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

FORM 10-K

(Mark One)

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

For the fiscal year ended December 31, 2018

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 Number 001-38244

Genprex, Inc.

(Exact Name of Registrant as Specified in Its Charter)

Delaware **(State or Other Jurisdiction of Incorporation or Organization)**	**90-0772347** **(I.R.S. Employer Identification Number)**
1601 Trinity Street, Bldg B, Suite 3.322 **Austin, Texas** **(Address of Principal Executive Offices)**	**78712** **(Zip Code)**

Registrant's Telephone Number, including area code: (512) 370-4081

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

Title of each class	**Name of each exchange on which registered**
Common Stock, par value $0.001 per share	The Nasdaq Capital Market

Securities registered pursuant to 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 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 (§232.405 of this chapter) 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 if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§229.405 of this chapter) is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ☐

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

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

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

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

The aggregate market value of the voting and non-voting common equity held by non-affiliates of the registrant as of June 29, 2018 (the last business day of the registrant's most recently completed second fiscal quarter) was approximately $30.4 million, based on the closing price of the registrant's common stock on June 29, 2018 of $7.6627 per share, as reported by the Nasdaq Capital Market.

As of March 25, 2019, there were 15,536,765 shares of the registrant's common stock outstanding.

DOCUMENTS INCORPORATED BY REFERENCE

Portions of the registrant's definitive proxy statement to be filed with the Securities and Exchange Commission, or SEC, subsequent to the date hereof pursuant to Regulation 14A in connection with the registrant's 2019 Annual Meeting of Stockholders, are incorporated by reference into Part III of this Annual Report on Form 10-K. Such proxy statement will be filed with the SEC not later than 120 days after the conclusion of the registrant's fiscal year ended December 31, 2018.

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CAUTIONARY NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains forward-looking statements, principally under the headings "Business," "Risk Factors" and "Management's Discussion and Analysis of Financial Condition and Results of Operations". In some cases, you can identify these statements by forward-looking words such as "may," "might," "should," "would," "could," "expect," "plan," "anticipate," "intend," "believe," "estimate," "predict," "potential" or "continue," and the negative of these terms and other comparable terminology. These forward-looking statements, which are subject to known and unknown risks, uncertainties and assumptions about us, may include projections of our future financial performance based on our growth strategies and anticipated trends in our business. These statements are only predictions based on our current expectations and projections about future events. There are important factors that could cause our actual results, level of activity, performance or achievements to differ materially from the results, level of activity, performance or achievements expressed or implied by the forward-looking statements. In particular, you should consider the numerous risks and uncertainties described under "Risk Factors."

While we believe we have identified material risks, these risks and uncertainties are not exhaustive. Other sections of this Annual Report on Form 10-K describe additional factors that could adversely impact our business and financial performance. Moreover, we operate in a very competitive and rapidly changing environment. New risks and uncertainties emerge from time to time, and it is not possible to predict all risks and uncertainties, nor can we assess the impact of all factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements.

Although we believe the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee future results, level of activity, performance or achievements. Moreover, neither we nor any other person assumes responsibility for the accuracy or completeness of any of these forward-looking statements. You should not rely upon forward-looking statements as predictions of future events. Except as required by law, we are under no duty to update any of these forward-looking statements to conform our prior statements to actual results or revised expectations, and we do not intend to do so.

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

- our ability to obtain additional funding to develop our current and potential product candidates;
- the need to obtain regulatory approval of our current and potential product candidates;
- the success of our clinical trials through all phases of clinical development;
- compliance with obligations under intellectual property licenses with third parties;
- any delays in regulatory review and approval of product candidates in clinical development;
- our ability to commercialize our current and potential product candidates;
- market acceptance of our current and potential product candidates;
- competition from existing products or new products that may emerge;
- potential product liability claims;
- our dependence on third-party manufacturers to supply or manufacture our products;
- our ability to establish or maintain collaborations, licensing or other arrangements;
- our ability and third parties' ability to protect intellectual property rights;
- our ability to adequately support future growth; and
- our ability to attract and retain key personnel to manage our business effectively.

You should carefully read this Annual Report on Form 10-K and the documents that we reference herein and have filed as exhibits to this Annual Report on Form 10-K completely and with the understanding that our actual future results may be materially different from what we expect. We qualify all of the forward-looking statements in this Annual Report on Form 10-K by these cautionary statements.

We caution you not to place undue reliance on the forward-looking statements contained in this Annual Report on Form 10-K, which speak only as of the date of this Annual Report on Form 10-K.

PART I

Item 1. Business.

Overview

Genprex™ is a clinical stage gene therapy company developing a new approach to treating cancer, based upon our novel proprietary technology platform, including our initial product candidate, Oncoprex™ immunogene therapy, or Oncoprex. Our platform technologies are designed to administer cancer fighting genes by encapsulating them into nanoscale hollow spheres called nanovesicles, which are then administered intravenously and taken up by tumor cells where they express proteins that are missing or found in low quantities. Oncoprex has a multimodal mechanism of action whereby it interrupts cell signaling pathways that cause replication and proliferation of cancer cells, re-establishes pathways for apoptosis, or programmed cell death, in cancer cells, and modulates the immune response against cancer cells. Oncoprex has also been shown to block mechanisms that create drug resistance.

We hold an exclusive worldwide license from The University of Texas MD Anderson Cancer Center, or MD Anderson, to patents covering the therapeutic use of a series of genes that have been shown in preclinical and clinical research to have cancer fighting properties.

With Oncoprex, we are initially targeting non-small cell lung cancer, or NSCLC. Researchers at MD Anderson have conducted two Phase I clinical trials and are currently conducting an ongoing Phase II clinical trial of Oncoprex in NSCLC. According to the World Health Organization, lung cancer is the leading cause of cancer deaths worldwide, causing more deaths than breast, colon, kidney, liver, prostate or skin cancers, and lung cancer is one of the most common types of cancer. Each year, there are over 2 million new lung cancer cases and 1.7 million deaths from lung cancer worldwide, and in the United States there are over 228,000 new cases and more than 142,000 deaths from lung cancer per year. NSCLC represents 84% of all lung cancers. According to the National Cancer Institute, the five-year survival rate for Stage IV (metastatic) NSCLC is less than 5%, and overall survival for lung cancer has not improved appreciably in the last 25 years. We believe that there is a significant unmet medical need for new treatments for NSCLC in the United States and globally, and we believe that Oncoprex may be suitable for a majority of NSCLC patients.

We believe that our platform technologies could allow delivery of a number of cancer fighting genes, alone or in combination with other cancer therapies, to combat multiple types of cancer. Our research and development pipeline, discussed in “Our Pipeline” below, demonstrates our clinical and preclinical progress to date.

Cancer results from genetic mutations. Mutations that lead to cancer are usually present in two major classes of genes: oncogenes, which are involved in functions such as signal transduction and transcription; and tumor suppressor genes, which play a role in governing cell proliferation by regulating transcription. Transduction is the process by which chemical and physical signals are transmitted through cells. Transcription is the process by which a cell’s DNA sequence is copied to make RNA molecules, which then play a role in protein expression. In normal cells, mutations in oncogenes are discovered and targeted for elimination by tumor suppressor genes. In cancer cells, the oncogene mutations may overwhelm the natural tumor suppression processes, or those tumor suppression processes may be impaired or absent. Functional alterations due to mutations in oncogenes or tumor suppressor genes may result in the abnormal and uncontrolled growth patterns characteristic of cancer. These genetic alterations facilitate such malignant growth by affecting signal transduction pathways and transcription, thus inhibiting normal growth signaling in the cell, circumventing the natural process of apoptosis, evading the immune system’s response to cancer, and inducing angiogenesis, which is the formation of new blood vessels that supply cancer cells.

The most common genetic alterations present in NSCLC are in tumor suppressor genes, against which few targeted small molecule drugs have been developed. Each of the two sets of chromosomes in the cell nucleus includes two copies of each gene, called alleles, which may be identical or may show differences. In most situations, tumor suppressor genes require both alleles of a gene to be deleted or inactivated to impair tumor suppression activity and lead to tumor growth. The replacement of just one functional allele may therefore be enough to restore the normal cellular functions of growth regulation and apoptosis.

Among the genetic conditions associated with lung cancer are the overexpression of epidermal growth factor receptors, or EGFRs, and mutations of kinases. Kinases are enzymes that play an important role in signal transduction through the modification of proteins by adding or taking away phosphate groups, a process called (de-)phosphorylation, to change the proteins’ function. When two EGFR transmembrane proteins are brought to proximity on the cell membrane surface, or dimerize, either through a ligand, or binding molecule, that binds to the extracellular receptor, or through some other process, the intracellular protein-kinase domains can autophosphorylate, and activate downstream processes, including cell signaling pathways that can lead to either cell cycle arrest or cell growth and proliferation. EGFRs and kinases can act similarly to a switch that turns “on” and “off” when phosphate groups are either added or taken away. Mutated kinases can have a malfunctioning on/off switch, causing the switch to be stuck in the “on” position or failing to turn the switch “off,” leading to the loss of cell control.

A subset of NSCLC patients (approximately 10% of NSCLC patients of North American and European descent and approximately 30% to 50% of NSCLC patients of Asian descent) carry an EGFR mutation that makes their tumors sensitive to

tyrosine kinase inhibitors, or TKIs, such as erlotinib. However, even for these patients, tumor resistance to TKIs frequently develops within two years, resulting in eventual disease progression. TKIs, such as erlotinib, generally do not benefit NSCLC patients who do not have this activating EGFR mutation. However, our clinical and preclinical data have shown that the combination of Oncoprex and erlotinib can increase anti-tumor activity even in cancers without the EGFR mutations, as well as in cancers that have become resistant to erlotinib. For this reason, we believe Oncoprex may be suitable for the majority of NSCLC patients.

Cancer can spread when cells' natural cancer suppression functions are impaired. The tumor suppressor gene called Tumor Suppressor Candidate 2, or TUSC2 (which was formerly known as FUS1) has been shown to affect both cell proliferation and apoptosis. TUSC2 is a pan-kinase inhibitor, which means that it has the ability to inhibit multiple kinase receptors, such as EGFR and platelet-derived growth factor receptor, or PDGFR. TUSC2 is frequently inactivated early in the development of lung cancer, and loss of TUSC2 expression in NSCLC is associated with significantly worse overall survival compared to patients with normal TUSC2 expression. Many types of cancer cells, including approximately 85% of NSCLC cells, lack expression of TUSC2.

Cancer can also spread when the body's natural immune functions are impaired, including by the cancer cells themselves. PD-1, or Programmed Death-1, is a receptor expressed on the surface of activated T cells, which are part of the body's immune system. PD-L1, or Programmed Death Ligand-1, is a protein/receptor expressed on the surface of cancer and other cells. The binding of PD-1 to PD-L1 has been speculated to contribute to cancer cells' ability to evade the body's immune response. PD-1 and molecules like it are called immune checkpoints, because they can impede the normal immune response, for example by blocking the T cells from attacking the cancer cells. In many cancers, PD-L1 receptors are up-regulated, and substantial research is now being performed in the emerging field of immuno-oncology to discover drugs or antibodies that could block PD-L1 and similar receptors. It is believed that blocking the PD-1/PD-L1 interaction pathway and other similar checkpoints, such as cytotoxic T-lymphocyte-associated protein 4, or CTLA-4, with drugs called checkpoint inhibitors can prevent cancer cells from inactivating T cells.

