—	26,913
Loss (gain) on equity investment in affiliated entities	1,899,654	553,570	(36,556,658)
Share of net loss in Geneos	2,165,213	434,387	4,584,610
Loss on extinguishment of convertible August 2019 bonds	—	—	8,177,043
Gain on extinguishment of convertible senior notes	—	—	(8,762,030)
Net unrealized loss (gain) on available-for-sale equity securities	7,846,172	3,222,838	(1,695,497)
Unrealized transaction (gain) loss on foreign-currency denominated debt	—	(176,927)	15,902
Changes in operating assets and liabilities:			
Accounts receivable, including from affiliated entities	(3,706,172)	11,031,705	(17,015,471)
Prepaid expenses and other current assets, including from affiliated entities	(5,336,525)	(6,343,632)	(38,475,465)
Other assets	741,750	24,531,654	(23,285,424)
Accounts payable and accrued expenses, including from affiliated entities	32,606,581	26,140,970	3,251,478
Accrued clinical trial expenses	267,807	375,921	5,962,381
Deferred revenue, including from affiliated entity	(85,989)	(39,853)	(62,353)
Operating lease right-of-use assets and liabilities, net	(2,603,956)	(2,329,394)	(2,091,855)
Grant funding liability, including from affiliated entity	(2,034,517)	(2,973,089)	624,173
Other liabilities	(14,826)	(42,837)	20,720
Net cash used in operating activities	(216,215,421)	(215,708,525)	(177,979,046)
Cash flows from investing activities:			
Purchases of investments	(248,528,843)	(348,953,236)	(156,216,677)
Proceeds from sale of or maturity of investments	361,083,850	174,839,758	62,991,023
Purchases of capital assets	(969,153)	(1,231,006)	(1,520,665)
Proceeds from sale of investment of GeneOne	—	—	40,125,418
Decrease in cash resulting from the deconsolidation of Geneos	—	—	(2,774,851)
Investment in Geneos	(1,999,998)	—	(1,399,999)
Net cash provided by (used in) investing activities	109,585,856	(175,344,484)	(58,795,751)
Cash flows from financing activities:			
Proceeds from issuance of common stock, net of issuance costs	82,955,311	209,441,410	454,486,400
Proceeds from stock option exercises	283,022	6,668,741	12,269,801
Taxes paid related to net share settlement of equity awards	(1,397,631)	(4,611,348)	(4,028,177)
Acquisition of non-controlling interest	—	—	2,379,969
Proceeds from Geneos issuance of note payable	—	—	171,620
Net cash provided by financing activities	81,840,702	211,498,803	465,279,613
Effect of exchange rate changes on cash and cash equivalents	(25,556)	(30,134)	27,205
(Decrease) increase in cash and cash equivalents	(24,814,419)	(179,584,340)	228,532,021
Cash and cash equivalents, beginning of period	71,143,778	250,728,118	22,196,097
Cash and cash equivalents, end of period	$ 46,329,359	$ 71,143,778	$ 250,728,118
Supplemental disclosure:			
Amounts accrued for purchases of property and equipment	$ 108,181	$ 204,815	$ 136,711
Interest paid	$ 1,066,975	$ 1,077,803	$ 4,624,764
Change in prepaid expenses and other current assets related to fixed assets	$ 6,071,000	$ 7,709,337	$ —

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

1. The Company

Inovio Pharmaceuticals, Inc. (the "Company" or "INOVIO") is a biotechnology company focused on developing and commercializing DNA medicines to help treat and protect people from diseases associated with HPV, cancer, and infectious diseases. The Company's goal is to advance its diverse pipeline of product candidates and deliver on the promise of DNA medicines technology in treating and preventing a wide array of diseases.

In clinical trials, the INOVIO's DNA medicine candidates have shown the ability to generate immune responses, especially CD4+, CD8+, and memory T-cell responses against targeted pathogens and cancers, via its precisely designed plasmids. These plasmids are delivered into cells using the Company's investigational proprietary smart device, CELLECTRA.

INOVIO's lead candidates are focused on diseases associated with HPV. In 2022, INOVIO announced data from a Phase 1/2 clinical trial with INO-3107 for the treatment of HPV-6 and HPV-11 associated RRP. In this trial, treatment with INO-3107 resulted in a statistically significant reduction of the median number of surgeries, a result that reinforces the Company's belief that DNA medicines may play a key role in the treatment of HPV-related diseases.

The Company's partners and collaborators include Advaccine Biopharmaceuticals Suzhou Co, ApolloBio Corporation, AstraZeneca, The Bill & Melinda Gates Foundation (Gates), Coalition for Epidemic Preparedness Innovations (CEPI), Defense Advanced Research Projects Agency (DARPA), The U.S. Department of Defense (DoD), HIV Vaccines Trial Network, International Vaccine Institute (IVI), Kaneka Eurogentec, National Cancer Institute (NCI), National Institutes of Health (NIH), National Institute of Allergy and Infectious Diseases (NIAID), the Parker Institute for Cancer Immunotherapy, Plumbline Life Sciences, Regeneron Pharmaceuticals, Richter-Helm BioLogics, Thermo Fisher Scientific, the University of Pennsylvania, the Walter Reed Army Institute of Research, and The Wistar Institute.

The Company and its collaborators are currently evaluating the feasibility of, or conducting or planning clinical studies of, DNA medicines for Ebola; HPV-related precancers, including cervical, vulvar, and anal dysplasia; HPV-related cancers, including head & neck; other HPV-related disorders, such as RRP; and GBM.

INOVIO was incorporated in Delaware in June 2001 and has its principal executive offices in Plymouth Meeting, Pennsylvania.

2. Summary of Significant Accounting Policies

Basis of Presentation and Liquidity

The Company incurred a net loss attributable to common stockholders of $279.8 million for the year ended December 31, 2022. The Company had working capital of $218.4 million and an accumulated deficit of $1.5 billion as of December 31, 2022. The Company has incurred losses in each year since its inception and expects to continue to incur significant expenses and operating losses for the foreseeable future in connection with the research and preclinical and clinical development of its product candidates. The Company's cash, cash equivalents and short-term investments of $253.0 million as of December 31, 2022 are sufficient to support the Company's operations for a period of at least 12 months from the date it is issuing these financial statements.

In order to continue to fund future research and development activities, the Company will need to seek additional capital. This may occur through strategic alliance and licensing arrangements, grant agreements and/or future public or private debt or equity financings including At-the-Market Equity Offering Sales Agreements ("Sales Agreements"). The Company has a history of conducting debt and equity financings, including the receipt of net proceeds of $83.0 million, $47.7 million and $454.5 million under Sales Agreements during the years ending December 31, 2022, 2021 and 2020, respectively, and $162.1 million from a January 2021 underwritten public offering of common stock. During the year ended December 31, 2019, the Company also issued convertible notes and bonds in a series of private placement transactions. However, sufficient funding may not be available in the future, or if available, may be on terms that significantly dilute or otherwise adversely affect the rights of existing stockholders. If adequate funds are not available, the Company may need to delay, reduce the scope of or put on hold one or more of its clinical and/or preclinical programs.

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. The Company's consolidated financial statements as of and for the year ended December 31, 2022 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 consolidated financial statements.

The Company is and, from time to time, may in the future be subject to various legal proceedings and claims arising in the ordinary course of business. The Company assesses contingencies to determine the degree of probability and range of possible loss for potential accrual in its consolidated financial statements. An estimated loss contingency is accrued in the consolidated financial statements if it is probable that a liability has been incurred and the amount of the loss can be reasonably estimated. Legal proceedings, including litigation, government investigations and enforcement actions, could result in material costs, occupy significant management resources and entail civil and criminal penalties, even if the Company ultimately prevails. Any of the foregoing consequences could result in serious harm to the Company's business, results of operations and financial condition.

Consolidation

The consolidated financial statements include the accounts of Inovio Pharmaceuticals, Inc. and its wholly-owned subsidiary Inovio Asia LLC.

Segment Reporting

Operating segments are identified as components of an enterprise about which separate discrete financial information is available for evaluation by the chief operating decision-maker in making decisions regarding resource allocation and assessing performance. The Company views its operations and manages its business as one segment operating primarily within the United States.

Use of Estimates

The preparation of consolidated financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, disclosures of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

Concentration of Credit Risk

Financial instruments that potentially subject the Company to concentrations of credit risk consist primarily of cash and short-term investments. The Company limits its exposure to credit loss by placing its cash and investments with high credit quality financial institutions. Additionally, the Company has established guidelines regarding diversification of its investments and their maturities which are designed to maintain principal and maximize liquidity.

The Company has contracts with certain of its customers that have represented more than 10% of the Company's total revenues, as discussed in Note 3.

Fair Value of Financial Instruments

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.

The Company's financial instruments include cash equivalents, short-term investments, investments in affiliated entities, accounts receivable, prepaid expenses and other assets, accounts payable and accrued expenses, and convertible senior notes. The carrying amounts of cash equivalents, accounts receivable, prepaid expenses and other assets, accounts payable and accrued expenses approximate the related fair values due to the short-term maturities of these instruments. Short-term investments are recorded at fair value on a recurring basis, based on current market valuations. The Company carries convertible senior notes at face value less unamortized debt discount and issuance costs on its consolidated balance sheet, and it presents the fair value of such convertible notes and bonds for disclosure purposes only.

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 included certain money market accounts and U.S. treasury securities at December 31, 2022 and 2021.

Short-term 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 included mutual funds, U.S. treasury securities, commercial paper, certificates of deposit, U.S. agency mortgage-backed securities and an equity investment in the Company's affiliated entity, PLS, at December 31, 2022 and 2021.

Short-term investments are recorded at fair value, based on current market valuations. Unrealized gains and losses on the Company's short-term debt investments are excluded from earnings and reported as a separate component of other comprehensive loss until realized. Realized gains and losses and unrealized gains and losses on available-for-sale equity securities are included in non-operating other income (expense) on the consolidated statements of operations and are derived using the specific identification method for determining the cost of the securities sold.

Accounts Receivable

Accounts receivable are recorded at invoiced amounts and do not bear interest. The Company performs ongoing credit evaluations of its customers' financial condition. Credit is extended to customers as deemed necessary and generally does not require collateral. Management believes that the risk of loss is significantly reduced due to the quality and financial position of the Company's customers. No allowance for doubtful accounts was deemed necessary at December 31, 2022 and 2021.

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, 2022.

Valuation of Intangible Assets and Goodwill

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

License costs are recorded based on the fair value of consideration paid and are amortized using the straight-line method over the shorter of the expected useful life of the underlying patents or the term of the related license agreement to the extent the license has an alternative future use. As of December 31, 2022 and 2021, the Company's intangible assets resulting from prior acquisitions of other companies, and additional intangibles including license costs, net of accumulated amortization, totaled $2.1 million and $2.6 million, respectively.

The determination of the value of intangible assets requires management to make estimates and assumptions that affect the Company's consolidated financial statements. The Company assesses potential impairments to intangible assets when there is evidence that events or changes in circumstances indicate that the carrying amount of an asset may not be recovered. The Company's judgments regarding the existence of impairment indicators and future cash flows related to intangible assets are based on operational performance of its acquired businesses, market conditions and other factors. If impairment is indicated, the Company will reduce the carrying value of the intangible asset to fair value. While current and historical operating and cash flow losses are potential indicators of impairment, the Company believes the future cash flows to be received from its intangible assets will exceed the intangible assets' carrying value, and accordingly, the Company has not recognized any impairment losses through December 31, 2022.

Goodwill represents the excess of acquisition cost over the fair value of the net assets of acquired businesses. Goodwill is reviewed for impairment at least annually at November 30, or more frequently if an event occurs indicating the potential for impairment. During its goodwill impairment review, the Company may assess qualitative factors to determine whether it is likely 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 likely that the fair value of its reporting unit is less than its carrying amount, then no additional assessment is deemed necessary. Otherwise, the Company will proceed to perform the impairment test in which the fair value of the reporting unit is compared with its carrying amount, and an impairment charge will be recorded for the amount by which the carrying amount exceeds the reporting unit's fair value, if any. The Company performed its annual assessment for goodwill impairment as of November 30, 2022, identifying no impairment.

Although there are inherent uncertainties in this assessment process, the estimates and assumptions the Company is using are consistent with its internal planning. If these estimates or their related assumptions change in the future, the Company may be required to record an impairment charge on all or a portion of its goodwill and intangible assets. Furthermore, the Company

cannot predict the occurrence of future impairment triggering events nor the impact such events might have on its reported asset values. Future events could cause the Company to conclude that impairment indicators exist and that goodwill or other intangible assets associated with its acquired businesses are impaired. Any resulting impairment loss could have an adverse impact on the Company's results of operations. See Note 8 for further discussion of the Company's goodwill and intangible assets.

Income Taxes

The Company recognizes deferred tax assets and liabilities for temporary differences between the financial reporting basis and the tax basis of the Company's assets and liabilities along with net operating loss and tax credit carry forwards. The Company records a valuation allowance against its deferred tax assets to reduce the net carrying value to an amount that it believes is more likely than not to be realized. When the Company establishes or reduces the valuation allowance against its deferred tax assets, its provision for income taxes will increase or decrease, respectively, in the period such determination is made.

Valuation allowances against the Company's deferred tax assets were $299.1 million and $237.2 million at December 31, 2022 and 2021, 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 revenue, in accordance with Accounting Standards Update ("ASU") 2014-09, *Revenue from Contracts with Customers* ("Topic 606"), when it transfers promised goods or services to customers in an amount that reflects the consideration to which it expects to be entitled in exchange for those goods or services. To determine revenue recognition for contracts with customers, the Company performs the following five steps: (i) identify the contract(s) with a customer; (ii) identify the performance obligations in the contract; (iii) determine the transaction price; (iv) allocate the transaction price to the performance obligations in the contract; and (v) recognize revenue when (or as) the Company satisfies its performance obligations. At contract inception, the Company assesses the goods or services agreed upon within each contract and assess whether each good or service is distinct and determine those that are performance obligations. The Company then recognizes as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) the performance obligation is satisfied.

Collaborative Arrangements

The Company assesses whether its collaboration agreements are subject to ASC Topic 808: Collaborative Arrangements ("Topic 808") based on whether they involve joint operating activities and whether both parties have active participation in the arrangement and are exposed to significant risks and rewards. To the extent that the arrangement falls within the scope of Topic 808 and the Company concludes that its collaboration partner is not a customer, the Company presents such payments as a reduction of research and development expense. If payments from the collaboration partner to the Company represent consideration from a customer, then the Company accounts for those payments within the scope of ASU Topic 606.

The Company enters into collaborative arrangements with partners that typically include payment of one or more of the following: (i) license fees; (ii) product supply services; (iii) milestone payments related to the achievement of developmental, regulatory, or commercial goals; and (iv) royalties on net sales of licensed products. Where a portion of non-refundable, upfront fees or other payments received are allocated to continuing performance obligations under the terms of a collaborative arrangement, they are recorded as deferred revenue and recognized as revenue when (or as) the underlying performance obligation is satisfied.

As part of the accounting for these arrangements, the Company must develop estimates and assumptions that require judgment of management to determine the underlying stand-alone selling price for each performance obligation which determines how the transaction price is allocated among the performance obligation. The standalone selling price may include items such as forecasted revenues, development timelines, discount rates and probabilities of technical and regulatory success. The Company evaluates each performance obligation to determine if it can be satisfied at a point in time or over time. In addition, variable consideration must be evaluated to determine if it is constrained and, therefore, excluded from the transaction price.

License Fees

If a license to intellectual property is determined to be distinct from the other performance obligations identified in the arrangement, the Company will recognize revenues from non-refundable, up-front fees allocated to the license when the license is transferred to the licensee and the licensee is able to use and benefit from the license. For licenses that are bundled with other promises, the Company utilizes judgment to assess the nature of the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress for purposes of recognizing revenue. The Company evaluates the measure of progress each reporting period and, if necessary, adjusts the measure of performance and related revenue recognition.

Product Supply Services

Arrangements that include a promise for future supply of drug product for either clinical development or commercial supply at the licensee's discretion are generally considered as options. The Company assesses if these options provide a material right to the licensee and if so, they are accounted for as separate performance obligations. The Company evaluates whether it is the principal or agent in the arrangement. The Company had determined that it is the principal in the current arrangements as the Company controls the product supply before it is transferred to the customer.

Milestone Payments

At the inception of each arrangement that includes milestone payments (variable consideration), the Company evaluates whether the milestones are considered probable of being reached and estimates the amount to be included in the transaction price using the most likely amount method. If it is probable that a significant revenue reversal would not occur, the associated milestone value is included in the transaction price. Milestone payments that are not within the Company's or its collaboration partner's control, such as regulatory approvals, are generally not considered probable of being achieved until those approvals are received. The transaction price is then allocated to each performance obligation on a relative stand-alone selling price basis, for which the Company recognizes revenue as or when the performance obligations under the contract are satisfied. At the end of each subsequent reporting period, the Company re-evaluates the probability of achieving such milestones and any related constraint, and if necessary, adjusts its estimate of the overall transaction price. Any such adjustments are recorded on a cumulative catch-up basis, which would affect license, collaboration or other revenues and earnings in the period of adjustment.

Royalties

For arrangements that include sales-based royalties, including milestone payments based on the level of sales, and for which the license is deemed to be the predominant item to which the royalties relate, the Company recognizes revenue at the later of (i) when the related sales occur, or (ii) when the performance obligation to which some or all of the royalty has been allocated has been satisfied (or partially satisfied). To date, the Company has not recognized any royalty revenue resulting from any of its collaborative arrangements.

Grants

The Company accounts for various grant agreements under the contributions guidance under Subtopic 958-605, *Not-for-Profit Entities-Revenue Recognition*, which is outside the scope of Topic 606, as the government agencies granting the Company funds are not receiving reciprocal value for their contributions. All contributions received from current grant agreements are recorded as a contra-expense as opposed to revenue on the consolidated statement of operations.

Foreign Currency Transactions

The functional and presentation currency of the Company is the U.S. dollar. Transactions denominated in a currency other than the functional currency are recorded on the initial recognition at the exchange rate at the date of the transaction. After initial recognition, monetary assets and liabilities denominated in foreign currency are translated at the end of each reporting period into the functional currency at the exchange rate at that date. The cumulative translation adjustment is included in the accumulated other comprehensive income (loss) within the statement of stockholders' equity. Exchange differences are included in general and administrative expenses in the consolidated statement of operations. Non-monetary assets and liabilities measured at cost are remeasured at the exchange rate at the date of the transaction.

Variable Interest Entities (VIE)

The Company evaluates its ownership, contractual and other interests in entities that are not wholly-owned to determine if these entities are VIEs, and, if so, whether the Company is the primary beneficiary of the VIE. In determining whether the Company is the primary beneficiary of a VIE and therefore required to consolidate the VIE, the Company applies a qualitative approach that determines whether it has both (1) the power to direct the activities of the VIE that most significantly impact the VIE's economic performance and (2) the obligation to absorb losses of, or the rights to receive benefits from, the VIE that could potentially be significant to that VIE. The Company will continuously perform this assessment, as changes to existing relationships or future transactions may result in the consolidation or deconsolidation of a VIE.

Equity Investments

Under ASC Topic 321, *Investments - Equity Securities,* the Company must measure equity investments (except those accounted for under the equity method, those that result in consolidation of the investee and certain other investments) at fair value and recognize any changes in fair value in the consolidated statement of operations. The Company can elect a measurement alternative for equity investments that do not have readily determinable fair values and do not qualify for the practical expedient in ASC Topic 820, *Fair Value Measurement,* to estimate fair value using the net asset value per share (or its equivalent). The Company's equity investments that do not have readily determinable fair values and do not qualify for the net asset value practical expedient for estimating fair value are measured at cost, less any impairments, plus or minus changes resulting from observable price changes in orderly transactions for identifiable or similar investments of the same issuer.

Research and Development Expenses

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

Advance payments for goods or services to be rendered in the future for use in research and development activities are deferred and included in prepaid expenses and other assets. The deferred amounts are expensed as the related goods are delivered or the services are performed.

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 shares of common stock outstanding during the year. Diluted net loss per share is calculated in accordance with the treasury stock method for the outstanding stock options and restricted stock units ("RSUs") 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 dilutive impact of the outstanding Notes and Bonds issued by the Company (discussed in Note 9) has been considered using the "if-converted" method. The calculation of diluted net loss per share requires that, to the extent the average market price of the underlying shares for the reporting period exceeds the exercise price of the options or other securities and the presumed exercise of such securities are dilutive to net loss per share for the period, an adjustment to net loss used in the calculation is required to remove the change in fair value of such securities from the numerator for the period. Likewise, an adjustment to the denominator is required to reflect the related dilutive shares, if any. For the years ended December 31, 2022, 2021 and 2020, basic and diluted net loss per share are the same, as the assumed exercise or settlement of stock options, RSUs and the potentially dilutive shares issuable upon conversion of the Notes and Bonds are antidilutive.

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

	Year Ended December 31,		
	2022	2021	2020
Options to purchase common stock	12,221,548	10,488,993	8,906,624
Service-based restricted stock units	2,556,257	2,448,868	2,558,052
Performance-based restricted stock units	111,941	663,353	663,353
Convertible preferred stock	3,309	3,309	3,309
Convertible notes	3,049,980	3,049,980	3,049,980
December 2019 Bonds	—	—	1,009,450
Total	17,943,035	16,654,503	16,190,768

Leases

For its long-term operating leases, the Company recognized an operating lease right-of-use asset and an operating lease liability on its consolidated balance sheets. The lease liability is determined as the present value of future lease payments using an estimated rate of interest that the Company would pay to borrow equivalent funds on a collateralized basis at the lease commencement date. The right-of-use asset is based on the liability adjusted for any prepaid or deferred rent. The Company determines the lease term at the commencement date by considering whether renewal options and termination options are reasonably assured of exercise.

Fixed rent expense for the Company's operating leases is recognized on a straight-line basis over the term of the lease and is included in operating expenses on the consolidated statements of operations. Variable lease payments including lease operating expenses are recorded as incurred.

Stock-Based Compensation

The Company incurs stock-based compensation expense related to RSUs and stock options. The fair value of restricted stock is determined by the closing price of the Company's common stock reported on the Nasdaq Global Select Market on the

date of grant. The Company estimates the fair value of stock options granted using the Black-Scholes option pricing model. The Black-Scholes option pricing model was developed for use in estimating the fair value of traded options, which have no vesting restrictions and are fully transferable. In addition, option valuation models require the input of subjective assumptions, including the expected stock price volatility and expected option life. The Company amortizes the fair value of the awards on a straight-line basis over the requisite vesting period of the awards. Expected volatility is based on historical volatility. The expected life of options granted is based on historical expected life. The risk-free interest rate is based on the U.S. Treasury yield in effect at the time of grant. The dividend yield is based on the fact that no dividends have been paid historically and none are currently expected to be paid in the foreseeable future. The Company recognizes forfeitures as they occur.