Our Oncoprex immunogene therapy is designed to interrupt cell signaling pathways that cause replication and proliferation of cancer cells, and to target and kill cancer cells via receptor pathways, and also to stimulate the natural immune responses against cancer. Oncoprex combines features of gene therapy and immunotherapy in that it up-regulates TUSC2 expression in the cell, and also increases the anti-tumor immune cell population and down-regulates PD-L1 receptors, thereby boosting the immune response to cancer.

Oncoprex consists of a TUSC2 gene encapsulated in a positively charged nanovesicle made from lipid molecules with a positive electrical charge. Oncoprex is injected intravenously and can specifically target cancer cells, which generally have a negative electrical charge. Once Oncoprex is taken up into a cancer cell, the TUSC2 gene is expressed into a protein that is capable of restoring certain defective functions arising in the cancer cell. Oncoprex nanovesicles are designed to deliver the functioning TUSC2 gene to cancer cells while minimizing their uptake by normal tissue. Tumor biopsy studies conducted at MD Anderson show that the uptake of TUSC2 in tumor cells after Oncoprex treatment is 10 to 25 times the uptake in normal cells. We believe that Oncoprex, unlike other gene therapies, which either need to be delivered directly into tumors or require cells to be removed from the body, re-engineered and then reinserted into the body, is the first systemic gene therapy to be used for cancer in humans.

Clinical data from the evaluation of 25 patients in our Phase I/II clinical trial, as well as our preclinical data, indicate that Oncoprex can be combined with the widely used anti-cancer drug erlotinib (marketed as Tarceva® by Genentech, Inc.) in humans. Erlotinib is a tyrosine kinase inhibitor, or TKI, which uses a mechanism of action similar to that of pan-kinase inhibitors to block the action of tyrosine kinases, which are a type of kinase involved in many cell functions, including cell signaling, growth and division. In addition, MD Anderson researchers have conducted preclinical studies combining Oncoprex with:

- the TKI gefitinib (marketed as Iressa® by AstraZeneca Pharmaceuticals) in animals and in human NSCLC cells;
- third generation TKIs such as osimertinib (marketed as Tagrisso® by AstraZeneca Pharmaceuticals);
- MK2206 in animals (MK2206 is an inhibitor of AKT kinases, which affect cell signaling pathways downstream from tyrosine kinases);
- an anti-PD-1 antibody such as pembrolizumab (marketed as Keytruda® by Merck & Co.) in humanized animal models;
- an anti-PD-1 antibody equivalent to the checkpoint inhibitor nivolumab (marketed as Opdivo® by Bristol-Myers Squibb Company) in animals; and
- an anti-CTLA4 antibody equivalent to ipilimumab (marketed as Yervoy® by Bristol-Myers Squibb Company) in animals.

The manufacturers of the marketed drugs were not involved in any of our clinical or preclinical studies. In studies involving marketed drugs, the drugs were administered concurrently with Oncoprex without being modified in any way, and the antibodies used in our preclinical studies that did not use the marketed drugs were the non-humanized equivalent to marketed drugs.

Data from these clinical and preclinical studies indicate that combining Oncoprex with these other therapies yields results more favorable than either these therapies or Oncoprex alone, with minimal side effects relative to other lung cancer drugs, thereby potentially making Oncoprex a therapy complementary to these cancer treatments. In addition, based on our clinical and preclinical studies and on preclinical studies conducted by others, we believe that Oncoprex could be combined with other lung cancer drugs that have similar mechanisms of action to the drugs mentioned above, such as pembrolizumab (marketed as Keytruda® by Merck & Co.), nivolumab (marketed as Opdivo® by Bristol-Myers Squibb Company), durvalumab (marketed as Imfinzi® by Medimmune/AstraZeneca), atezolizumab (marketed as Tecentriq® by Genentech/Roche), and osimertinib (marketed as Tagrisso® by AstraZeneca).

Researchers at MD Anderson have collaborated with other researchers to identify other genes, such as those in the 3p21.3 chromosomal region, that may act as tumor suppressors or have other cancer fighting functions. We hold rights to certain of these genes under license agreements with MD Anderson. Data from preclinical studies performed by others suggest that product candidates that could be derived from our technology platform could be effective against other types of cancer, including breast, head and neck, renal cell (kidney), gliobastoma, and soft tissue cancer, as well as NSCLC. Therefore, our platform technologies may allow delivery of a number of cancer fighting genes, alone or in combination with other cancer therapies, to combat multiple types of cancer.

MD Anderson researchers have completed the first phase of a Phase I/II clinical trial of Oncoprex in combination with erlotinib in patients with Stage IV (metastatic) or recurrent NSCLC that is not potentially curable by radiotherapy or surgery, whether or not they have received prior chemotherapy, and whether or not they have an activating EGFR mutation. The Phase I portion of the trial was a dose-escalating study with primary endpoints of establishing the safety and tolerability of the combination of Oncoprex and erlotinib, and establishing the Maximum Tolerated Dose, or MTD. The secondary endpoint of the Phase I portion of the trial was to assess the toxicity of the combination of Oncoprex with erlotinib. In the Phase I portion of the trial, which began in 2014, 18 subjects were treated, and the MTD was determined to be the highest tested dose: 0.6 mg/kg of Oncoprex administered every 21 days and 150 mg of erlotinib per day. Toxicities were found to compare favorably with those of other lung cancer drugs.

The Phase II portion of the trial is designed to include subjects treated with the combination of Oncoprex and erlotinib at the MTD with the primary goal of measuring the response rate, and secondary endpoints of stable disease, time to progression and overall survival. The response rate for cancer therapies is defined under the Response Evaluation Criteria in Solid Tumors, or RECIST, as Complete Response (CR) + Partial Response (PR); disease control rate is defined under the RECIST criteria as Complete Response (CR) + Partial Response (PR) + Stable Disease (SD)>8weeks.

Enrollment criteria for the second phase of the Phase I/II clinical trial are identical to those in the first phase. The Phase II portion of the trial began in June 2015 and is ongoing at MD Anderson. Of the 39 patients allowed in the protocol for the Phase II portion of the trial, 10 have been enrolled and nine are evaluable for response under the trial protocol, because they have received two or more cycles of treatment. Interim results show that four of the patients had tumor regression and one patient had a Complete Response, or CR under the RECIST criteria. The patient with the CR had disappearance of the lung primary tumor, as well as lung, liver, and lymph node metastases. The median response duration for all patients, which is defined as the median time between when response is first noted to the time when cancer progression is observed, was three months. The response rate for the nine patients evaluated to date was 11% and the disease control rate for the nine patients was 78%.

The response rate and disease control rate to date in the Phase II portion of our Phase I/II clinical trial substantially exceeds the response rate of 7% (with no CRs) and disease control rate of 58% reported for a clinical trial of the TKI afatinib (marketed as Gilotrif® by Boehringer Ingelheim Pharmaceuticals, Inc.) in a study referred to as the LUX-Lung 1 clinical trial. A total of 585 patients were enrolled in that Phase IIB/III clinical trial, whose primary endpoint was overall survival and whose secondary endpoints were progression-free survival, RECIST response, quality of life and safety. The LUX-Lung 1 clinical trial was a randomized, double blinded Phase IIB/III clinical trial treating subjects with Stage IIIB or IV adenocarcinoma, a type of NSCLC. The Phase II portion of our Phase I/II trial is not blinded, and is designed to treat NSCLC subjects regardless of EGFR status.

Preliminary analysis of the early data from the Phase II portion of our Phase I/II trial supports our belief that Oncoprex may provide medical benefit in several subpopulations of NSCLC patients for which there is an unmet medical need, and may provide pathways for accelerated approval by the US Food and Drug Administration, or FDA. As a result of these initial findings, in April 2016, we suspended enrollment of new patients in the Phase II portion of the trial to collect additional trial data and have it analyzed in order to seek FDA guidance as to whether the protocol for this clinical trial could be modified to expand enrollment and also to divide the patients into cohorts with a view toward seeking accelerated approval in one or more of these cohort populations. We have completed the collection and analysis of the additional preliminary data and expect to present our findings to the FDA within the next several months. We now have decided to continue this clinical trial under the current protocol without major modification at this time. We are maintaining our plan to seek a pathway toward accelerated approval in one or more patient cohort populations. Although this clinical trial is currently closed to new patient enrollment, it is not terminated, and is considered “ongoing” because activities such as patient follow-up and further data collection and analysis continue. We plan to reopen enrollment in the Phase II portion of the trial at

MD Anderson and at additional clinical trial sites.

In 2012, MD Anderson researchers completed a Phase I clinical trial of Oncoprex as a monotherapy. The primary objective of this Phase I trial was to assess the toxicity of Oncoprex administered intravenously and to determine the MTD and recommended Phase II dose of Oncoprex alone. Secondary objectives were to assess the expression of TUSC2 following intravenous delivery of Oncoprex in tumor biopsies and also to assess the anticancer activity of Oncoprex. This trial demonstrated that Oncoprex was well tolerated and established the MTD and the therapeutic dosage for Oncoprex at 0.06 mg/kg administered every 21 days. Although this trial was not designed to show changes in outcomes, a halt in cancer growth was observed in a number of patients, and tumor regressions occurred in primary lung tumors and metastatic cancers in the liver, pancreas, and lymph nodes. In addition, pre- and post-treatment patient biopsies demonstrated that intravenous Oncoprex selectively and preferentially targeted patients' cancer cells, and suggested that clinical anti-cancer activity was mediated by TUSC2.

We believe that Oncoprex' combination of pan-kinase inhibition, direct induction of apoptosis, anti-cancer immune modulation and complementary action with targeted drugs and immunotherapies is unique, and positions Oncoprex to provide treatment for patients with NSCLC and possibly other cancers, who are not benefitting from currently offered therapies.

Our Oncoprex immunogene therapy technology was discovered through a lung cancer research consortium from MD Anderson and The University of Texas Southwestern Medical Center, or UTSWMC, along with the National Cancer Institute, or NCI. The TUSC2 discovery teams included Jack A. Roth, MD, FACS, chairman of our Scientific and Medical Advisory Board. We have assembled a team of experts in clinical and translational research, including laboratory scientists, medical oncologists and biostatisticians, to pursue the development and commercialization of Oncoprex and other potential product candidates.

Our technology discoveries and research and development programs have been the subjects of numerous peer-reviewed publications and have been supported by Small Business Innovation Research, or SBIR, grants and grants from the National Institutes of Health, the United States Department of Treasury, and the State of Texas. We hold a worldwide, exclusive license from MD Anderson to patents covering the therapeutic use of TUSC2 and other genes that have been shown to have cancer fighting properties, as well as a number of related technologies, including 32 issued patents and one allowed patent.

Our Pipeline

We are developing Oncoprex, our lead product candidate, to be administered with erlotinib for NSCLC. We are also conducting preclinical research with the goal of developing Oncoprex to be administered with immunotherapies in NSCLC. In addition, we have conducted research into other tumor suppressor genes associated with chromosome 3p21.3. Our research and development pipeline is shown below:

Our Strategy

We intend to develop and commercialize treatments for cancer based on our proprietary gene therapy platform, alone or in combination with other cancer therapies. Key elements of our strategy include:

- **Conduct Ongoing and New Clinical Trials.** We plan to continue clinical trials of Oncoprex immunogene therapy in combination with erlotinib for treatment of NSCLC, while exploring pathways to accelerated Food and Drug Administration, or FDA, approval of this combination in subpopulations of NSCLC patients for whom there is currently no approved targeted therapy. We also plan to pursue a clinical trial of the combination of Oncoprex with anti-PD-1

immunotherapy. We may also pursue clinical trials of the combination of Oncoprex plus osimertinib (marketed as Tagrisso® by AstraZeneca) and with additional targeted therapies and immunotherapies.

- **Investigate the Effectiveness of Oncoprex in Other Cancers** We may also explore the combination of Oncoprex and erlotinib in other cancers such as soft tissue sarcomas, kidney, head and neck, glioblastoma, and/or breast cancer, and we may pursue development of additional proprietary genes alone or in combination with other drugs, such as EGFR TKIs and/or with immunotherapies.
- **Prepare to Commercialize Oncoprex.** Successful commercialization requires careful alignment of Genprex's business model with its manufacturing strategy. As Genprex continues the development of Oncoprex, access to technology is a primary consideration. Manufacturing strategy has been developed and incorporated into Genprex's business plan. Genprex expects and plans to continue to refine its manufacturing strategy to ensure scalable production of its drug candidates and prepare for commercialization. The Company believes that our manufacturing team have significant experience to effectively anticipate and solve future manufacturing challenges, associated with scaling production to larger volume, with CDMO partners. The company will continue to establish and demonstrate product bioequivalence as our processes evolve and scale from existing pre-clinical lab settings through technology transfer to future settings including larger GMP scale processes and facilities. Genprex is prepared to provide a GMP validation package for our large-scale manufacturing solutions. As the Company's clinical trials progress, manufacturing will be completed in parallel to ensure optimal drug delivery required for patient demand. This will require specialized expertise, advanced manufacturing, and supply chain management capabilities that Genprex will leverage through our access to and, optimal use of, innovative technologies. We also expect to review and optimize supply chain services such as stability studies, cold chain storage and shipping, and supply and inventory management. In addition to meeting requirements for reproducibility, safety, and efficacy, the preparation to support commercialization of Oncoprex is also designed to be cost effective. Genprex will continue to optimize its manufacturing capabilities and process controls to support clinical trials and move toward commercialization.

- **Pursue Strategic Partnerships.** As we gather additional clinical data, we plan to pursue strategic partnerships with other developers and providers of anti-cancer drugs to investigate possible therapeutic combinations of Oncoprex with drugs manufactured by others, to accelerate the development of our current and potential product candidates through co-development and to increase the commercial opportunities for our current and potential product candidates.

- **Develop Our Platform Technology.** We plan to investigate the applicability of our platform technology with additional anti-cancer drugs.

Current Treatment of Cancer

Chemotherapy is the standard treatment for the majority of NSCLC patients, as it is for many cancer patients. Because it is a systemic, rather than a targeted, approach to treating cancer, chemotherapy also kills healthy cells and has a number of other side effects.

A subset of NSCLC patients carry one or both of two EGFR mutations, referred to as exon 19 deletion and exon 21 substitution, which make their tumors sensitive to TKIs. Because EGFR is frequently overexpressed in lung tumors, it has become a favored therapeutic target for pharmaceutical companies. Several pharmacological and biological approaches, including TKIs, have been developed specifically to block activated EGFR for cancer therapy. The class of drugs functioning as protein kinase inhibitors, or KIs, comprises the majority of targeted therapies for lung cancer, accounting for most sales and use. Of the KIs, the TKI drugs are the most common, with drugs targeting EGFR kinases leading the sector growth. Several EGFR TKI therapies are marketed commercially including market leader erlotinib, gefitinib, afatinib and osimertinib.

A leading small molecule EGFR TKI is erlotinib, which is approved in the U.S and Europe as a first-line therapy in metastatic NSCLC patients with an activating EGFR mutation. Erlotinib was previously approved as a second-line treatment in patients with metastatic NSCLC after failure of at least one prior chemotherapy regimen. Erlotinib has been used to treat more than 400,000 lung cancer patients.

However, while erlotinib is most effective in patients who have an activating EGFR mutation and are therefore described as "EGFR positive," it is significantly less effective in overall NSCLC populations and is generally not effective in patients without an activating EGFR mutation. Approximately 10% of NSCLC patients of North American and European descent and approximately 30% to 50% of NSCLC patients of Asian descent have the activating EGFR mutations. This means that the majority of NSCLC patients do not have activating EGFR mutations and are therefore "EGFR negative" and not optimal candidates for erlotinib and other TKIs.

In addition, even among those patients who are EGFR positive and benefit from erlotinib therapy, most eventually become resistant to and ultimately no longer respond to erlotinib therapy, resulting in eventual disease progression. Furthermore, clinical trials have shown that combining EGFR TKIs with conventional chemotherapy does not increase survival for lung cancer patients.

While next generation TKIs show promise in targeting resistant EGFR positive tumors that carry a mutation known as T790M, only about one-half of EGFR positive patients (5% to 7.5% of all NSCLC patients of North American and European descent and 15% to 25% of NSCLC patients of Asian descent) carry the T790M mutation. This leaves a significant majority of NSCLC patients—those who are EGFR negative and those who are EGFR positive but have become resistant to erlotinib and do not have the T790M mutation—without a targeted therapy for their cancer.

Our clinical and preclinical data indicate that the combination of our lead product candidate, Oncoprex, with erlotinib and other EGFR TKIs may increase anti-tumor activity in cancers with or without the EGFR mutations and in cancers that have become resistant to erlotinib therapy, thus expanding the number of patients who could benefit from those drugs.

TUSC2, the Active Agent in Oncoprex

TUSC2, which is the active agent in Oncoprex, is a multifunctional gene that plays a vital role in cancer suppression and normal cell regulation. Key TUSC2 anti-cancer mechanisms of action include the inactivation of multiple oncogenic kinases, the induction of apoptosis, the control of cell signaling and inflammation, and modulation of the immune system to fight cancer. Oncoprex has also been shown to block mechanisms that create drug resistance. Our data indicate that Oncoprex in combination with both EGFR TKIs and with immunotherapies achieve results more favorable than results achieved with either Oncoprex or such other therapies alone, and may make those drugs effective for patients who would not otherwise benefit from them.

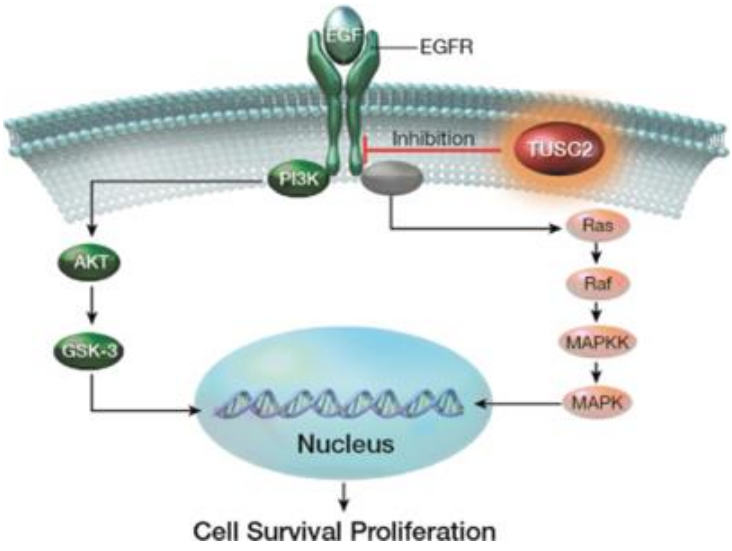
Normal TUSC2 function is inactivated at the early onset of cancer development, making TUSC2 a potential target for all stages of cancer, including metastatic disease. The TUSC2 protein is reduced or absent in approximately 85% of lung cancers. In patients with NSCLC, the loss of TUSC2 expression has been associated with significantly worse overall survival than when TUSC2 expression is not impaired.

Studies show TUSC2 protein functions as a key mediator in the Apaf1-mediated mitochondrial apoptosis pathway by recruiting and directing cytoplasmic Apaf1 protein to a critical cellular location and activating it *in situ* and by up-regulating activity of other proapoptotic effectors. Normal TUSC2 function mediates apoptosis in cancer cells through interaction with Apaf1 and down-regulates multiple tyrosine kinases including EGFR, AKT, PDGFR, c-Kit, and c-Abl. TUSC2 mediates apoptosis in cancer cells but not normal cells through its interaction with Apaf1 and down-regulates tyrosine kinases including EGFR, PDGFR, c-Kit, and c-Abl.

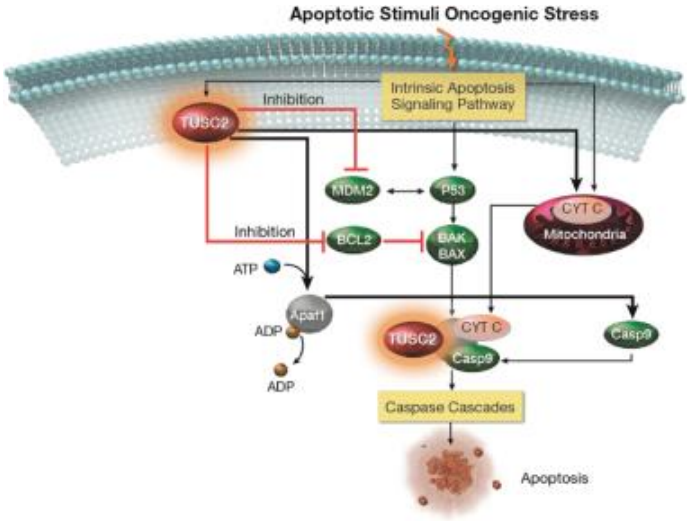
In normal cells, the proteins involved in the PI3K/AKT pathway (also called the mTOR pathway), in which PI3K, a kinase, generates messenger molecules required to translocate AKT, another protein kinase, to the cell's plasma membrane where it is phosphorylated and activated, play an important role in cellular function and cellular trafficking. These proteins are often found to be aberrantly active in cancers, causing cells to lose their ability to control cell growth, proliferation, and differentiation. Thus, mutations in PI3K (overexpression) and its upstream receptors, EGFR, have been associated with many forms of cancers.

Similarly, proteins in the Ras/MAPK pathway, which is a signal transduction pathway that transduces signals to the cell nucleus where specific genes are activated for cell growth, division and differentiation, play a critical role in cellular responses to various stress stimuli, including osmotic stress, DNA damage, and proinflammatory factors. As shown in the figures below, the TUSC2 protein, a potent pan-kinase inhibitor, blocks multiple cell signaling pathways downstream of the receptor (EGFR in the figures), leading to cell cycle interruption and thereby preventing cancer cell proliferation and survival.

Additionally, under stress conditions, such as oncogenic stress, cells go through a regulated process of programmed cell death, or cellular suicide, called apoptosis, in order to control cell development and replication. The TUSC2 protein interacts via various apoptotic signaling pathways to stimulate programmed cell death via the release of caspases, enzymes that play a significant role in apoptosis.