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

	Year Ended December 31,		
	2022	2021	2020
Risk-free interest rate	2.05%	0.91%	0.63%
Expected volatility	94%	93%	78%
Expected life in years	5.7	6	6
Dividend yield	—	—	—

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

	Year Ended December 31,		
	2022	2021	2020
Risk-free interest rate	1.96%	1.45%	0.82%
Expected volatility	87%	87%	76%
Expected life in years	10	10	10
Dividend yield	—	—	—

Recent Accounting Pronouncements

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

ASU No. 2020-06. In August 2020, the FASB issued ASU No. 2020-06, *Debt—Debt with Conversion and Other Options (Subtopic 470-20) and Derivatives and Hedging—Contracts in Entity's Own Equity (Subtopic 815-40): Accounting for Convertible Instruments and Contracts in an Entity's Own Equity* ("ASU 2020-06"), which simplifies the guidance on an issuer's accounting for convertible instruments and contracts in its own equity. ASU 2020-06 was effective for public entities for fiscal years beginning after December 15, 2021, and interim periods within those fiscal years. The Company adopted ASU 2020-06 as of January 1, 2022 on a modified retrospective basis and recorded a net reduction in accumulated deficit of $1.8 million, a decrease in additional paid-in capital of $3.3 million, and an increase in convertible senior notes of $1.5 million to reflect the impact of the accounting change. The Company derecognized the related deferred tax liabilities of $1.5 million with a corresponding adjustment to the valuation allowance, resulting in no net impact to the cumulative adjustment to retained earnings (see Note 9, Convertible Debt, for additional information).

3. Revenue Recognition and Concentration of Credit Risk

During the years ended December 31, 2022, 2021 and 2020, the Company recognized revenue from various license and other agreements. The following table indicates the percentage of total revenues in excess of 10% with any single customer:

Customer	2022 Revenue	% of Total Revenue	2021 Revenue	% of Total Revenue	2020 Revenue	% of Total Revenue
Advaccine	$ —	— %	$ —	— %	$ 5,000,000	68 %
Plumbline Life Sciences, Inc. (affiliated entity)	33,596	—	245,310	14	1,370,396	18
U.S. Department of Defense	9,591,778	94	754,853	43	—	—
All other, including affiliated entities	636,894	6	774,595	43	1,040,824	14
Total revenue	$ 10,262,268	100 %	$ 1,774,758	100 %	$ 7,411,220	100 %

Of the total revenue recognized during the year ended December 31, 2022, $14,000 was in deferred revenue as of December 31, 2021. During the year ended December 31, 2021, the Company recognized revenue of $46,000 that was included in deferred revenue at December 31, 2020. Performance obligations are generally satisfied within 12 months of the initial contract date.

As of December 31, 2022, all of the Company's accounts receivable was attributable to the CEPI MERS grant. As of December 31, 2021, $3.6 million, or 65%, and $1.9 million, or 34%, of the Company's accounts receivable was attributable to the DoD and CEPI MERS grants, respectively. 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.

4. Collaborative Agreements

Advaccine Biopharmaceuticals Suzhou Co., Ltd.

On December 31, 2020, the Company entered into a Collaboration and License Agreement with Advaccine Biopharmaceuticals Suzhou Co., Ltd. ("Advaccine"), which was amended and restated on June 7, 2021 (as amended and restated, the "Advaccine Agreement"). Under the terms of the Advaccine Agreement, the Company granted to Advaccine the exclusive right to develop, manufacture and commercialize the Company's vaccine candidate INO-4800 within the territories of China, Taiwan, Hong Kong and Macau (referred to collectively as "Greater China") and 33 additional countries in Asia. Advaccine does not have the right to grant sublicenses, other than to affiliated entities, without the Company's express prior written consent. As part of the collaboration, Advaccine also granted to the Company a non-exclusive license to certain DNA vaccine manufacturing processes.

The June 2021 amendment related to a collaboration between the Company and Advaccine to jointly conduct a global Phase 3 segment of the Company's clinical trial of INO-4800. The parties were jointly participating in the trial and were to equally share the global development costs for the trial, including the Company's manufacturing costs to supply INO-4800. Advaccine agreed to be fully responsible for conducting the trial in Greater China, including its costs and expenses incurred. On October 27, 2022, the Company announced that it had discontinued its internally funded efforts to develop INO-4800 as a COVID-19 heterologous booster vaccine. Advaccine will continue to develop INO-4800 with its own resources under the terms of the Advaccine Agreement.

Under the Advaccine Agreement, Advaccine made an upfront payment to the Company of $3.0 million in January 2021. In addition to the upfront payment, the Company is entitled to receive up to an aggregate of $200.0 million upon the achievement of specified milestones related to the development, regulatory approval and commercialization of INO-4800, including the achievement of specified net sales thresholds for INO-4800 in Greater China and the additional covered territories, if approved. The Company will also be entitled to receive a royalty equal to a high single-digit percentage of annual net sales in each region within the licensed territory, subject to reduction in the event of competition from biosimilar products in a particular region and in other specified circumstances. Advaccine's obligation to pay royalties will continue, on a licensed product-by-licensed product basis and region-by-region basis, for ten years after the first commercial sale in a particular region within Greater China or, if later, until the expiration of the last-to-expire patent covering a given licensed product in a given region.

Beginning in the first calendar year following the first commercial sale of INO-4800 in the licensed territory outside of Greater China, Advaccine will pay the Company an annual maintenance fee of $1.5 million for a period of five years, which fee will be creditable against any royalties payable by Advaccine with respect to sales outside of Greater China.

Under the Advaccine Agreement, the Company will supply Advaccine's clinical requirements of INO-4800 and devices, although Advaccine may manufacture INO-4800 for its clinical use and may procure alternate suppliers. Advaccine is responsible for the manufacture and supply of INO-4800 itself or through a contract manufacturer for commercial use. Upon Advaccine's reasonable request, the parties may negotiate a separate clinical and/or commercial supply agreement.

The Advaccine Agreement will continue in force on a region-by-region basis until Advaccine has no remaining royalty obligations in such region. Either party may terminate the Advaccine Agreement (i) in the event the other party shall have materially breached its obligations thereunder and such default shall have continued for a specified period after written notice thereof or (ii) upon the bankruptcy or insolvency of the other party. In addition, the Company may terminate the agreement, upon prior written notice, if Advaccine (i) ceases all development or commercialization activities for at least nine months, subject to certain exceptions, or (ii) challenges the validity, enforceability or scope of any of the patents licensed by the Company to Advaccine under the Advaccine Agreement, subject to certain conditions. Advaccine may terminate the Advaccine Agreement at any time for convenience upon nine months' written notice to the Company, if such notice is provided before the first commercial sale of INO-4800 in the licensed territory, or 18 months' written notice thereafter; provided that the Company may accelerate the effectiveness of such termination to the extent permitted by law.

The Company evaluated the terms of the Advaccine Agreement under ASC Topics 606 and 808 at inception and determined that the contract was with a customer and therefore should be accounted for under ASC Topic 606. The license to INO-4800 in the territories was identified as the only distinct performance obligation on a standalone basis as of the inception of the Advaccine Agreement. The Company concluded that the license was distinct from potential future manufacturing and supply obligations. The Company further determined that the transaction price under the Advaccine Agreement consisted of the $3.0 million upfront payment received in January 2021 plus a $2.0 million milestone payment which was achieved upon contract signing. The future potential milestone amounts were not included in the transaction price, as they were all determined to be fully constrained. As part of the evaluation of the development and regulatory milestones constraint, the Company determined that the achievement of such milestones is contingent upon success in future clinical trials and regulatory approvals, each of which is uncertain. Future potential milestone amounts may be recognized as revenue under the Advaccine Agreement, as well as under other collaborative research and development arrangements, if unconstrained. Reimbursable program costs will be recognized proportionately with the performance of the underlying services or delivery of drug supply and are excluded from the transaction price.

Under Topic 606, the entire transaction price of $5.0 million was allocated to the license performance obligation. The Company recognized $0, $0 and $5.0 million of revenue for the years ended December 31, 2022, 2021, and 2020, respectively, under the Advaccine Agreement.

In connection with the June 2021 amendment, the Company determined that the global Phase 3 trial component of the agreement was a collaboration and not a contract with a customer and therefore accounted for the June 2021 amendment under ASC Topic 808. Reimbursements from Advaccine were recognized as contra-research development expense on the consolidated statement of operations once earned and collectibility was assured. During the years ended December 31, 2022, 2021 and 2020 the Company received funding of $1.2 million, $4.5 million and $0, respectively, from Advaccine that was recorded as contra-research and development expense.

ApolloBio Corporation

On December 29, 2017, the Company entered into an Amended and Restated License and Collaboration Agreement (the "ApolloBio Agreement"), with ApolloBio Corporation ("ApolloBio"), with an effective date of March 20, 2018. Under the terms of the ApolloBio Agreement, the Company granted to ApolloBio the exclusive right to develop and commercialize VGX-3100, its DNA immunotherapy product candidate designed to treat pre-cancers caused by HPV, within the agreed upon territories.

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

The ApolloBio Agreement will continue in force until ApolloBio has no remaining royalty obligations. Either party may terminate the ApolloBio Agreement in the event the other party shall materially breach or default in the performance of its material obligations thereunder and such default continues for a specified period after written notice thereof. In addition, ApolloBio may terminate the ApolloBio Agreement at any time beginning one year after the effective date for any reason upon 90 days written notice to the Company.

For the years ended December 31, 2022, 2021 and 2020, there has been no significant reimbursable program costs under the ApolloBio Agreement.

Coalition for Epidemic Preparedness Innovations

The Company previously entered into agreements with CEPI pursuant to which the Company intended to develop vaccine candidates against Lassa fever and MERS. The goal of the collaboration between the Company and CEPI was to conduct research and development so that investigational stockpiles would be ready for clinical efficacy trial testing during potential disease outbreaks. The agreements with CEPI contemplated preclinical studies, as well as Phase 1 and Phase 2 clinical trials, occurring over multiple years. As part of the arrangement between the parties, CEPI agreed to fund up to an aggregate of $56 million of costs over a five-year period for preclinical studies, as well as planned Phase 1 and Phase 2 clinical trials, to be conducted by the Company and collaborators, with funding from CEPI based on the achievement of identified milestones. During the years ended December 31, 2022, 2021 and 2020, the Company received funding of $6.7 million, $10.0 million and $6.4 million, respectively, related to these grants and recorded those payments as contra-research and development expense. As of December 31, 2022 and 2021, the Company had an accounts receivable balance of $1.7 million and $1.9 million, respectively, on the consolidated balance sheet related to these CEPI grants.

In November 2022, the Company announced that it and CEPI would discontinue the development of these product candidates targeting Lassa fever and MERS, following the initial analysis of data from the studies conducted by the Company and funded by CEPI.

In January 2020, CEPI awarded the Company a grant of up to $9.0 million to support preclinical and clinical development of INO-4800 through Phase 1 human testing in the United States. In April 2020, CEPI awarded the Company a grant of $6.9 million to work with the International Vaccine Institute ("IVI") and the Korea National Institute of Health ("KNIH") to conduct clinical trials of INO-4800 in South Korea, a grant of $5.0 million to accelerate development of the Company's next-generation intradermal electroporation device, known as CELLECTRA 3PSP, for the intradermal delivery of INO-4800, and a grant of $1.3 million to support large-scale manufacturing of INO-4800. During the years ended December 31, 2022, 2021 and 2020, the Company received funding of $1.1 million, $6.9 million and $10.0 million, respectively, from CEPI related to these grants for INO-4800 and recorded such amounts as contra-research and development expense. As of December 31, 2022 and 2021, the Company had $2.3 million and $1.8 million recorded as deferred grant funding on the consolidated balance sheet related to the CEPI grants related to INO-4800, respectively

Bill & Melinda Gates Foundation

In October 2018, Gates awarded and funded the Company a grant of $2.2 million to advance the development of dMAbs to address issues in infectious disease prevention and therapy. This technology has high relevance for the control of influenza and HIV. This next-generation approach to the delivery of monoclonal antibodies would make the technology accessible to low and middle-income countries. In August 2019, Gates funded an additional $1.1 million for the project. During the years ended December 31, 2022, 2021 and 2020, the Company recorded $233,000, $182,000 and $463,000, respectively, as contra-research and development expense related to the Gates dMAb grant. As of December 31, 2022 and 2021, the Company had $153,000 and $384,000 recorded as deferred grant funding on the consolidated balance sheet related to the grant, respectively.