Pan-Kinase Inhibition by TUSC2



Stimulation of Apoptotic Signaling by TUSC2

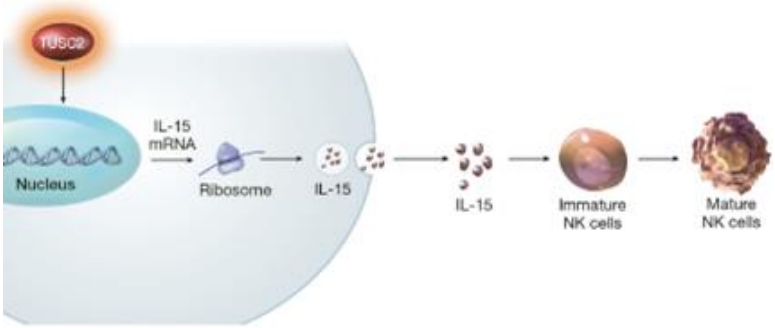
Cancer and the Immune Response

When functioning normally, the body's immune system recognizes and destroys cancer cells, as well as other mutated cells and foreign bodies. As cancer develops over time, some mutations in cancer cells enable them to inhibit immune mechanisms, thus allowing the cancer cells to escape detection and destruction by the immune system and leading to the cancer's "immune tolerance." Therapies are being developed to allow patients to overcome this immune tolerance, some by stimulating the natural immune response and others by removing the inhibitions on the immune response created by the cancer. For example, PD-1 is a protein found on certain types of T cells, which are part of the immune system. Because PD-1 prevents T cells from attacking other cells, including in some cases cancer cells, inhibiting PD-L1 receptors, a process called PD-1 checkpoint inhibition, can facilitate the immune response to cancer.

In addition to its pro-apoptotic cytotoxicity and tyrosine kinase inhibitory activity, TUSC2 enhances the immune response to cancer. Data from preclinical studies at MD Anderson have shown a therapeutic benefit from the combination of TUSC2 and anti-PD-1 antibody and a key role for TUSC2 in regulating immune cell subpopulations including cytokines, natural killer, or NK, cells, and T lymphocytes. In addition, TUSC2 has been found to down-regulate PD-L1 receptors on the surface of cancer cells.

NK cells, an important part of the innate immune system, have developed several mechanisms to distinguish healthy cells from target cells. These mechanisms allow NK cells to kill cells that are deemed dangerous to the host, including cancer cells. However, one of the consequences of malignant transformation is the ability of the cancer cell to evade the immune system. Cancer cells do so via the up-regulation and interplay of receptors, including checkpoint inhibitors such as PD-1 and PD-L1.

As shown in the illustration below, TUSC2 has been found to stimulate the release of interleukin-15, or IL-15, resulting in up-regulation of mature NK cells that circulate and target cancer cells.



Modulation by TUSC2 of the Immune Response to Cancer

The Genprex Platform and Oncoprex

Genprex is developing a novel approach to cancer treatment, based on our immunogene therapy platform, which is designed to deliver any of a number of cancer fighting tumor-suppressor genes, alone or in combination with other cancer therapies, to combat multiple types of cancer. The Genprex platform consists of anti-cancer genes encapsulated in nanovesicles that can be delivered intravenously.

Our lead product candidate, Oncoprex, is the TUSC2 gene, as the active anti-cancer agent, encapsulated into nanovesicles made from fat molecules with a positive electrical charge formulated for intravenous administration. In our ongoing Phase II clinical trial Oncoprex is injected intravenously approximately every 21 days for as long as the patient continues to benefit, which is defined as tumor size stabilization or shrinkage.

Oncoprex has a multimodal mechanism of action whereby it interrupts cell signaling pathways that cause replication and proliferation of cancer cells, re-establishes pathways for programmed cell death, or apoptosis, in cancer cells, and modulates the immune response against cancer cells. Oncoprex has also been shown to block mechanisms that create drug resistance.

Oncoprex is a pan-kinase inhibitor shown to simultaneously inhibit the EGFR and AKT oncogenic kinase pathways *in vitro* and *in vivo*. Once the cancer cell takes up the nanovesicle containing TUSC2, it is reprogrammed to die. Resistance to targeted drugs and checkpoint inhibitors develop through activation of alternate bypass pathways. For example, when PD-1 is blocked, the TIM-3 checkpoint is up-regulated. We believe that Oncoprex' multimodal activity will block emerging bypass pathways, reducing the probability that drug resistance develops.

Our cancer gene therapy platform and its delivery system are highly targeted. While the TUSC2 gene induces apoptosis in cancer cells which have low or absent TUSC2 expression, TUSC2 delivered by nanovesicles to normal cells is not toxic. Moreover, the nanovesicles are taken up by tumor cells after Oncoprex treatment at 10 to 25 times the rate at which they are taken up by normal cells, because of selective endocytosis, or enveloping by the cell, of the nanovesicle lipid formulation and the enhanced permeability and retention, or EPR, characteristics of tumor vasculature, without the need for external ligands, or binding molecules. Pre- and posttreatment biopsies following intravenous injection of Oncoprex in a phase 1 clinical trial showed robust TUSC2 protein expression in cancer cells at both primary and metastatic tumor sites.

Our preclinical and clinical data indicate that Oncoprex is well tolerated and may be effective alone or in combination with targeted small molecule therapies, thereby facilitating the action of both drugs, allowing use in expanded populations of patients who may benefit from advanced therapy regimens.

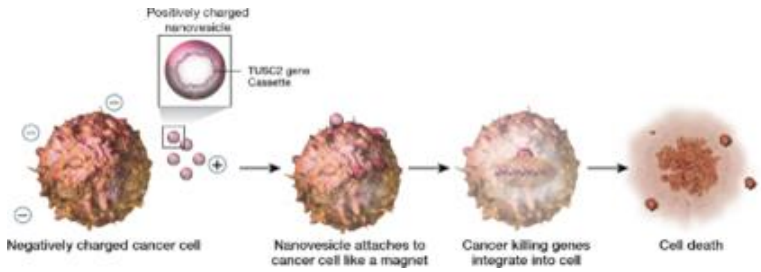
Data have shown that when Oncoprex is combined with EGFR TKI therapy, such as erlotinib, in EGFR mutated resistant cancers, the combination therapy overcomes intrinsic and acquired therapeutic resistance by simultaneously inactivating the EGFR and the AKT signaling pathways to restore apoptotic signaling. Overcoming EGFR resistance in a clinical setting could provide a path for approval of Oncoprex for patients who do not have an activating EGFR mutation (90% of patients of American and European descent and 50% to 70% of those of Asian descent) and/or for patients who have an activating EGFR mutation but who have become resistant to erlotinib.

Clinical and preclinical data indicate that Oncoprex, when combined with EGFR TKIs such as erlotinib, gefitinib, and osimertinib, provides a synergistic effect that could also benefit the larger population of NSCLC patients who are EGFR negative (which means they are not expected to benefit from EGFR TKI drugs alone). Further, our data show that Oncoprex may re-sensitize EGFR positive patients who become resistant to, and therefore no longer benefit from, EGFR TKIs alone. Thus, Oncoprex may both significantly expand the benefit of EGFR TKIs to the majority of patients (90% of those of American and European descent and 50% to 70% of those of Asian descent) who do not have EGFR activating mutations and would therefore not otherwise be expected to benefit from EGFR TKI drugs, and also extend the usefulness and benefit of EGFR TKIs for the population of NSCLC patients who are EGFR positive, but who do not have the T790 mutation and who have become refractory to erlotinib, for whom there is currently no well-accepted standard treatment other than chemotherapy.

Many currently approved cancer therapeutics target only single molecules or a single specific genetic abnormality related to driving the proliferation and survival of cancer cells. In contrast, Oncoprex works by targeting several molecules within the cancer cell to interrupt cell signaling pathways that cause replication and proliferation of cancer cells, to target and kill cancer cells, to block mechanisms that create drug resistance and to stimulate the natural immune response. Moreover, clinical and preclinical data show that Oncoprex works with other cancer drugs or their non-humanized equivalents, to produce more effective anti-cancer effects than either produces alone. In conjunction with these other drugs and equivalents, Oncoprex has been shown to mediate an anti-tumor response through up-regulation of NK cells, CD8+ T cells, and down-regulation of regulatory T cells, or Tregs, and PD-L1 receptors, activate alternative immune mechanisms with the potential to complement checkpoint inhibitors. Published data indicate that effectiveness of these kinase inhibitors and immunotherapy drugs is enhanced when they are combined with Oncoprex.

Delivery System

The Genprex immunogene therapy platform consists of anti-cancer genes encapsulated in nanovesicles delivered intravenously. The Oncoprex TUSC2 gene is encapsulated in a positively charged nanovesicle that binds to actively replicating (and therefore negatively charged) cancer cells, and then enters the cancer cell through selective endocytosis. These nanoscale vesicles differ significantly from liposomes historically used for drug delivery in that they are true particles encapsulating the therapeutic payload within a bilamellar lipid coat. Our collaborators at MD Anderson have optimized the characteristics of lipids including N-(1-(2,3-Dioleoyloxy)propyl)-N,N,N-trimethylammonium methyl sulfate, or DOTAP:cholesterol and a DNA plasmid expressing the TUSC2 tumor suppressor gene which form a spherical particle with a hollow center, nanoscale in size, which encapsulates the TUSC2 gene for delivery as Oncoprex.



Operation of the Oncoprex TUSC2 Nanovesicle Delivery System

The particle size is small enough to allow Oncoprex to cross tight barriers in the lung, but large enough to avoid accumulation or clearance in the liver, spleen and kidney. The cationic (positive) charge of the nanovesicle targets cancer cells, and direct nanovesicle fusion avoids target cell endocytosis. A Phase I clinical trial showed that intravenous Oncoprex therapy selectively and preferentially targeted primary and metastatic tumor cells, resulting in anticancer activity. The nanovesicles are non-immunogenic, allowing repetitive therapeutic dosing and providing extended half-life in the circulation.

We believe that the nanovesicles used in Oncoprex are applicable to delivery of a range of therapeutic and prophylactic plasmid DNAs and RNA interference constructs. The nanovesicle manufacturing methods we and our collaborators have developed have been optimized and we believe they may be useful for a wide array of disease treatments. Clinical outcomes demonstrated that the delivery system used in Oncoprex is well tolerated in humans and can deliver high therapeutic doses. The nanovesicle delivery system and safety database may be attractive to drug developers because it overcomes historical technological boundaries with lipid-based delivery systems.

Platform Technologies

We hold an exclusive worldwide license to patents covering the therapeutic use of a series of genes in the 3p21.3 region of the human chromosome, including TUSC2, that have been shown in preclinical and clinical research to have cancer fighting properties. While we are initially targeting NSCLC, data from preclinical studies conducted by others indicate that product candidates derived from our immunogene therapy platform may also be effective with respect to other types of cancer, including soft tissue, kidney, head and neck, and breast cancer. Preclinical and clinical data also indicate that our current and potential product candidates are complementary to other successful cancer drugs. Therefore, our platform technologies may allow delivery of any of a number of cancer fighting genes, alone or in combination with other cancer therapies, to combat multiple types of cancer. In addition, we are investigating biomarkers to predict response and additional immunotherapies to combine with Oncoprex.

Preclinical and Clinical Development, Rationale and Strategy

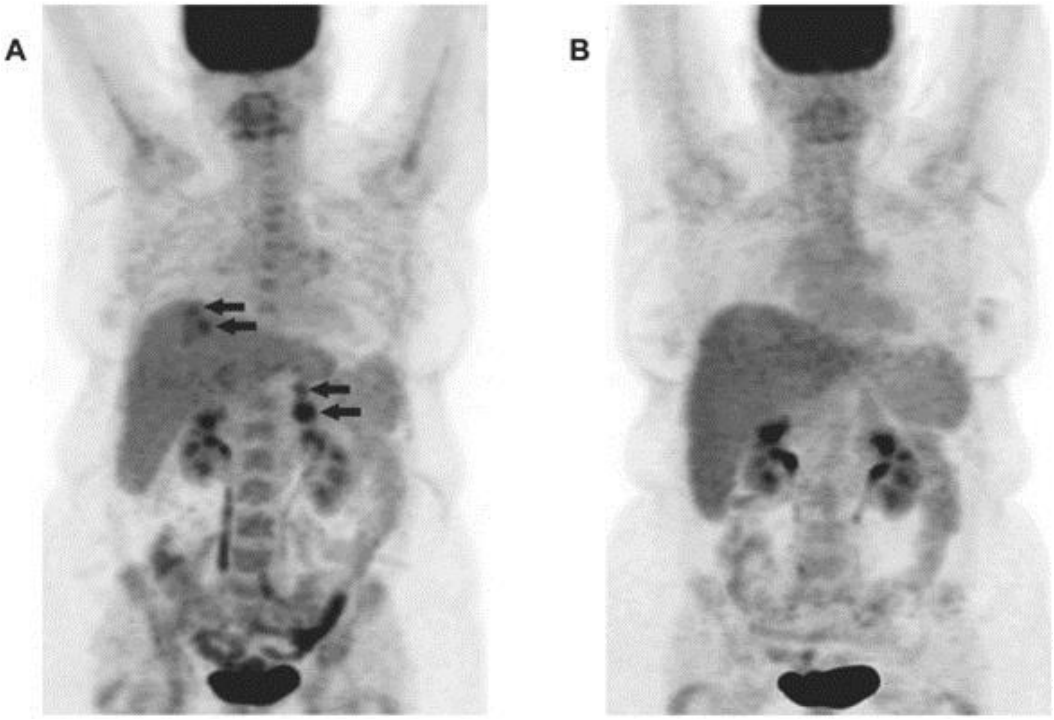
Phase I Monotherapy Clinical Trial

In 2012, MD Anderson researchers completed a Phase I clinical trial of Oncoprex as a monotherapy. The primary objective of this Phase I trial was to assess the toxicity of Oncoprex administered intravenously and to determine the maximum tolerated dose, or MTD, and recommended Phase II dose, of Oncoprex alone. Secondary objectives were to assess the expression of TUSC2 following intravenous delivery of Oncoprex in tumor biopsies and also to assess the anti-cancer activity of Oncoprex, although the study was not designed to show changes in outcomes. This trial demonstrated that Oncoprex was well tolerated and established the MTD and the therapeutic dosage for Oncoprex at 0.06 mg/kg administered every 21 days. Although this trial was not designed to show changes in outcomes, a halt in cancer growth was observed in some patients. Tumor regressions occurred in primary lung tumors and metastatic cancers in the liver, pancreas, and lymph nodes. In addition, pre- and posttreatment patient biopsies demonstrated that intravenous Oncoprex selectively and preferentially targeted patients' cancer cells, and suggested that clinical anti-cancer activity was mediated by TUSC2.

In the Phase I Monotherapy Trial, Oncoprex was injected intravenously in stage IV (metastatic) lung cancer patients who had received traditional platinum combination chemotherapy but still showed tumor progression at the time of entry into the study. Oncoprex was manufactured in GMP facilities to meet specifications of size, appearance, and transfection efficiency. During the trial, manufacturing was transferred from Baylor College of Medicine to MD Anderson, thus confirming reproducibility of the manufacturing process. Subjects received escalating doses ranging from 0.01 mg/kg to 0.09 mg/kg at three-week intervals for a maximum of six cycles of a dose every three weeks. Fever is a common reaction to intravenous drug administration; accordingly, dexamethasone, a steroid, and diphenhydramine, an antihistamine, were administered as a standard treatment to prevent fever and eliminated the only clinically significant toxicity of fever.

In the Phase I Monotherapy Trial, 31 subjects were treated at six dose levels ranging from 0.01 to 0.09 mg/kg. Seventy percent of subjects had received two or more prior chemotherapy regimens. Among four subjects treated without the fever-reducing premedications, all four subjects developed grade 2 or higher fevers within 24 hours of treatment. Among the 27 subjects premedicated with the fever-reducing premedications, the highest fever was grade 2, which occurred in two subjects. The only serious adverse events, defined as grade 3, 4 or 5 events under the Common Terminology Criteria for Adverse Events, or CTCAE, published by the U.S. Department of Health and Human Services, were grade 3 fever (experienced by three patients) and grade 3 hypotension (experienced by 1 patient). The only dose-limiting toxicities were two episodes of transient grade 3 hypophosphatemia (abnormally low levels of phosphate in the blood) resulting in an MTD of 0.06 mg/kg. Twenty-three subjects received two or more doses, of whom five subjects, or 22% of the 23 subjects, achieved disease control for periods ranging from 2.6 months to 10.8 months. The median disease control period for these subjects was 5.0 months (95% CI: 2.0-7.6), while the other 18 subjects' cancer progressed during the Phase I Monotherapy Trial. Disease control for cancer therapies is defined under the Response Evaluation Criteria in Solid Tumors, or RECIST, as Complete Response (CR) + Partial Response (PR) + Stable Disease (SD)>8weeks). Median survival for all subjects in the Phase I Monotherapy Trial was 8.3 months (95% CI 6.0-10.5 months) and mean survival time was 13.2 months (95%CI 8.9-7.5 months) with a range of two to 23+ months.

Two subjects had reductions in primary tumor size of 14% and 26%. One subject with stable disease, a 54-year-old female with a large cell neuroendocrine carcinoma who received 12 cycles of Oncoprex therapy, had evidence of a durable metabolic response, which is a lasting reduction of metabolic activity in the tumor, as shown by positron emission tomography, or PET, imaging. The response was documented with PET scans performed after the second, fourth and sixth doses, all showing decreased metabolic activity in the tumor with no changes in size or number of metastases by computed tomography, or CT, imaging. The illustration below is of the PET scan of this subject performed after the fourth dose. This subject had received six prior chemotherapy regimens. Prior to entry in the Phase I Monotherapy Trial, two hepatic metastases were progressing on gemcitabine. The subject also had a metastasis in the head of the pancreas and a peripancreatic lymph node, shown by the arrows in the illustration below. Illustration A shows the pretreatment PET scan. The dose of Fluorodeoxyglucose (18F) was 8.8mCi. Illustration B shows the post treatment PET scan performed 20 days following the fourth dose of Oncoprex. The dose of Fluorodeoxyglucose (18F) was 9.0mCi. All scans were performed within a 60 to 90 minute window after injection.

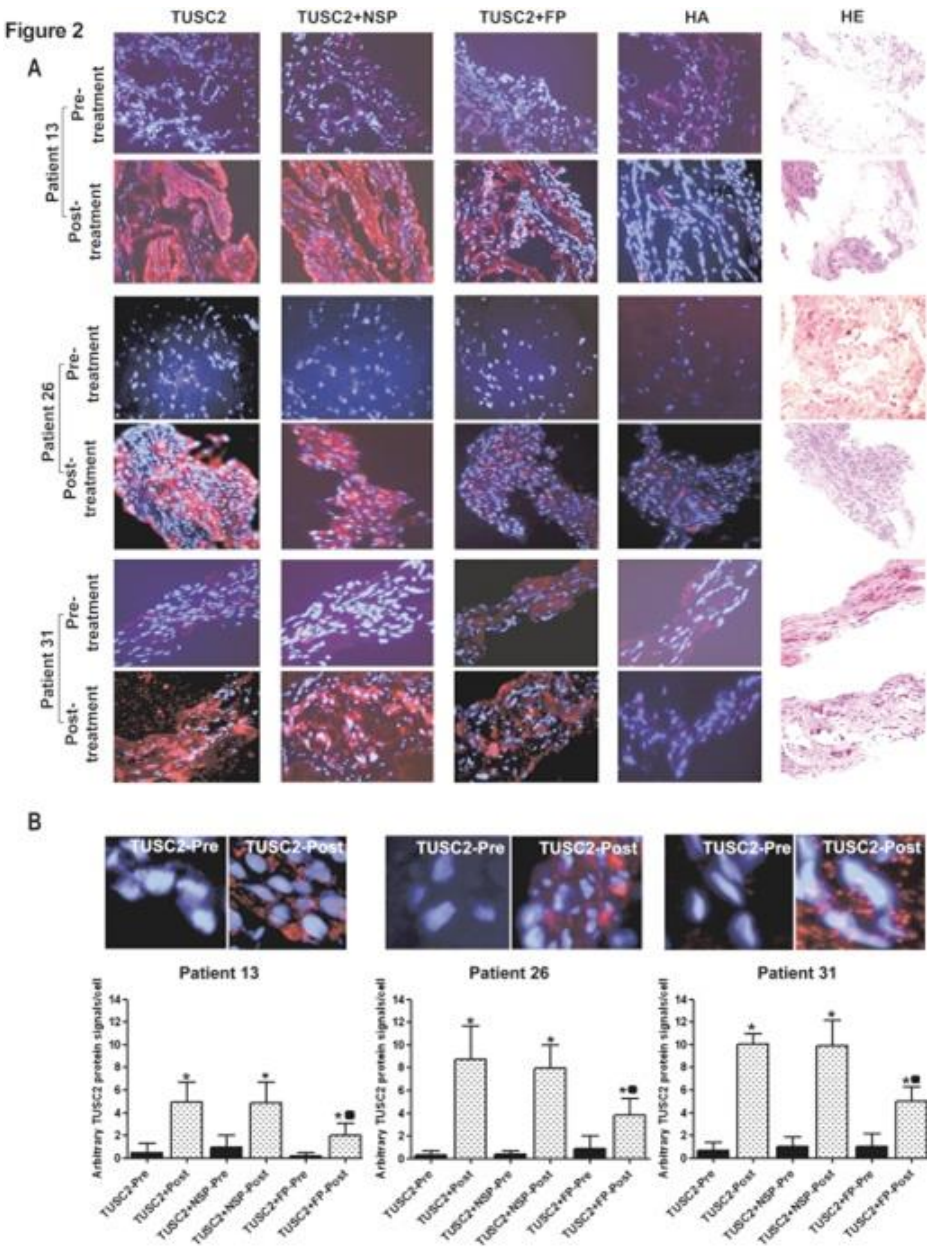


Metabolic Tumor Response in a Metastatic Lung Cancer Subject

This subject survived after subsequent therapy more than seven years after the final treatment with Oncoprex, to our knowledge, without evidence of cancer progression in the responding sites.

To test whether the TUSC2 gene introduced by Oncoprex therapy was expressed following Oncoprex therapy in the Phase I Monotherapy Trial, pre-treatment and 24-hour post-treatment tumor biopsies were obtained from seven subjects by percutaneous CT guidance from a central tumor location. A quantitative real time reverse transcriptase PCR, or RT-PCR, analysis using a plasmid TUSC2 sequence-specific probe was performed on samples blinded to time of biopsy. The RT-PCR analysis detected high levels of TUSC2 plasmid expression in six of seven post-treatment tumor specimens but not in pretreatment specimens or negative controls.