In March 2020, Gates awarded and funded the Company a grant of $5.0 million to accelerate the development of the CELLECTRA 3PSP device for the intradermal delivery of INO-4800. During the years ended December 31, 2022, 2021 and 2020, the Company recorded $0, $893,000 and $4.1 million, respectively, as contra-research and development expense related to this Gates grant.

Department of Defense (DoD)

In June 2020, the Company entered into an Other Transaction Authority for Prototype Agreement (the “OTA Agreement”) with the DoD to fund the Company’s efforts in developing the CELLECTRA® 3PSP device and associated arrays to be used for delivery of INO-4800 against COVID-19. The total amount of funding provided to the Company under the OTA Agreement was $54.5 million. The Company determined that the OTA Agreement should be considered under Subtopic 958-605, *Not-for-Profit Entities-Revenue Recognition*, which is outside the scope of Topic 606, as the government agency granting the Company funds was not receiving reciprocal value for their contributions. The Company recorded contra-research development expense on the consolidated statement of operations in the same period that the underlying expenses were incurred. During the years ended December 31, 2022, 2021 and 2020, the Company recorded $6.1 million, $27.1 million and $21.2 million, respectively, as contra-research and development expense related to the OTA agreement

Additionally, in June 2020, the Company was awarded a fixed-price contract (the “Procurement Contract”) from the DoD for the purchase of the Company’s intradermal CELLECTRA® 2000 device and accessories. The total purchase price under the Procurement Contract was $16.8 million. The Company determined that the Procurement Contract fell under the scope of ASC Topic 606 as the contract was with a customer and the Company was able to satisfy its obligations under the arrangement. Performance obligations under the Procurement Contract consisted of the delivery of a specified number of CELLECTRA® 2000 devices and accessories. The total transaction price was allocated to the individual performance obligations based on the determined standalone selling price for the devices and accessories. In 2021, the DoD announced that it would discontinue funding for the Phase 3 segment of the Company's clinical trials for INO-4800 and in January 2022, the total purchase price under the Procurement Contract was reduced to $10.7 million. During the year ended December 31, 2022, all performance obligations under the Procurement Contract were satisfied. During the years ended December 31, 2022, 2021

and 2020, the Company recorded revenue of $9.6 million, $755,000 and $0, respectively, from the Procurement Contract.

5. Short-term Investments and Fair Value Measurements

The following is a summary of available-for-sale securities as of December 31, 2022 and 2021:

		As of December 31, 2022			
	Contractual Maturity (in years)	Cost	Gross Unrealized Gains	Gross Unrealized Losses	Fair Market Value
Mutual funds	---	$ 117,036,232	$ —	$ (9,373,514)	$ 107,662,718
U.S. treasury securities	Less than 1	95,001,209	7,567	(44,266)	94,964,510
Certificates of deposit	Less than 1	2,977,564	13,664	(320)	2,990,908
U.S. agency mortgage-backed securities	*	1,435,592	—	(384,331)	1,051,261
		$ 216,450,597	$ 21,231	$ (9,802,431)	$ 206,669,397

		As of December 31, 2021			
	Contractual Maturity (in years)	Cost	Gross Unrealized Gains	Gross Unrealized Losses	Fair Market Value
Mutual funds	---	$ 192,966,772	$ 87,069	$ (1,614,411)	$ 191,439,430
U.S. treasury securities	Less than 1	94,193,441	—	(9,921)	94,183,520
Commercial paper	Less than 1	39,967,853	—	—	39,967,853
Certificates of deposit	Less than 1	2,976,210	15,618	(338)	2,991,490
U.S. agency mortgage-backed securities	*	1,608,137	4,508	(23,998)	1,588,647
		$ 331,712,413	$ 107,195	$ (1,648,668)	$ 330,170,940

*No single maturity date.

During the years ended December 31, 2022 and 2021, the Company recorded gross realized gain on investments of $21,000 and $394,000, respectively, and gross realized loss on investments of $4.1 million and $399,000, respectively. During the years ended December 31, 2022 and 2021, the Company recorded net unrealized loss on available-for-sale equity securities of $7.8 million and $3.2 million, respectively. No material balances were reclassified out of accumulated other comprehensive loss for the years ended December 31, 2022, 2021 and 2020. Interest and dividends on investments classified as available-for-sale are included in interest income in the consolidated statements of operations. As of December 31, 2022, the Company had 29 available-for-sale securities in a gross unrealized loss position, of which 21 with an aggregate total unrealized loss of $8.7 million were in such position for longer than 12 months.

The Company periodically reviews its portfolio of available-for-sale debt securities to determine if any investment is impaired due to credit loss or other potential valuation concerns. For the debt securities where the fair value of the investment is less than the amortized cost basis, the Company has assessed at the individual security level for various quantitative factors including, but not limited to, the nature of the investments, changes in credit ratings, interest rate fluctuations, industry analyst reports, and the severity of impairment. Unrealized losses on available-for-sale debt securities as of December 31, 2022 were primarily due to changes in interest rates, and not due to increased credit risks associated with specific securities. Based on the credit quality of the available-for-sale debt securities that are in an unrealized loss position, and the Company's estimates of future cash flows to be collected from those securities, the Company believes the unrealized losses are not credit losses. Accordingly, at December 31, 2022, the Company has not recorded an allowance for credit losses related to its available-for-sale debt securities.

The following table presents the Company's assets that were measured at fair value on a recurring basis, determined using the following inputs as of December 31, 2022:

	Fair Value Measurements at December 31, 2022			
	Total	Quoted Prices in Active Markets (Level 1)	Significant Other Unobservable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Short-term investments				
Mutual funds	$ 107,662,718	$ 107,662,718	$ —	$ —
U.S. treasury securities	94,964,510	94,964,510	—	—
Certificates of deposit	2,990,908	—	2,990,908	—
U.S. agency mortgage-backed securities	1,051,261	—	1,051,261	—
Total short-term investments	206,669,397	202,627,228	4,042,169	—
Investment in affiliated entity	2,007,142	2,007,142	—	—
Total assets measured at fair value	$ 208,676,539	$ 204,634,370	$ 4,042,169	$ —

The following table presents the Company's assets that were measured at fair value on a recurring basis, determined using the following inputs as of December 31, 2021:

	Fair Value Measurements at December 31, 2021			
	Total	Quoted Prices in Active Markets (Level 1)	Significant Other Unobservable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Short-term investments				
Mutual funds	$ 191,439,430	$ 191,439,430	$ —	$ —
U.S. treasury securities	94,183,520	94,183,520	—	—
Commercial paper	39,967,853	—	39,967,853	—
Certificates of deposit	2,991,490	—	2,991,490	—
U.S. agency mortgage-backed securities	1,588,647	—	1,588,647	—
Total short-term investments	330,170,940	285,622,950	44,547,990	—
Investments in affiliated entity	3,906,796	3,906,796	—	—
Total assets measured at fair value	$ 334,077,736	$ 289,529,746	$ 44,547,990	$ —

Level 1 assets at December 31, 2022 and 2021 consisted of mutual funds and U.S. treasury securities held by the Company that are valued at quoted market prices, as well as the Company's investment in its affiliated entity, PLS. The Company accounts for its investment in 597,808 common shares of PLS based on the closing price of the shares on the Korea New Exchange Market on the applicable balance sheet date. Unrealized gains and losses on the Company's equity securities are reported in the consolidated statement of operations as unrealized gain or loss on available-for-sale equity securities or as a gain or loss on investment in affiliated entity.

Level 2 assets at December 31, 2022 consisted of certificates of deposit and U.S. agency mortgage-backed securities 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. Level 2 assets at December 31, 2021 consisted of commercial paper, certificates of deposit and U.S. agency mortgage-backed securities. 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 the

service's assessment of the fair values of the Company's investment portfolio balance against the fair values of the Company's investment portfolio balance obtained from an independent source.

There were no Level 3 assets held as of December 31, 2022 and 2021.

6. Certain Balance Sheet Items

Prepaid and other current assets at December 31, 2022 and 2021 consisted of the following:

	2022	2021
Insurance recovery (a)	$ 30,000,000	$ —
Prepaid manufacturing expenses	1,401,028	27,474,159
Other prepaid expenses	18,729,453	11,362,832
	$ 50,130,481	$ 38,836,991

Accounts payable and accrued expenses at December 31, 2022 and 2021 consisted of the following:

	2022	2021
Trade accounts payable	$ 19,862,487	$ 27,424,743
Accrued compensation	12,574,921	16,112,912
Accrued litigation settlement (a)	44,000,000	—
Other accrued expenses	3,249,477	4,106,875
	$ 79,686,885	$ 47,644,530

(a) In July 2022, the Company entered into a memorandum of understanding for the proposed settlement of the class action securities litigation described in this report under “Legal Proceedings.” The final judicial order for the settlement was issued in January 2023. The settlement consists of $30.0 million in cash and $14.0 million in shares of the Company's common stock to settle all outstanding claims. As of December 31, 2022, the Company's insurance carriers had paid the cash component of the proposed settlement, which amounts were being held in escrow. The Company's insurance carriers paid $252,000 of other expenses on behalf of the Company, which amounts are being offset against the insurers' cash commitment as part of the settlement.

7. Fixed Assets

Fixed assets at December 31, 2022 and 2021 consisted of the following:

	Cost	Accumulated Depreciation and Amortization	Net Book Value
As of December 31, 2022			
Leasehold improvements	$ 15,803,108	$ (10,036,080)	$ 5,767,028
Research and development equipment	5,300,104	(4,295,217)	1,004,887
Office furniture and fixtures	2,827,476	(2,803,800)	23,676
Computer equipment and other	5,360,712	(4,428,306)	932,406
	$ 29,291,400	$ (21,563,403)	$ 7,727,997
As of December 31, 2021			
Leasehold improvements	$ 15,803,108	$ (8,258,608)	$ 7,544,500
Research and development equipment	12,392,916	(4,279,816)	8,113,100
Office furniture and fixtures	2,827,476	(2,599,643)	227,833
Computer equipment and other	5,374,084	(3,806,311)	1,567,773
	$ 36,397,584	$ (18,944,378)	$ 17,453,206

Depreciation expense for the years ended December 31, 2022, 2021 and 2020 was $3.7 million, $3.0 million and $3.0 million, respectively. The Company determined that the carrying value of these long-lived assets was not impaired during the periods presented. During the year ended December 31, 2022 the Company sold fixed assets with a net book value of $6.1 million and disposed of fixed assets with a net book value of $1.1 million. The Company has recorded a receivable from the sale of these assets of $6.1 million, which is included in prepaid expenses and other current assets on the consolidated balance sheet.

8. Goodwill and Intangible Assets

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

		December 31, 2022			December 31, 2021		
	Weighted Average Useful Life (Yrs)	Gross	Accumulated Amortization	Net Book Value	Gross	Accumulated Amortization	Net Book Value
Indefinite lived:							
Goodwill		$ 10,513,371	$ —	$ 10,513,371	$ 10,513,371	$ —	$ 10,513,371
Definite lived:							
Licenses	10	1,323,761	(1,323,761)	—	1,323,761	(1,305,600)	18,161
Bioject (a)	12	5,100,000	(2,988,889)	2,111,111	5,100,000	(2,735,556)	2,364,444
Other (b)	18	4,050,000	(4,031,250)	18,750	4,050,000	(3,806,250)	243,750
Total intangible assets	11	10,473,761	(8,343,900)	2,129,861	10,473,761	(7,847,406)	2,626,355
Total goodwill and intangible assets		$ 20,987,132	$ (8,343,900)	$ 12,643,232	$ 20,987,132	$ (7,847,406)	$ 13,139,726

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

(b) Other intangible assets represent the estimated fair value of acquired intellectual property.