In addition, an *in situ* proximity ligation assay, or PLA, performed on paired biopsies from three subjects, demonstrated no TUSC2 protein staining in pre-treatment tissues compared with intense TUSC2 protein staining in post-treatment tissues. For the PLA, anti-TUSC2 polyclonal antibodies were developed to detect the presence of TUSC2. Pre-treatment and post-treatment biopsies were obtained from three patients. The top panel for each patient in the illustration below represents the pre-treatment biopsy "controls" with DAPI, a type of blue stain. The bottom panel for each patient are post-treatment biopsies, and represent overlays of blue DAPI staining and red anti-TUSC2 antibody staining. The blue stains in the top panels indicate the absence of TUSC2 in the pre-treatment biopsies, and the red and purple (red overlaying blue) stains in the bottom panels indicate the presence of TUSC2 in robust quantities in the post-treatment biopsies, showing that TUSC2 was successfully introduced into the tumors in the Phase I Monotherapy Trial.



Proximity Ligation Assay (PLA) for TUSC2 protein in tumor biopsies

An RT-PCR gene expression profiling analysis of apoptotic pathway genes in a paired specimen showing high post-treatment levels of TUSC2 mRNA and protein in one subject also showed up-regulation and downregulation of certain genes involved in both the intrinsic and extrinsic apoptotic pathways. Antibodies to single and double stranded DNA were not detected 14 months after completion of 12 cycles of therapy in the subject, indicating that within that period no anti-DNA antibodies had developed. The conclusion from the Phase I Monotherapy Trial was that Oncoprex administered intravenously in lung cancer patients was well tolerated with demonstrable gene delivery to tumors with protein expression and evidence of antitumor activity. Although the number of biopsies was limited due to regulatory constraints, the consistent results across test platforms suggests that these observations are reliable.

Based on the positive results from the Phase I Monotherapy Trial and preclinical data from studies of the combination of Oncoprex plus EGFR TKI drugs, we are evaluating Oncoprex as a lung cancer therapeutic to be used in combination with the EGFR kinase inhibitor erlotinib in our ongoing Phase I/II Combination Therapy Trial.

Preclinical Studies

Investigators at MD Anderson conducted preclinical research showing that Oncoprex alone blocked the activation of the c-Abl tyrosine kinase. A number of other studies at MD Anderson have demonstrated the complementary effects of Oncoprex combined with a variety of targeted kinase inhibitory agents, both marketed and in various stages of clinical development, including erlotinib, gefitinib, osimertinib, MK2206, and others. Researchers investigated the use of Oncoprex combined with commercially available EGFR TKI drugs erlotinib and gefitinib, and conducted preclinical *in vitro* and *in vivo* studies combining Oncoprex with these drugs in a variety of human lung cancer cell lines, including cancers with activating EGFR mutations and EGFR mutation negative cancers. Lung cancers known to have intrinsic and acquired resistance to erlotinib therapy were also studied, as were Kras-related and other cancers. Notably, studies in xenograft animal models demonstrated that Oncoprex and either erlotinib or gefitinib showed synergistic anti-cancer effects, superior to either agent used alone, in both EGFR mutation negative cancers (generally not candidates for erlotinib) and in EGFR mutation positive cancers (optimal candidates for erlotinib), including cancers known to be resistant to erlotinib therapy. The addition of Oncoprex to either erlotinib or gefitinib overcame drug-induced resistance by simultaneously inactivating EGFR and AKT signaling pathways and by inducing apoptosis in erlotinib- or gefitinib-resistant cancers with EGFR mutations and with EGFR mutation-negative cancers.

In one study, MD Anderson researchers tested the combination of erlotinib and Oncoprex against five human NSCLC cell lines: H1299, H322, A549, H460, and H1975, the latter of which has the L858R and T790M EGFR mutations and is highly resistant to erlotinib. The results showed that the combination of Oncoprex and erlotinib significantly reduced NSCLC colony formation beyond the effect of erlotinib, Oncoprex or controls alone ($p<0.01$ at both 1 and 2.3 uM concentrations for all cell lines). The cooperative interaction between erlotinib and Oncoprex was confirmed *in vivo* using a lung colony formation metastases model in nu/nu mice with A549 human lung cancer cells injected in the tail vein. Mice were treated with the combination of Oncoprex and erlotinib and various controls including empty nanovesicles, erlotinib alone, Oncoprex alone, and other controls.

The greatest reduction in lung colonies occurred with the Oncoprex with erlotinib combination (90% reduction) which was reduced compared to all control groups ($p<0.0005$). In terms of total tumor nodules, the cooperative effect is greater than 0.9999. This means that there is less than a 1 in 10,000 chance that the low dose erlotinib with TUSC2 combination does not have a cooperative effect and greater than 9,999 in 10,000 chance that the cooperative effect exists. P-value is the probability that the difference between two data sets was due to chance. The smaller the p-value, the more likely the differences are not due to chance alone. In general, if the pvalue is less than or equal to 0.05, the outcome is considered statistically significant. The FDA's evidentiary standard of efficacy generally relies on a p-value of less than or equal to 0.05.

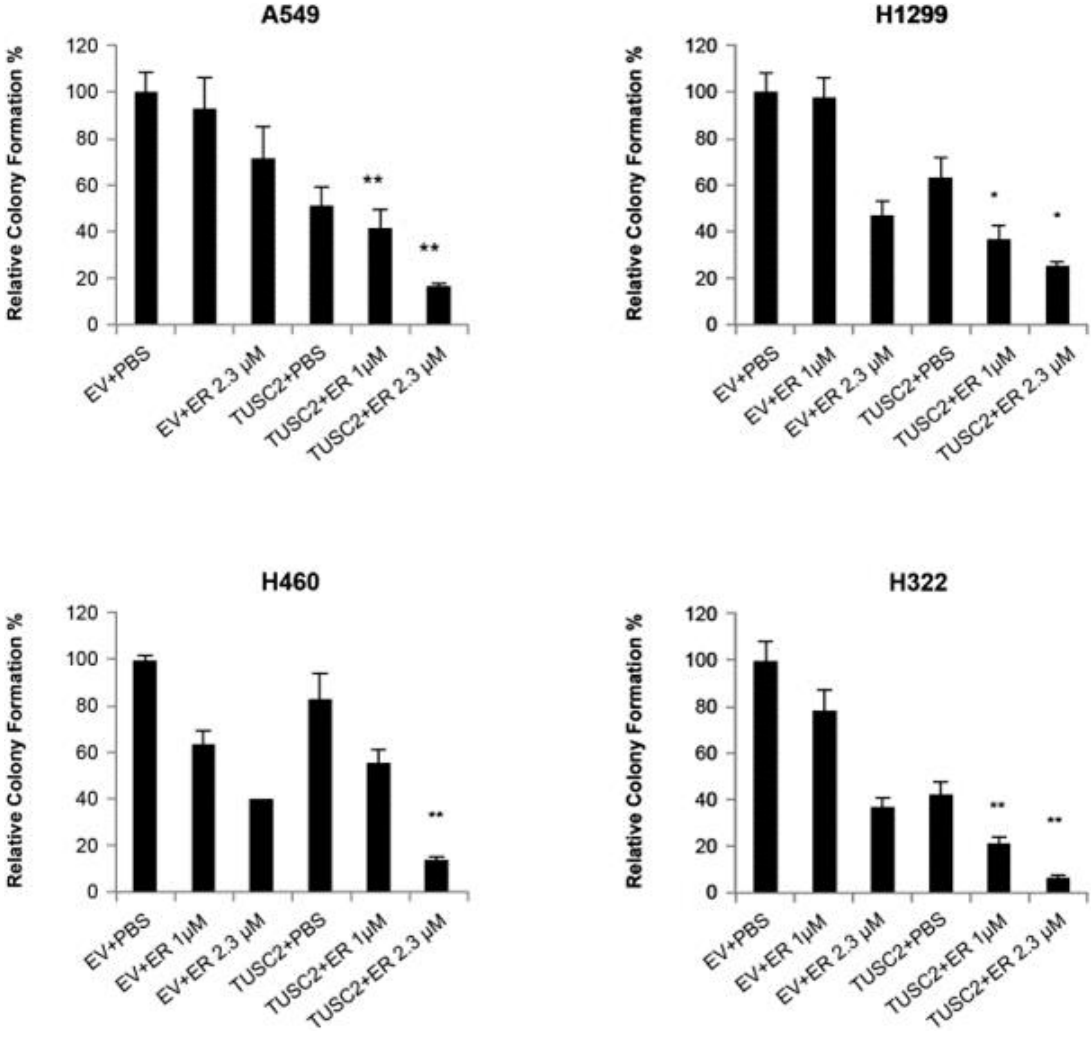
MD Anderson researchers also tested Oncoprex in TUSC2-deficient and erlotinib or gefitinib-resistant NSCLC cell lines. Treatment of the NSCLC EGFR mutation negative cell lines H1299, H322, H358 and H460 cancer cell line showed that the Oncoprex combination significantly sensitized ($p<0.001$) response of the cancer cell lines to both erlotinib or gefitinib treatment and synergistically induced apoptosis *in vitro*. The findings were confirmed *in vivo* in an H322 orthotopic lung cancer mouse model. These studies included the K-ras mutant cell line H460, which is significant because patients with K-ras mutant tumors are generally unresponsive to erlotinib or gefitinib. Synergistic induction of apoptosis was observed with the combination of Oncoprex and concentrations of erlotinib or gefitinib similar to steady-state serum concentrations achievable with oral dosing. The combination of Oncoprex and either erlotinib or gefitinib induced similar levels of tumor cell growth inhibition, apoptosis induction, and inactivation of oncogenic protein kinases.

Data from these and other MD Anderson studies suggest a combination of Oncoprex with gefitinib or erlotinib can promote synergistic tumor cell killing and overcome drug-induced resistance by simultaneously inactivating the EGFR and the AKT signaling pathways and by inducing apoptosis in resistant cells with nonmutated EGFR. These data suggest that NSCLC patients with an activating EGFR mutation, whose cancer progresses on erlotinib, may potentially benefit from Oncoprex with erlotinib combination therapy. These data also suggest that NSCLC patients without an activating EGFR mutation (generally unresponsive to erlotinib) may potentially benefit from Oncoprex with erlotinib combination therapy.

In another study, MD Anderson researchers analyzed the effects of TUSC2 re-expression on the sensitivity of tumor cells to the AKT inhibitor MK2206 in vitro and in mice. The AKT pathway is an important intracellular, converging positive regulator of apoptosis. AKT stimulates apoptosis and is frequently dysregulated in cancers, and this has been associated with reduced sensitivity to anti-tumor drugs. The study showed that the combination of TUSC2 transfection with MK2206 treatment suppressed tumor cell viability in vitro and effectively inhibited xenograft tumor growth in vivo more effectively than either agent alone.

Preclinical Study Showing that the TUSC2-Erlotinib Combination Significantly Inhibits Tumor Cell Viability and Colony Formation in NSCLC Cells Without an Activating EGFR Mutation

Previous research has shown that NSCLC in cells that lack the activating EGFR mutations exon 19 deficiency and exon 21 substitution is not halted or inhibited by erlotinib at pharmacologically relevant doses. In one preclinical study, MD Anderson researchers tested a group of EGFR negative NSCLC lines for sensitivity to erlotinib after restoration of TUSC2 expression, both transiently and stably, and found a significant benefit resulting from the combination at micromolar ranges between 1uM and 2.3uM. These concentrations are achievable in patient serum with standard dosing regimens and are pharmacologically relevant. Cell viability was evaluated in 3 TUSC2 Tet-On stable clones that had been treated with doxycycline to induce TUSC2, and combined with erlotinib. As expected, the cells that had not had TUSC2 expression restored were not sensitive to erlotinib alone, and the viability of cells in the A549, H1299, and H175 cancer cell lines was 92%, 90%, and 98%, respectively. Induction of TUSC2 with doxycycline alone showed more cytoxicity than erlotinib alone, resulting in 16%, 22%, and 5% cell death, respectively. However, when cells were exposed to doxycycline and treated with 2.3 μM erlotinib for 48 hours, a growth inhibitory effect was observed for all three cell lines ($p<0.05$), with the relative survival of the A549, H1299, and H175 cancer cells being reduced by 48%, 42%, and 38%, respectively. Similarly, as shown in the graphs below, colony formation was significantly inhibited in cells transiently transfected with TUSC2 and treated with erlotinib. The ability of A549, H1299, H322, and H460 cells to form colonies was reduced by 90%, 80%, 93%, and 85%, respectively. In dose titration experiments erlotinib also mediated increased inhibition of colony formation at nanomolar concentrations. Taken together, the results clearly demonstrate the superiority of the TUSC2-erlotinib combination treatment over each agent alone, and indicate that the effect is independent of the technique of exogenous gene expression. For both viability and colony formation assays the probability of a cooperative effect was greater than 0.99, on a scale from 0 to 1. Zero means no probability of a true cooperative effect, and one means 100% probability of a cooperative effect given the observed data.



Inhibition of Colony Formation by a Combination of TUSC2 and Erlotinib

In the graphs above, “EV” means DOTAP: cholesterol (DC)—empty vector (EV) complex (the Oncoprex nanovesicle without the TUSC2 gene), “PBS” means phosphate-buffered saline, and “EV + PBS” means EV and PBS, acting as a control; “ER” means erlotinib; “*” means $p<0.05$; and “**” means $p<0.01$.

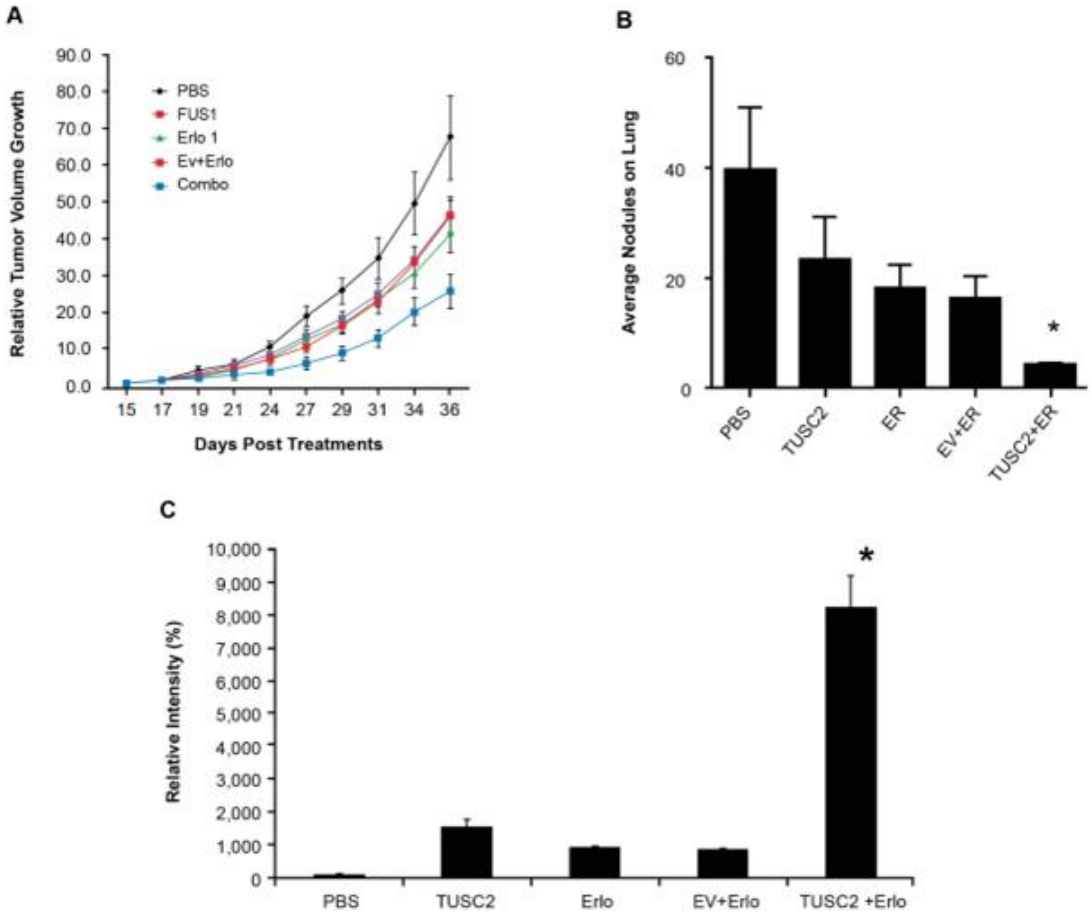
TUSC2-Erlotinib Combination Significantly Inhibits Tumor Growth and Metastasis and Induces Apoptotic Activity

In another preclinical study, MD Anderson researchers analyzed the effect of the combination of TUSC2 and erlotinib on inhibiting tumor growth and metastasis in two NSCLC mouse xenograft models. Mice with established flank tumors of equal volumes were divided into different treatment groups: PBS, used as a control; DC-TUSC2 complex (Oncoprex), referred to in the graphs below as “Fus1” or “TUSC2”; erlotinib alone, referred to in the graphs as “Erlo” or “ER”; DOTAP:cholesterol (DC)—empty vector (EV) complex with erlotinib, referred to as “EV + Erlo” or “EV + ER”; and Oncoprex plus erlotinib, referred to as “Combo,” “TUSC2 + ER” or “TUSC2 + Erlo.” In the H322 subcutaneous xenograft model, the combination of intravenous Oncoprex and erlotinib was significantly superior ($p<0.05$) in reducing tumor volumes than either agent alone, as shown by graph A below. With adjustment for multiple comparisons, the tumor growth rate of Oncoprex and erlotinib combination was the only group significantly smaller than the PBS control group ($p<0.01$). The mean tumor volume was 421.25±89.27 mm3, compared with 1082.50±338.69 mm3, 801.25±144.60 mm3, 675.00±228.80 mm3, and 875.00±267.85 mm3, in their counterparts receiving PBS, Oncoprex, erlotinib, or EV + erlotinib, respectively. In terms of tumor size, the posterior probability of cooperative effect was 0.9928, which means that there were less than 100 in 10,000 chances that the effect of TUSC2-erlotinib combination was not cooperative.

MD Anderson researchers also developed a lung metastasis xenograft mouse model, using the human TUSC2-defective, EGFR negative A549 NSCLC cell line. Animals were treated with the same protocol as their subcutaneous counterparts. The number of tumor nodules on lung surfaces was reduced by 82% after TUSC2-erlotinib treatment, compared to 41% and 54%, for TUSC2 alone or erlotinib treatment alone, respectively, as shown in graph B below. The overall difference of the tumor nodule count among the five groups was significant ($p<0.0001$), as was the difference between the Oncoprex and erlotinib combination group compared to each of the other groups ($p<0.01$).

As shown in graph C below, in resected tumor tissues assayed by TUNEL, the average number of apoptotic cells in the TUSC2 + erlotinib group was many times higher than in any of the other groups, including the groups receiving erlotinib alone and USC2-nanovesicles alone.

These results show that the growth inhibitory benefit of TUSC2-erlotinib *in vitro* could be reproduced *in vivo* and validate the effects of this combination.



Inhibition of Tumor Growth and Metastasis, and Induction of Apoptotic Activity, by a Combination of TUSC2 and Erlotinib

In graphs B and C above, "*" means $p<0.05$; the values in graph C above represent percentages from at least 1000 counted cells.

Phase I/II Combination Clinical Trial: TUSC2 Nanovesicles with Erlotinib

Phase I Combination Trial

The Phase I Monotherapy Trial showed that Oncoprex is well tolerated, that high levels of TUSC2 expression are detected in the tumor post-treatment, and that there is evidence of tumor growth suppression. Based on the positive results from the Phase I Monotherapy Trial and substantial preclinical evidence that Oncoprex is complementary with EGFR TKIs, we obtained permission from FDA to begin a new Phase I/II trial at MD Anderson combining Oncoprex with erlotinib in patients with Stage IV (metastatic) or recurrent NSCLC that is not potentially curable by radiotherapy or surgery, whether or not they have received prior chemotherapy, and whether or not they have an activating EGFR mutation. This trial is referred to as the Phase I/II Combination Trial. Enrollment in the Phase I portion of the Phase I/II Combination Trial, referred to as the Phase I Combination Trial, commenced in 2014 at MD Anderson with Dr. Charles Lu as the Principal Investigator.

In the Phase 1 Combination Trial, 18 subjects were treated with the following dose levels:

Dose Level	Drug Doses
1	erlotinib (100 mg/day) + Oncoprex (0.045mg/kg)
2	erlotinib (100 mg/day) + Oncoprex (0.06mg/kg)
3	erlotinib (150 mg/day) + Oncoprex (0.045mg/kg)
4	erlotinib (150 mg/day) + Oncoprex (0.06mg/kg)

As in the Phase I Monotherapy Trial, subjects received a pre-treatment regimen of oral and intravenous dexamethasone and diphenhydramine to reduce fever, along with an infusion of Oncoprex every three weeks. Subjects received oral erlotinib daily during each three-week cycle during the treatment period.

The Phase I Combination Trial was also a dose escalation study with the primary purpose of determining the MTD. Dose Limiting Toxicities were defined as grade 3, 4, or 5 events during the first cycle of treatment that were considered to be treatment related. At dose level 1 (Oncoprex .045 mg/kg plus erlotinib 100 mg), one subject had grade 3 adverse events of fatigue, muscle weakness, and hyponatremia (low sodium level) considered to be related to the study treatment (erlotinib); therefore, three additional subjects were treated at this dose level (six subjects total), none of whom suffered a Dose Limiting Toxicity. At dose level 2 (Oncoprex .06 mg/kg plus erlotinib 100 mg), there were no Dose Limiting Toxicities. At dose level 3 (Oncoprex .45 mg/kg plus erlotinib 150 mg), one subject had a grade 3 rash considered to be related to the study treatment (erlotinib); therefore, an additional three subjects were treated at this dose level (six subjects total). No additional subjects suffered a Dose Limiting Toxicity at dose level 3. At dose level 4 (Oncoprex .06 mg/kg plus erlotinib 150 mg), there were no Dose Limiting Toxicities; thus dose level 4 was determined to be the MTD.

Once the MTD for the study treatment combination was determined in the Phase 1 Combination Trial to be Dose Level 4, accrual proceeded on the Phase II portion of the study. Since the eligibility criteria, drug administration details (other than dose) and evaluation details were identical for the Phase I Combination trial and the Phase II Combination trial, three subjects in the Phase I Combination Trial who were treated at the MTD were included in the Phase II Combination Trial.

Four patients in the Phase I Combination Trial had stable disease ranging from 12 weeks to 36 weeks. The following observations from our preclinical studies and from the Phase I Combination Trial provided the rationale for proceeding with the Phase II Combination Trial combining Oncoprex with erlotinib:

- TUSC2 inhibits a variety of tyrosine kinases including EGFR, PDGFR, c-kit, and c-abl;
- expression of TUSC2 in NSCLC cells combined with TKIs is complementary *in vitro* and *in vivo*;
- intravenous administration of a nanoparticle encapsulated TUSC2 expression plasmid effectively delivers TUSC2 to distant tumor sites and mediates an anti-tumor effect in orthotopic human lung cancer xenograft models; and
- when the TUSC2-nanoparticle is combined with a TKI, the suppression of tumor growth in mouse xenograft models is synergistic.