Aggregate amortization expense on intangible assets was $496,000, $520,000 and $547,000 for the years ended December 31, 2022, 2021 and 2020, respectively. Amortization expense related to intangible assets at December 31, 2022 is expected to be incurred as follows:

Year ending December 31,	
2023	$ 273,000
2024	253,000
2025	253,000
2026	253,000
2027	253,000
Thereafter	845,000
	$ 2,130,000

There were no impairment or impairment indicators present and no losses were recorded during the years ended December 31, 2022, 2021 and 2020.

9. Convertible Debt

Convertible Senior Notes

On February 19, 2019 and March 1, 2019, the Company completed a private placement of $78.5 million aggregate principal amount of its 6.50% convertible senior notes due 2024 (the “Notes”). The Notes were sold in a private offering to

qualified institutional buyers pursuant to Rule 144A under the Securities Act of 1933, as amended. Net proceeds from the offering were $75.7 million.

The Notes are senior unsecured obligations of the Company and accrue interest payable in cash semi-annually in arrears on March 1 and September 1 of each year at a rate of 6.50% per annum. The Notes mature on March 1, 2024, unless earlier converted, redeemed or repurchased. Prior to the close of business on the business day immediately preceding November 1, 2023, the Notes will be convertible at the option of the holders only upon the satisfaction of certain circumstances. Thereafter, the Notes will be convertible at the option of the holders at any time until the close of business on the scheduled trading day immediately before the maturity date. Upon conversion, the Company will pay or deliver, as the case may be, cash, shares of its common stock or a combination of cash and shares of its common stock, at its election. The initial conversion rate was 185.8045 shares per $1,000 principal amount of Notes (equivalent to an initial conversion price of approximately $5.38 per share), subject to adjustment upon the occurrence of specified events.

The Company may redeem all, or any portion, of the Notes for cash if the last reported sale price per share of the Company's common stock exceeds 130% of the conversion price on (i) each of at least 20 trading days (whether or not consecutive) during the 30 consecutive trading days ending on, and including, the trading day immediately before the Company sends the related redemption notice; and (ii) the trading day immediately before the date the Company sends such redemption notice. The redemption price will be equal to 100% of the principal amount of the Notes to be redeemed, plus accrued and unpaid interest to, but excluding, the redemption date.

Initially, in accounting for the issuance of the Notes, the Company separated the Notes into liability and equity components. The carrying amount of the liability component was calculated by measuring the fair value of similar debt instruments, which do not have an associated convertible feature. The carrying amount of the equity component representing the conversion option for the Notes was $16.3 million and was recorded as a debt discount, which was being amortized to interest expense at an effective interest rate of 13.1%. In addition, the Company allocated $592,000 of debt issuance costs to the equity component and the remaining debt issuance costs of $2.2 million were allocated to the liability component, which were being amortized to interest expense under the effective interest rate method.

On January 1, 2022, the Company adopted ASU No. 2020-06, Debt—Debt with Conversion and Other Options (Subtopic 470-20) and Derivatives and Hedging—Contracts in Entity's Own Equity (Subtopic 815-40): Accounting for Convertible Instruments and Contracts in an Entity's Own Equity ("ASU 2020-06"), which is intended to simplify the accounting for convertible instruments. The ASU eliminates the cash conversion feature models in ASC 470-20, Debt with Conversion and Other Options, which required an issuer of certain convertible debt to separately account for embedded conversion features as a component of equity. Instead, an issuer will account for these securities as a single unit of account, unless the conversion feature meets certain criteria. The Company adopted the new standard using the modified retrospective method and recorded a net reduction to accumulated deficit of $1.8 million, a decrease to additional paid-in capital of $3.3 million, and an increase to convertible senior notes of $1.5 million to reflect the impact of the accounting change. The Notes are now accounted for as a single liability measured at amortized cost, as no other embedded features require bifurcation and recognition as derivatives.

The balance of the Notes at December 31, 2022 was as follows:

Principal amount	$	78,500,000
Principal amount converted into common shares		(62,085,000)
Unamortized debt issuance cost		(155,815)
Accrued interest		355,655
Net carrying amount	$	16,614,840

For the years ended December 31, 2022, 2021 and 2020, the Company recognized $1.3 million, $1.9 million and $6.9 million, respectively, of interest expense related to the Notes, of which $1.1 million, $1.1 million and $4.1 million, respectively, related to the contractual interest coupon.

As of December 31, 2022, future minimum payments due under the Notes, representing contractual amounts due, including interest based on the fixed rate of 6.5% per annum, were as follows:

2023		1,067,000
2024		16,948,000
Total	$	18,015,000

December 2019 Convertible Bonds

On December 26, 2019, the Company closed a private placement of convertible promissory notes (the "December 2019 Bonds") with an aggregate principal amount of 4.7 billion KRW (USD $4.1 million based on the exchange rate on the date of issuance) issued to a Korea-based institutional investor. Net proceeds from the offering were $4.0 million.

The December 2019 Bonds, which were unsecured obligations of the Company, were issued on December 31, 2019 and accrue interest at a coupon rate of 1.00% per annum, payable quarterly. The December 2019 Bonds were scheduled to mature on December 31, 2024, unless earlier converted or repurchased. On March 17, 2021, the December 2019 Bonds were converted in full into an aggregate of 1,009,450 shares of the Company's common stock, leaving no further December 2019 Bonds outstanding. Upon conversion, the $4.4 million carrying value of the December 2019 Bonds was reclassified to stockholders' equity.

During the year ended December 31, 2021, the Company recognized $50,000 of interest expense related to the December 2019 Bonds, of which $9,000 related to the contractual interest coupon. The effective interest rate of the December 2019 Bonds was 6.2%.

10. Stockholders' Equity

Preferred Stock

			Shares Outstanding as of December 31,	
	Shares Authorized	Shares Issued	2022	2021
Series C Preferred Stock, par $0.001	1,091	1,091	9	9

The holder of a 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 fully paid and non-assessable shares of common stock. As of December 31, 2021, the conversion value was $27.20 per share, such that the outstanding shares of Series C preferred stock were convertible into an aggregate of 3,309 shares of common stock.

Issuances of Common Stock

On November 9, 2021, the Company entered into an ATM Equity Offering[SM] Sales Agreement (the "2021 Sales Agreement") with outside sales agents (collectively, the "Sales Agents") for the offer and sale of its common stock for an aggregate offering price of up to $300.0 million. The 2021 Sales Agreement provides that the Sales Agents will be entitled to compensation in an amount equal to up to 3.0% of the gross sales proceeds of any common stock sold through the Sales Agents under the 2021 Sales Agreement. During the years ended December 31, 2022 and 2021, the Company sold 34,445,743 and 6,955,341 shares, respectively, of its common stock under the 2021 Sales Agreement. The sales were made at a weighted average price of $2.44 and $6.96 per share, respectively, resulting in aggregate net proceeds of $83.0 million and $47.7 million, respectively. As of December 31, 2022 there was $167.4 million of remaining capacity under the 2021 Sales Agreement.

On January 25, 2021, the Company closed an underwritten public offering of 20,355,000 shares of common stock at a public offering price of $8.50 per share. The net proceeds to the Company, after deducting the underwriters' discounts and commissions and other offering expenses, were $162.1 million.

Stock Options and Restricted Stock Units

The Company has a stock-based incentive plan, the 2016 Omnibus Incentive Plan (as amended to date, the "2016 Incentive Plan"), pursuant to which the Company may grant stock options, restricted stock awards, RSUs and other stock-based awards or short-term cash incentive awards to employees, directors and consultants.

The 2016 Incentive Plan was originally approved by the Company's stockholders on May 13, 2016, and an amendment to the plan to increase the number of shares available for issuance was approved by the stockholders on May 8, 2019. As of December 31, 2022, the maximum number of shares of the Company's common stock available for issuance over the term of the 2016 Incentive Plan was 22,000,000 shares. On the first business day of each calendar year, the maximum number of shares is increased by 2,000,000 shares of common stock unless the Company's board of directors determines, prior to January 1 for any such calendar year, to increase the maximum amount by a lesser amount. On January 1, 2022 and again on January 1, 2023, the maximum number of shares increased by 2,000,000. At December 31, 2022, the Company had 3,831,240 shares of common stock available for future grant under the 2016 Incentive Plan, 2,446,257 shares underlying outstanding but unvested service-based RSUs, options outstanding to purchase 10,132,969 shares of common stock and 111,941 shares of performance-based RSUs outstanding under the 2016 Incentive Plan. The awards granted and available for future grant under the 2016 Incentive

Plan generally vest over three years and have a maximum contractual term of ten years. The 2016 Incentive Plan terminates by its terms on March 9, 2026.

On June 24, 2022, the Company's board of directors adopted a stock-based incentive plan (the "2022 Inducement Plan"), which provides for the discretionary grant of nonstatutory stock options, stock appreciation rights, restricted stock awards, RSU awards, performance awards, and other awards to individuals as a material inducement to entering into employment with the Company. The aggregate number of shares of the Company's common stock that may be issued under the 2022 Inducement Plan will not exceed 2,000,000 shares. At December 31, 2022 the Company had 1,703,750 shares of common stock available for future grant under the 2022 Inducement Plan, 110,000 shares underlying outstanding but unvested RSUs and options outstanding to purchase 186,250 shares of common stock under the 2022 Inducement Plan. The 2022 Inducement Plan can be terminated by the Company's board of directors at any time.

The Amended and Restated 2007 Omnibus Incentive Plan (the "2007 Incentive Plan") was adopted on March 31, 2007 and terminated by its terms on March 31, 2017. At December 31, 2022, the Company had options outstanding to purchase 1,902,329 shares of common stock under the 2007 Incentive Plan. The awards granted under the 2007 Incentive Plan generally vest over three years and have a maximum contractual term of ten years.

Total employee and director stock-based compensation expense recognized in the consolidated statements of operations for the years ended December 31, 2022, 2021 and 2020 was $22.2 million, $25.0 million and $14.5 million, respectively, of which $8.8 million, $13.4 million and $8.0 million was included in research and development expenses and $13.4 million, $11.6 million and $6.5 million was included in general and administrative expenses, respectively. The Company entered into a Separation Agreement with its former President and Chief Executive Officer on May 10, 2022, under which outstanding RSUs as of the separation date were fully vested, and one-half of the RSUs were settled in the Company's common stock and the remainder settled in cash. The officer's stock options will continue to vest over a certain period and will remain exercisable until five years after the separation date. Stock-based compensation for the year ended December 31, 2022 included a $4.2 million charge related to these RSU and stock option modifications.

At December 31, 2022 and 2021, there was $10.5 million and $16.5 million, respectively, of total unrecognized compensation expense related to unvested stock options, which is expected to be recognized over a weighted-average period of 1.6 years and 2.0 years, respectively.

At December 31, 2022 and 2021, there was $7.2 million and $13.4 million, respectively, of total unrecognized compensation expense related to unvested RSUs, which is expected to be recognized over a weighted-average period of 1.7 years and 1.8 years, respectively.

The fair value of stock options granted to non-employees was estimated using the Black-Scholes pricing model. Total stock-based compensation expense for stock options and RSUs granted to non-employees for the years ended December 31, 2022, 2021 and 2020 was $1.3 million, $1.4 million and $1.2 million, respectively. As of December 31, 2022, options to purchase 665,875 shares of common stock granted to non-employees remained outstanding.

The following table summarizes total stock options outstanding at December 31, 2022:

	Options Outstanding			Options Exercisable	
Exercise Price	Shares Underlying Options Outstanding	Weighted-Average Remaining Contractual Life (in Years)	Weighted Average Exercise Price	Shares Underlying Options Exercisable	Weighted Average Exercise Price
$1.56-$3.00	830,542	8.3	$ 2.17	247,104	$ 2.29
$3.01-$6.00	5,461,365	7.1	$ 3.50	3,059,330	$ 3.67
$6.01-$9.00	3,349,587	5.3	$ 7.57	2,861,909	$ 7.49
$9.01-$12.00	1,930,825	7.1	$ 10.97	1,080,389	$ 10.89
$12.01-$15.00	580,947	4.1	$ 13.38	529,392	$ 13.34
$15.01-$25.62	68,282	7.6	$ 21.12	51,568	$ 21.11
	12,221,548	6.6	$ 6.28	7,829,692	$ 6.79

At December 31, 2022, the aggregate intrinsic value of options outstanding was $0, the aggregate intrinsic value of options exercisable was $0, and the weighted average remaining contractual term of options exercisable was 5.7 years.

At December 31, 2022, the aggregate intrinsic value of unvested RSUs was $4.0 million and the aggregate intrinsic value of RSUs which vested during the year ended December 31, 2022 was $4.6 million.

At December 31, 2022, options to purchase 12,221,548 shares of common stock and 2,556,257 RSUs were expected to vest.

Stock option activity under the Company's equity incentive plans during the year ended December 31, 2022 was as follows:

	Number of Shares	Weighted-Average Exercise Price
Balance, December 31, 2021	10,488,993	$ 7.93
Granted	4,623,448	3.11
Exercised	(118,694)	2.38
Cancelled	(2,772,199)	7.46
Balance, December 31, 2022	12,221,548	$ 6.28

Restricted stock unit activity under the Company's equity incentive plans during the year ended December 31, 2022 was as follows:

	Number of Shares
Balance, December 31, 2021	2,448,868
Granted	2,485,947
Vested	(1,618,235)
Cancelled	(760,323)
Balance, December 31, 2022	2,556,257

The weighted average exercise price per share was $8.47 for the 77,250 options which expired during the year ended December 31, 2022, $4.56 for the 7,000 options which expired during the year ended December 31, 2021 and $4.44 for the 78,750 options which expired during the year ended December 31, 2020.

The weighted average grant date fair value per share was $2.34, $7.61 and $6.87 for options granted during the years ended December 31, 2022, 2021 and 2020, respectively.

The weighted average grant date fair value was $3.12, $10.37 and $9.12 per share for RSUs granted during the years ended December 31, 2022, 2021 and 2020, respectively.

The Company received $283,000, $6.7 million and $12.3 million in proceeds from the exercise of stock options during the years ended December 31, 2022, 2021 and 2020, respectively. The aggregate intrinsic value of options exercised was $81,000, $7.0 million and $14.2 million during the years ended December 31, 2022, 2021 and 2020, respectively.

As of December 31, 2022, the Company had 111,941 performance-based RSUs outstanding, which were granted to key employees in August 2020. The underlying performance milestones of the RSUs were not probable of achievement as of December 31, 2022, and no stock-based compensation expense has been recognized to date for the performance-based RSUs.

11. Commitments and Contingencies

Leases

The Company leases approximately 82,200 square feet of office, laboratory, and manufacturing space in San Diego, California and 57,360 square feet of office space in Plymouth Meeting, Pennsylvania under various non-cancellable operating lease agreements with remaining lease terms as of December 31, 2022 of 0.9 years to 7.0 years, which represent the non-cancellable periods of the leases. The Company has excluded the extension options from its lease terms in the calculation of future lease payments as they are not reasonably certain to be exercised. The Company's lease payments consist primarily of fixed rental payments for the right to use the underlying leased assets over the lease terms as well as payments for common area maintenance and administrative services. The Company has received customary incentives from its landlords, such as reimbursements for tenant improvements and rent abatement periods, which effectively reduce the total lease payments owed for these leases.

The Company performed an evaluation of its contracts with customers and suppliers in accordance with ASC Topic 842 and determined that, except for the real estate leases described above and various copier leases, none of its other contracts contain a right-of-use asset.

Operating lease right-of-use assets and liabilities on the consolidated balance sheet represents the present value of the remaining lease payments over the remaining lease terms. Payments for additional monthly fees to cover the Company's share of certain facility expenses are not included in operating lease right-of-use assets and liabilities. The Company uses its incremental borrowing rate to calculate the present value of its lease payments, as the implicit rates in the leases are not readily determinable.

As of December 31, 2022, the maturities of the Company's operating lease liabilities were as follows:

Year ending December 31,		
2023	$	4,089,000
2024		3,050,000
2025		3,063,000
2026		3,139,000
2027		2,526,000
Thereafter		4,223,000
Total remaining lease payments		20,090,000
Less: present value adjustment		(4,630,000)
Total operating lease liabilities		15,460,000
Less: current portion		(2,804,000)
Long-term operating lease liabilities	$	12,656,000
Weighted-average remaining lease term		5.9 years
Weighted-average discount rate		8.6 %

Lease costs included in operating expenses in the consolidated statements of operations for the years ended December 31, 2022, 2021 and 2020 were $3.4 million, $3.4 million and $3.4 million, respectively. Operating lease costs consisting of the fixed lease payments included in operating lease liabilities are recorded on a straight-line basis over the lease terms. Variable lease costs are recorded as incurred.

In the fourth quarter of 2019, the Company entered into two agreements to sublease a total of approximately 13,500 square feet in its Plymouth Meeting headquarters with one period through March 31, 2025 and the other month-to-month after December 31, 2022.

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

Legal Proceedings

Securities Class Action Litigation

On March 12, 2020, a purported shareholder class action complaint, McDermid v. Inovio Pharmaceuticals, Inc. and J. Joseph Kim, was filed in the United States District Court for the Eastern District of Pennsylvania, naming the Company and its former President and Chief Executive Officer as defendants. The lawsuit alleged that the Company made materially false and misleading statements regarding its development of a vaccine for COVID-19 in its public disclosures in violation of certain federal securities laws. The plaintiffs sought unspecified monetary damages on behalf of the putative class and an award of costs and expenses, including reasonable attorneys' fees. The plaintiffs' complaint was later amended to include certain of the Company's other officers as defendants. After additional motions were filed in the case, in June 2022 the parties negotiated an agreement in principle to settle the shareholder class action complaint. Under the settlement, the Company will pay $30.0 million in cash and $14.0 million in shares of its common stock to settle all outstanding claims. The Company's insurance carriers have paid the $30.0 million cash component of the settlement. On August 31, 2022, the court granted preliminary approval of the settlement. See Note 16 for events subsequent to December 31, 2022.

Shareholder Derivative Litigation

On April 20, 2020, a purported shareholder derivative complaint, Behesti v. Kim, et al., was filed in the United States District Court for the Eastern District of Pennsylvania, naming eight current and former directors of the Company as defendants. The lawsuit asserts state and federal claims and is based on the same alleged misstatements as the shareholder class

action complaint described above. The lawsuit accuses the Company's board of directors of failing to exercise reasonable and prudent supervision over the Company's management, policies, practices, and internal controls. The plaintiff seeks unspecified monetary damages on behalf of the Company as well as governance reforms. On June 5, 2020, the court stayed the Beheshti action pending resolution of a forthcoming motion to dismiss the McDermid securities class action or until any party provides notice that they no longer consent to the stay. On June 12, 2020 and June 15, 2020, two additional shareholder derivative complaints were filed in the United States District Court for the Eastern District of Pennsylvania, captioned Isman v. Benito, et al. and Devarakonda et al. v Kim, et. al. The complaints assert substantially similar claims as the Beheshti action and name the Company's current directors as defendants. The Devarakonda complaint also names one of the Company's former directors as a defendant. On July 21, 2020, the court consolidated the three derivative cases under the caption In re Inovio Pharmaceuticals, Inc. Derivative Litigation. The consolidated action is stayed.

On July 7, 2020, a fourth shareholder derivative complaint, Fettig v. Kim et al., was filed in the United States District Court for the Eastern District of Pennsylvania, naming eight current and former directors of the Company as defendants. The complaint asserts substantially similar claims as those in the consolidated derivative action. On August 27, 2020, the Fettig action was consolidated with the other derivative cases, which remain stayed as explained above.

On March 28, 2022, a fifth shareholder derivative complaint, Schumacher v. Benito et al., was filed in the Delaware Court of Chancery, naming eight current and former directors as defendants. The complaint asserts substantially similar claims as those in the consolidated derivative action. On May 4, 2022, the Delaware Court of Chancery entered a stay of the litigation.

VGXI Litigation

On June 3, 2020, the Company filed a complaint in the Court of Common Pleas of Montgomery County, Pennsylvania against VGXI, Inc. and GeneOne Life Science, Inc., or GeneOne, and together with VGXI, Inc. collectively referred to as VGXI, alleging that VGXI had materially breached the Company's supply agreement with them. The complaint seeks declaratory judgments, specific performance of the agreement, injunctive relief, an accounting, damages, attorneys' fees, interest, costs and other relief from VGXI. On June 3, 2020, the Company filed a petition for preliminary injunction, which was denied on June 25, 2020. On June 26, 2020, the Company filed notice of appeal of the denial of the petition with the Pennsylvania Superior Court.

On July 7, 2020, VGXI filed an answer, new matter and counterclaims against the Company, alleging that the Company had breached the supply agreement, as well as misappropriation of trade secrets and unjust enrichment. The counterclaims seek injunctive relief, damages, attorneys' fees, interest, costs and other relief from the Company. Also, on July 7, 2020, VGXI filed a third-party complaint against Ology Bioservices, Inc., a contract manufacturing organization that the Company had engaged to provide services similar to those that were being provided by VGXI. On July 27, 2020, the Company filed an answer to VGXI's counterclaims, disputing the allegations and the claims raised in VGXI's filing. On October 1, 2020, the Company filed a notice of discontinuance of appeal with the Pennsylvania Superior Court. A trial date for the litigation has not been set.

The Company intends to aggressively prosecute the claims set forth in its complaint against VGXI and to vigorously defend itself against VGXI's counterclaims.

GeneOne Litigation

On December 7, 2020, GeneOne filed a complaint in the Court of Common Pleas of Montgomery County, Pennsylvania against the Company, alleging that the Company had breached the CELLECTRA Device License Agreement, or the Agreement, between the Company and GeneOne. The Company terminated the Agreement on October 9, 2020. The complaint asserts claims for breach of contract, declaratory judgment, unfair competition, and unjust enrichment. The complaint seeks injunctive relief, an accounting, damages, disgorgement of profits, attorneys' fees, interest, and other relief from the Company. On January 29, 2021, the Company filed preliminary objections to the complaint. On August 23, 2021, the court overruled the Company's preliminary objections to the complaint. On September 13, 2021, the Company filed an answer to the complaint, new matter, and counterclaims. The Company's counterclaims allege that GeneOne breached the Agreement and assert claims for breach of contract and declaratory judgment. The counterclaims seek damages, interest, expenses, attorney's fees, and costs. On October 18, 2021, GeneOne filed its answer to the Company's counterclaims and new matter. On November 8, 2021, we filed our answer to GeneOne's new matter. A trial date for this litigation has not been set.

The Company intends to aggressively prosecute the claims set forth in its counterclaims against GeneOne and to vigorously defend itself against the claims in GeneOne's complaint.

Other Matters

From time to time, the Company may be involved in disputes, including litigation, relating to claims arising out of operations in the normal course of its business. Any of these claims could subject the Company to costly legal expenses and, while the Company generally believes that it has adequate insurance to cover many different types of liabilities, its insurance carriers may deny coverage or its policy limits may be inadequate to fully satisfy any damage awards or settlements. If this were to happen, the payment of any such awards could have a material adverse effect on the Company's consolidated results of

operations and financial position. Additionally, any such claims, whether or not successful, could damage the Company's reputation and business. Except as described above, the Company is not a party to any legal proceedings, the adverse outcome of which, in management's opinion, individually or in the aggregate, would be reasonably expected to have a material adverse effect on the Company's consolidated results of operations or financial position.

12. 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 pretax loss from operations are as follows:

	Year Ended December 31,		
	2022	2021	2020
U.S. Domestic	$ (277,440,803)	$ (302,614,003)	$ (162,664,355)
Foreign	(211,249)	(610,320)	(225,949)
Pretax loss from operations	$ (277,652,052)	$ (303,224,323)	$ (162,890,304)

There was no provision for or benefit from income taxes for the years ended December 31, 2022, 2021 and 2020.

The reconciliation of income taxes attributable to continuing operations computed at the statutory tax rates to income tax benefit, using a 21% statutory tax rate for December 31, 2022, 2021 and 2020, is as follows:

	Year Ended December 31,		
	2022	2021	2020
Benefit from income taxes at statutory rates	$ (58,307,000)	$ (63,677,000)	$ (34,207,000)
State income tax, net of federal benefit	(3,601,000)	(3,447,000)	—
Change in valuation allowance	61,065,000	77,424,000	21,428,000
Nondeductible loss on extinguishment of debt	—	—	14,450,000
Research and development tax credits	(7,534,000)	(16,523,000)	(2,650,000)
Stock-based compensation	2,913,000	483,000	(1,953,000)
Uncertain tax positions	2,291,000	6,509,000	1,068,000
Deconsolidation of subsidiary	—	—	853,000
Expired NOLs and credits	1,459,000	616,000	468,000
Limited NOLs and credits	(1,337,000)	(542,000)	(368,000)
Change in tax rates	(187,000)	—	—
Foreign tax rate differential	(8,000)	(24,000)	(9,000)
Other	3,246,000	(819,000)	920,000
	$ —	$ —	$ —

Significant components of the Company's deferred tax assets and liabilities as of December 31, 2022 and 2021 are shown below:

	As of December 31,	
	2022	2021
Deferred tax assets:		
Capitalized research expense	$ 41,252,000	$ 4,200,000
NOL carryforwards	212,768,000	197,144,000
Research and development and other tax credits	26,442,000	23,005,000
Deferred revenue	538,000	987,000
Stock-based compensation	3,945,000	3,599,000
Acquired intangibles	559,000	637,000
Interest expense	—	83,000
Investment in affiliated entity	1,569,000	750,000
Lease liability	3,247,000	3,793,000
Fixed assets	57,000	—
Other	11,062,000	5,973,000
	301,439,000	240,171,000
Valuation allowance	(299,124,000)	(237,205,000)
Total deferred tax assets	2,315,000	2,966,000
Deferred tax liabilities:		
Acquired intangibles	(199,000)	(194,000)
Right of use asset	(2,148,000)	(2,430,000)
Note discount	—	(321,000)
Fixed assets	—	(53,000)
Total deferred tax liabilities	(2,347,000)	(2,998,000)
Net deferred tax liabilities	$ (32,000)	$ (32,000)

As of December 31, 2022, the Company had federal, California and Pennsylvania tax net operating loss (NOL) carryforwards of $920.6 million, $210.3 million and $89.6 million, respectively, net of the net operating losses that will expire due to IRC Section 382 limitations. The aggregate federal net operating losses generated in 2018 and after for the amount of $625.4 million will carryforward indefinitely and be available to offset up to 80% of future taxable income each year, subject to certain modifications made by the Coronavirus Aid, Relief, and Economic Security Act (CARES Act) enacted in 2020. The federal NOL carryforward began to expire in 2022, and the California and Pennsylvania NOL carryforwards will begin and have begun to expire in 2028 and 2022, respectively, unless previously utilized.

The Company also had Korean NOL carryforwards of $1.0 million as of December 31, 2022. The Korean NOLs are available to offset up to 60% of future taxable income and will begin to expire in 2030, unless previously utilized.

In addition, as of December 31, 2022, the Company had federal and state research and development (R&D) tax credit carryforwards of $40.5 million and $4.7 million, respectively. The federal tax credit carryforwards will begin to expire in 2029. The California research tax credits do not expire.

Based upon statute, federal and state losses and credits are expected to expire as follows (in millions):

Expiration Date:	Federal NOLs	State NOLs	Foreign NOLs	Federal R&D	State R&D
2023	$ 5.3	$ 1.2	$ —	$ —	$ —
2024	18.9	9.1	—	—	—
2025	9.6	5.2	—	—	—
2026	12.2	7.1	—	—	—
2027 and thereafter	249.2	277.3	1.0	40.5	—
Indefinite	625.4	—	—	—	4.7
	$ 920.6	$ 299.9	$ 1.0	$ 40.5	$ 4.7

Pursuant to Internal Revenue Code (IRC) Sections 382 and 383, annual use of the Company's NOL and R&D credit carryforwards may be limited in the event that a cumulative change in ownership of more than 50% occurs within a three-year period. The Company has completed an IRC Section 382/383 analysis regarding the limitation of NOL and R&D credit carryforwards as of December 31, 2022. As a result of the analysis, the Company estimates that approximately $8.3 million of tax benefits related to NOL and R&D carryforwards will expire unused. Accordingly, the related NOL and R&D credit carryforwards have been removed from deferred tax assets, accompanied by a corresponding reduction of the valuation allowance. Due to the existence of the valuation allowance, limitations created by current and future ownership changes, if any, related to the Company's operations in the United States will not impact its effective tax rate. Any additional ownership changes may further limit the ability to use the NOL and R&D carryforwards.

The Tax Cuts and Jobs Act of 2017 subjects a U.S. stockholder to tax on Global Intangible Low-Taxed Income (GILTI) earned by certain foreign subsidiaries. The FASB Staff Q&A, Topic 740, No. 5, Accounting for Global Intangible Low-Taxed Income, states that an entity can make an accounting policy election to recognize deferred taxes for temporary basis differences expected to reverse as GILTI in future years or to provide for the tax expense related to GILTI in the year the tax is incurred as a period expense only. The Company has elected to provide for the tax expense related to GILTI in the year the tax is incurred as a period expense only. For 2022, 2021 and 2020, the Company did not generate any GILTI due to losses earned by its foreign subsidiary.

On March 27, 2020, the Coronavirus Aid, Relief, and Economic Security (CARES) Act was enacted in response to the COVID-19 pandemic. The CARES Act, among other things, permits federal NOL carryovers and carrybacks to offset 100% of taxable income for taxable years beginning before 2021. In addition, the CARES Act allows federal NOLs incurred in 2019, 2020, and 2021 to be carried back to each of the five preceding taxable years to generate a refund of previously paid income taxes. Due to the Company's history of net operating losses, the CARES Act did not have a material impact on the Company's financial statements for the years ended December 31, 2022, 2021 or 2020.

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

	Year ended December 31,		
	2022	2021	2020
Balance at beginning of the year	$ 18,819,000	$ 12,210,000	$ 11,204,000
Increases related to current year tax positions	2,902,000	6,602,000	1,043,000
Increases (decreases) related to prior year tax positions	(582,000)	7,000	27,000
Other	—	—	(64,000)
Balance at end of the year	$ 21,139,000	$ 18,819,000	$ 12,210,000

The amount of unrecognized tax benefits that, if recognized and realized, would affect the effective tax rate was $19.7 million, $17.4 million and $10.9 million as of December 31, 2022, 2021 and 2020, respectively, subject to valuation allowances. 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 U.S. federal income tax as well as income tax in multiple state and foreign jurisdictions. With few exceptions, the Company is no longer subject to United States federal income tax examinations for years before 2019 and state and local income tax examinations before 2018. 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 NOL carryforward amount. The Company is not to its knowledge currently under Internal Revenue Service ("IRS"), state, local or foreign tax examination.

13. 401(k) Plan

The Company has adopted a 401(k) Profit Sharing Plan covering substantially all of its employees. The defined contribution plan allows the employees to contribute a percentage of their compensation each year. The Company currently matches 50% of its employees' contributions, up to 6% of their annual compensation. The Company's contributions are recorded as expense in the accompanying consolidated statements of operations and totaled $1.8 million, $1.5 million and $1.1 million for the years ended December 31, 2022, 2021 and 2020, respectively.

14. Related Party Transactions

Plumbline Life Sciences, Inc.

The Company owned 597,808 shares of common stock in PLS as of December 31, 2022 and 2021, representing a 18.7% and 18.9% ownership interest, respectively. One of the Company's directors, Dr. David B. Weiner, acts as a consultant to PLS.

Revenue recognized from PLS consists of milestone, license and patent fees. For the years ended December 31, 2022, 2021 and 2020, the Company recognized revenue from PLS of $34,000, $245,000 and $1.4 million, respectively. At December 31, 2022 and 2021, the Company had an accounts receivable balance of $59,000 and $25,000, respectively, related to PLS.

The Wistar Institute

The Company's director Dr. David B. Weiner is a director of the Vaccine Center of The Wistar Institute ("Wistar"). Dr. Weiner is also the Executive Vice President of Wistar.

In March 2016, the Company entered into collaborative research agreements with Wistar for preventive and therapeutic DNA-based immunotherapy applications and products developed by Dr. Weiner and Wistar for the treatment of cancers and infectious diseases. Under the terms of the agreement, the Company reimbursed 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. In March 2021, upon expiration of the March 2016 agreements, the Company entered into new collaborative research agreements with Wistar with the same terms. The Company has the exclusive right to in-license new intellectual property developed under this agreement.

In 2021, the Company entered into collaborative research agreements with Wistar in support of the clinical development of INO-4800. Under the terms of these collaborative research agreements, which have been completed as of September 30, 2022, the Company is reimbursing Wistar a total of $1.9 million for all direct and indirect costs incurred in the conduct of the collaborative research.

In November 2016, the Company received a $6.1 million sub-grant through Wistar to develop a dMAb against the Zika infection, with funding through December 2021.

The Company is also a collaborator with Wistar on an Integrated Preclinical/Clinical AIDS Vaccine Development grant from the National Institutes of Health’s National Institute of Allergy and Infectious Diseases, with funding through February 2023.

In 2020, the Company received a $10.7 million sub-grant through Wistar, which was amended in 2021 to $13.6 million, for the preclinical development and translational studies of dMAbs as countermeasures for COVID-19, with funding through November 2022. The sub-grant also includes an option for an additional $6.0 million in funding through March 2024, of which $3.3 million has been exercised as of December 31, 2022.

Deferred grant funding recognized from Wistar and recorded as contra-research and development expense is related to work performed by the Company on the research sub-contract agreements. For the years ended December 31, 2022 and 2021, the Company recorded $8.7 million and $3.0 million, respectively, as contra-research and development expense from Wistar.

Research and development expenses recorded from Wistar relate primarily to the collaborative research agreements and sub-contract agreements related to Gates and CEPI (see Note 4). Research and development expenses recorded from Wistar for the years ended December 31, 2022, 2021 and 2020 were $1.4 million, $2.9 million and $2.3 million, respectively. At December 31, 2022 and 2021, the Company had an accounts receivable balance of $9.9 million and $2.6 million, respectively, and an accounts payable and accrued liability balance of $1.2 million and $548,000, respectively, related to Wistar. As of December 31, 2022 and 2021, the Company had a prepaid expense balance of $375,000 and $261,000, respectively, and recorded $88,000 and $37,000, respectively, as deferred grant funding on its consolidated balance sheet related to Wistar.

15. Geneos Therapeutics, Inc.

In 2016, the Company formed Geneos to develop and commercialize neoantigen-based personalized cancer therapies. Geneos was considered a variable interest entity (VIE) for which the Company was the primary beneficiary. In 2019, Geneos completed the initial closing of a Series A preferred stock financing. The Company invested $1.2 million in the Series A preferred stock financing, which was led by an outside investor. Following this transaction, the Company held 61% of the outstanding equity, on an as-converted to common stock basis, of Geneos and continued to consolidate its investment in Geneos under ASC 810, *Consolidation*.

In January 2020, Geneos completed the second closing of the Series A preferred stock financing, in which the Company invested $800,000. Following this transaction, the Company held 52% of the outstanding equity, on an as-converted to common stock basis, of Geneos and continued to consolidate its investment in Geneos.

In June 2020, Geneos closed an additional Series A preferred stock financing round, in which the Company invested $800,000. Following this transaction, the Company owned 47% of the outstanding equity of Geneos on an as-converted to common stock basis. This transaction triggered a VIE reconsideration, as the Company no longer held a controlling financial

interest. Based on the Company's assessment, Geneos continued to be a VIE as it did not have sufficient equity at risk to finance its activities without additional subordinated financial support. However, the Company was not the primary beneficiary of Geneos, as it did not have the power to direct the activities that most significantly impact Geneos's economic performance. Accordingly, the Company deconsolidated its investment in Geneos as of June 1, 2020, resulting in a gain of $4.1 million, of which $2.4 million related to the remeasurement of the retained noncontrolling interest investment to fair value.

The Company applies the equity method to investments in common stock and to other investments in entities that have risk and reward characteristics that are substantially similar to an investment in the investee's common stock. Since the Company's Series A preferred stock investment in Geneos has a substantive liquidation preference, it is not substantially similar to the Company's common stock investment and is therefore recorded as an equity security under ASC 321.

Following the deconsolidation, the Company accounts for its common stock investment in Geneos, in which the Company lacks control but does have the ability to exercise significant influence over operating and financial policies, using the equity method. Generally, the ability to exercise significant influence is presumed when the investor possesses more than 20% of the voting interests of the investee. This presumption may be overcome based on specific facts and circumstances that demonstrate that the ability to exercise significant influence is restricted. In applying the equity method, the Company records the investment at cost unless the initial recognition is the result of the deconsolidation of a subsidiary, in which case it is recorded at fair value. The Company's proportionate share of net loss of Geneos is recorded in equity in net earnings of Geneos in the Company's consolidated statements of operations. The Company's equity method investments are reviewed for indicators of impairment at each reporting period and are written down to fair value if there is evidence of a loss in value that is other-than-temporary. Any difference between the carrying amount of the Company's investment and the amount of underlying equity in Geneos's net assets is amortized into income or expense accordingly. There were no basis differences identified as of the deconsolidation date that would need to be amortized.

Upon deconsolidation, the Company recorded its Series A preferred stock investment at fair value based on the per share price paid by third party investors in connection with the preferred stock financing on June 1, 2020. The Company determined that its Series A preferred stock investment in Geneos did not have a readily determinable fair value and therefore elected the measurement alternative in ASC 321 to subsequently record the investment at cost, less any impairments, plus or minus changes resulting from observable price changes in orderly transactions for identical or similar investments of the same issuer. When fair value becomes determinable, from observable price changes in orderly transactions, the Company's investment will be marked to fair value. There have been no observable price changes or impairments identified since the deconsolidation date.

In November 2020, Geneos completed the closing of a Series A-1 preferred stock financing. The Company invested $1.4 million in the Series A-1 preferred stock financing, which was led by outside investors. The closing date of this transaction was determined to be a VIE reconsideration event; based on the Company's assessment, Geneos continued to be a VIE as it did not have sufficient equity at risk to finance its activities without additional subordinated financial support. The Company continued to not be the primary beneficiary of Geneos, as it did not have the power to direct the activities that most significantly impact Geneos's economic performance and should not consolidate Geneos. Following this transaction, the Company held approximately 36% of the outstanding equity, on an as-converted to common stock basis. Accordingly, the Company continued to account for its common stock investment in Geneos as an equity method investment under ASC 323 and its preferred stock investments as equity securities under ASC 321.

The Company's share of net losses of Geneos for the three months ended March 31, 2021 was $1.5 million; however, only $434,000 was recorded, reducing the Company's total investment in Geneos to $0. Of the total amount, $819,000 was allocated to the equity method investment, thereby reducing the balance to $0 as of March 31, 2021. The remaining $4.2 million loss was allocated to the Company's Series A and Series A-1 preferred stock investments in Geneos, on a ratable basis, thereby reducing the investment balance to $0 as of March 31, 2021.

In February 2021, Geneos completed a second closing of the Series A-1 preferred stock financing, in which the Company did not participate. Following this transaction, the Company held approximately 35% of the outstanding equity, on an as-converted to common stock basis.

In March 2022, Geneos completed the closing of a Series A-2 preferred stock financing. The Company invested $2.0 million in the Series A-2 preferred stock financing, which was led by outside investors. The closing date of this transaction was determined to be a VIE reconsideration event; based on the Company's assessment, Geneos continued to be a VIE as it did not have sufficient equity at risk to finance its activities without additional subordinated financial support. The Company continued to not be the primary beneficiary of Geneos, as it did not have the power to direct the activities that most significantly impact Geneos's economic performance and should not consolidate Geneos. Following this transaction, the Company held approximately 28% of the outstanding equity, on an as-converted to common stock basis. Accordingly, the Company continues to account for its common stock investment in Geneos as an equity method investment under ASC 323 and its preferred stock investments as equity securities under ASC 321.

The fair value of Geneos's Series A-2 preferred stock was based on the per share price paid by third-party investors in connection with the closing on March 21, 2022. The Company concluded that its Series A-2 preferred stock investment is a similar financial instrument as its Series A-1 preferred stock, and therefore remeasured the carrying value of the Series A-1 preferred stock investment at the Series A-2 preferred stock price, resulting in a gain on remeasurement of $165,000.

The Company recorded its current and accumulated share of net losses of Geneos of $2.2 million, which was allocated to the Series A-1 and Series A-2 preferred stock investment in Geneos, thereby reducing the balance to $0 as of December 31, 2022 as shown in the table below:

Investment in Geneos Series A-2 preferred stock	$	1,999,998
Remeasurement of Geneos Series A-1 preferred stock		165,215
Share in current and accumulated net loss of Geneos		(2,165,213)
Investment in Geneos as of December 31, 2022	$	—

The Company will not reduce its investment below $0 and will not record its share of further net losses of Geneos as the Company has no obligation to fund Geneos.

The Company continues to exclusively license its SynCon immunotherapy and CELLECTRA technology platform to Geneos to be used in the field of personalized, neoantigen-based therapy for cancer. The license agreement provides for potential royalty payments to the Company in the event that Geneos commercializes any products using the licensed technology.

The Company's Chief Scientific Officer Dr. Laurent Humeau is on the Board of Directors of Geneos. The Company's director Dr. David B. Weiner is the Chairman of the Scientific Advisory Board of Geneos.

16. Subsequent Events

On January 31, 2023, the Company committed to and communicated a corporate reorganization plan, including a reduction in force (the "Reduction"). The purpose of the Reduction is to decrease expenses and maintain a streamlined organization to support key clinical programs that are expected to drive long-term growth. As part of the Reduction, the Company reduced its overall headcount by approximately 24 employees, which represented 11% of its full-time employees. Along with other planned cost-saving measures, the Reduction is expected to provide annual savings of approximately $4.3 million. The Company expects to incur a one-time pre-tax charge of approximately $1.1 million in the first quarter of 2023 related to the Reduction, consisting primarily of one-time severance payments upon termination, continued benefits for a specific period of time, and outplacement services. The Company expects such costs to be the only direct expense of the Reduction. The Company expects all charges associated with the Reduction to be incurred during the quarter ending March 31, 2023, with related cash payments expected to be paid out in the first half of 2023.

On January 18, 2023, the court for the securities class action (see Note 11) entered an order granting final approval of the settlement, as set forth in a stipulation of settlement. In February 2023, pursuant to the securities class action settlement, the Company issued 7,000,000 shares of common stock. Following the expiration of the appeal period or resolution of an appeal if one is filed, the Company will make another contribution of common stock to the settlement fund with a value of approximately $2.1 million. The number of shares will be calculated based on the average trading price of the common stock for the 10 trading days preceding the determination date pursuant to the terms of the securities class action settlement.

Exhibit 21.1

INOVIO PHARMACEUTICALS, INC.
Subsidiaries

Subsidiary Name(1)	Jurisdiction of Organization
Inovio Asia, LLC	South Korea

Exhibit 23.1

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the following Registration Statements:

1. Registration Statement (Form S-3 No. 333- 236202) of Inovio Pharmaceuticals, Inc.,
2. Registration Statement (Form S-3 No. 333-252256) of Inovio Pharmaceuticals, Inc.,
3. Registration Statement (Form S-8 Nos. 333-142938, 333-150769, 333-161559, 333-166906, 333-174353, 333-181532, 333-192318, 333-196325, 333-209155, and 333-216061) pertaining to the 2007 Omnibus Incentive Plan, as amended, of Inovio Pharmaceuticals, Inc.,
4. Registration Statement (Form S-8 Nos. 333-216059, 333-223776, 333-230337, 333-231872, 333-236201, 333-253736 and 333-263167) pertaining to the 2016 Omnibus Incentive Plan, as amended, of Inovio Pharmaceuticals, Inc.,
5. Registration Statement (Form S-8 No. 333-265944) pertaining to the Inovio Pharmaceuticals, Inc. 2022 Inducement Plan,

of our reports dated March 1, 2023, with respect to the consolidated financial statements of Inovio Pharmaceuticals, Inc. included in this Annual Report (Form 10-K) of Inovio Pharmaceuticals, Inc. for the year ended December 31, 2022.

/s/ Ernst & Young LLP

San Diego, California

March 1, 2023

Exhibit 31.1

Certification of CEO Pursuant to
Securities Exchange Act Rules 13a-15(e) and 15d-15(e)
as Adopted Pursuant to
Section 302 of the Sarbanes-Oxley Act of 2002

I, Jacqueline E. Shea, certify that:

1. I have reviewed this annual report on Form 10-K of Inovio Pharmaceuticals, Inc.

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15(d)-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, 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;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 1, 2023

/s/ JACQUELINE E. SHEA

Jacqueline E. Shea
President, Chief Executive Officer and Director

Exhibit 31.2

Certification of CFO Pursuant to
Securities Exchange Act Rules 13a-15(e) and 15d-15(e)
as Adopted Pursuant to
Section 302 of the Sarbanes-Oxley Act of 2002

I, Peter Kies, certify that:

1. I have reviewed this annual report on Form 10-K of Inovio Pharmaceuticals, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15(d)-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, 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;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control

Date: March 1, 2023

/s/ Peter Kies

Peter Kies
Chief Financial Officer

Exhibit 32.1

Certification Pursuant to
18 U.S.C. Section 1350,
As Adopted Pursuant to
Section 906 of the Sarbanes-Oxley Act of 2002

In connection with the Annual Report of Inovio Pharmaceuticals, Inc. (the "Company") on Form 10-K for the year ending December 31, 2022 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), each of the undersigned, in the capacities and on the date indicated below, hereby certifies, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that to his knowledge:

(1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: March 1, 2023

/s/ JACQUELINE E. SHEA

Jacqueline E. Shea
President, Chief Executive Officer and Director
(Principal Executive Officer)

Date: March 1, 2023

/s/ PETER KIES

Peter Kies
Chief Financial Officer
(Principal Financial and Accounting Officer)