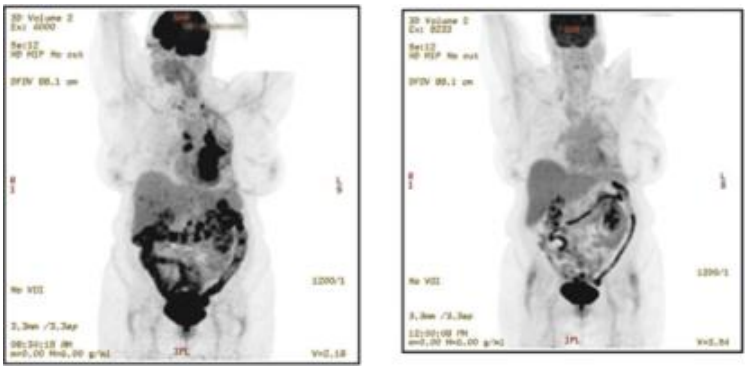
Phase II Combination Trial

The Phase II Combination Trial is designed to include subjects treated with the combination of Oncoprex and erlotinib at the MTD with the primary goal of measuring the response rate, and secondary endpoints of stable disease, time to progression and overall survival. The response rate for cancer therapies is defined under the Response Evaluation Criteria in Solid Tumors, or RECIST, as Complete Response (CR) + Partial Response (PR); disease control rate is defined under the RECIST criteria as Complete Response (CR) + Partial Response (PR) + Stable Disease (SD)>8weeks.

Enrollment criteria for the second phase of the Phase I/II clinical trial are identical to those in the first phase. The Phase II portion of the trial began in June 2015 and is ongoing at MD Anderson. The first subject enrolled in the Phase II portion of the study began erlotinib on Day 8, and subsequently every other enrolled subject began erlotinib on Day 8. The rationale for delaying erlotinib was to allow exploratory analyses of potential differential effects of Oncoprex nanoparticles alone and in combination with erlotinib on downstream pathway activation and potential biomarkers of erlotinib resistance. In the Phase II Combination Trial, subjects will continue to receive three-week cycles of Oncoprex in combination with erlotinib until the occurrence of progressive disease (PD), unacceptable toxicity, withdrawal of consent, or study treatment discontinuation for other reasons, whichever occurs first.

Of the 39 patients allowed in the protocol for the Phase II portion of the trial, 10 have been enrolled (three of whom were also subjects of the Phase I Combination Trial) and nine are evaluable for response under the trial protocol, because they have received 2 or more cycles of treatment. None of the 10 subjects treated to date in the Phase II portion of the Phase I/II trial suffered a Dose Limiting Toxicity. Interim results show that four of the patients had tumor regression and one patient had a Complete Response, or CR under the RECIST criteria. The median response duration for all patients, which is defined as the median time between when response is first noted to the time when cancer progression is observed, was three months. The response rate for the nine patients evaluated to date was 11% and the disease control rate for the nine patients was 78%.

The patient with the CR, a 58 year old female, upon enrollment in the study had metastatic NSCLC status following 6 cycles of pemetrexed and carboplatin and two cycles of maintenance pemetrexed with cancer progression. The patient's tumor has EGFR exon 18 and 20 missense mutations, which are not sensitive to erlotinib. As shown in the illustrations below, this patient had disappearance of both the lung primary tumor and the lung, liver and lymph node metastases.



Subject with RECIST Complete Response

Preliminary analysis of these data further supported our belief that Oncoprex may provide medical benefit in several subpopulations of NSCLC patients for which there is an unmet medical need, and may provide pathways for accelerated FDA approval.

As a result of these initial findings, in April 2016, we suspended enrollment of new patients in the Phase II Combination Trial to collect additional trial data and have it analyzed in order to seek FDA guidance as to whether the protocol for this clinical trial could be modified to expand enrollment and/or also to divide the patients into cohorts with a view toward seeking accelerated approval in one or more of these cohort populations. We have completed the collection and analysis of the additional preliminary data and expect to present our findings to the FDA within the next several months. We now have decided to continue this clinical trial under the current protocol without major modification at this time. We are maintaining our plan to seek a pathway toward accelerated approval in one or more patient cohort populations. Although this clinical trial is currently closed to new patient enrollment, it is not terminated, and is considered "ongoing" because activities such as patient follow-up and further data collection and analysis continue.

We plan to reopen enrollment in the current Phase II Combination Trial at MD Anderson and at additional clinical trial sites. Adding additional sites will require approval of the Investigational Review Board, or IRB, of each site where the trial is conducted. Assuming enrollment of two or three patients per month, we estimate that enrollment of the remaining patients for the Phase II Combination Trial could take a year, but because enrollment in clinical trials is uncertain, that estimate is also subject to substantial uncertainty. Any estimate of the duration of the trial would also be subject to substantial uncertainty, because treatment generally continues under the clinical trial protocol until the patient dies, experiences a serious adverse event or withdraws from the trial, or until cancer progresses. Even after completion of treatment, patients continued to be monitored. We intend to use a portion of our available funds to add additional clinical trial sites.

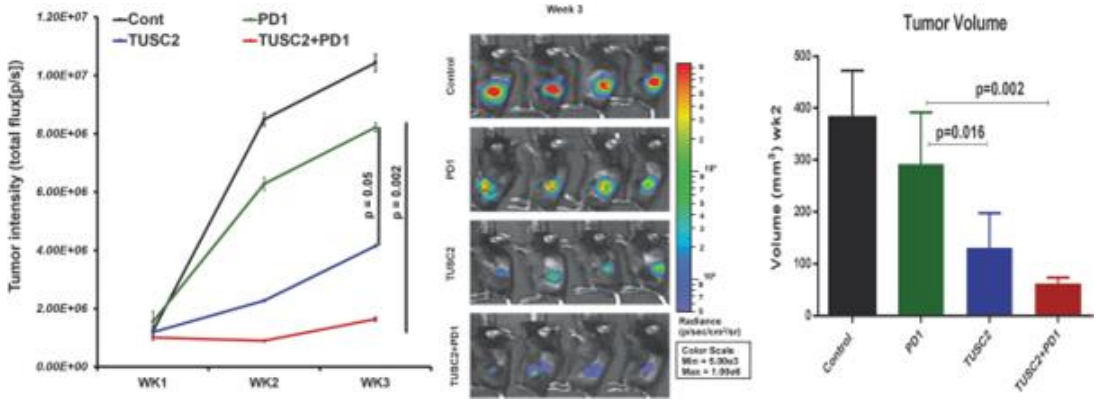
Preclinical Studies of TUSC2 in the Immune Response to Cancer

Previous research has shown that TUSC2 regulates cytokine expression *in vitro*. Cytokines are proteins that stimulate inflammation as part of the immune response. Stable expression of TUSC2 in H1299 NSCLC cells altered expression of a wide spectrum of cytokines including IL2, IL7, IL8 and 10, GM-CSF and PDGF-beta. TUSC2 is a positive regulator of innate immunity via regulation of IL-15 expression. IL-15 induces NK cell differentiation.

The systemic effect of the TUSC2 and anti-PD1 antibody combination was examined in two immunecompetent, syngeneic mouse models of Kras and p53 mutant lung cancer. C57BL/6 mice were subcutaneously injected with murine adenocarcinoma lung carcinoma CMT/167-luc cells (KrasG12V mutation). CMT/167 cells do not express TUSC2. Tumors from untreated mice, isotype antibody control, or those treated with anti-PD1 were used as controls. 344SQ (KrasG12D allele and a knock-in Trp53R172HΔG allele) adenocarcinomas which metastasize to the lung in 126S2 mice were also used. When tumors reached 50-100 mm3, mice were either injected intravenously with DOTAP:cholesterol (DC)-TUSC2 complex alone (at a dose of 25 μg of plasmid DNA and 10 nmol DC, every 48 hours for three injections), or (DC)-TUSC2 complex combined with anti-PD1 antibody (250 μg for four injections) alone or combined with anti-CTLA4 (100ug for three injections). Tumor growth and development was monitored by scoring ex-vivo luminescence using the IVIS Imaging System 200 Series. All tumor measurements were blinded to treatment and results were analyzed independently by biostatisticians.

Preclinical Study Showing that the TUSC2 and Anti-PD1 Combination Cooperatively Inhibits Growth of CMT/167 Lung Adenocarcinomas

Mouse experiments showed combined treatment with TUSC2 and anti-PD1 antibody superior to anti-PD1 alone in five independent experiments in two different tumor models. Results of a representative experiment is shown in the graph below. By week 3 the reduction in tumor image intensity by the combination of TUSC2 and anti-PD1 and TUSC2, anti-PD1, plus anti-CTLA4 was greater than the reduction with TUSC2 alone, anti-PD1 combined with anti-CTLA4, or the isotype control. Spleens and blood were collected for immunological analysis profiling by multicolor flow cytometry. Immune profiling panels were designed to evaluate response and major changes of specific regulatory innate and adaptive immune cells to TUSC2 or anti-PD1 treatment in peripheral blood and spleen.



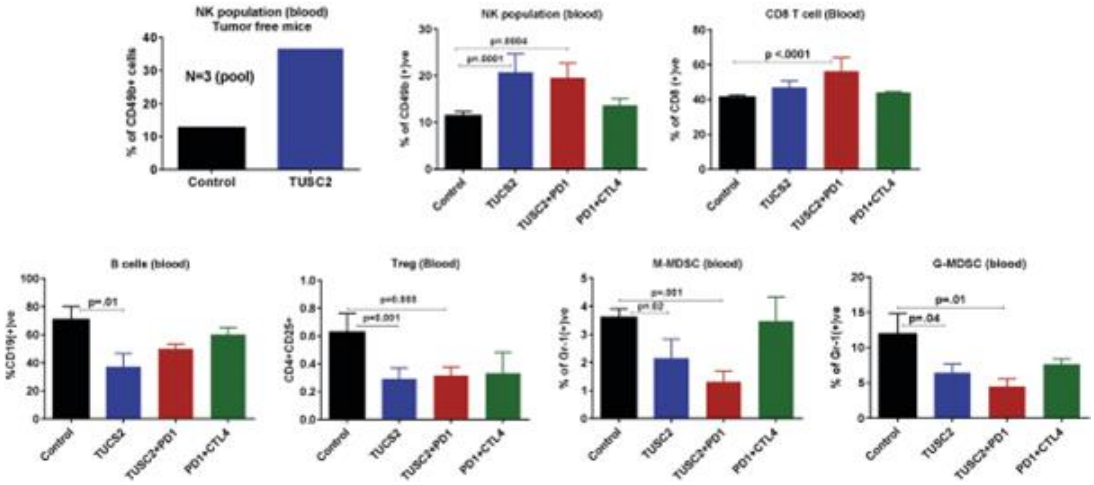
12-Preclinical Study Showing Effect of TUSC2 Anti-PD1 Combo on T Lymphocytes

Preclinical Study Showing the Effect of the TUSC2 and Anti-PD1 Combination on T Lymphocytes

The population of natural killer cells (NK), cytotoxic lymphocytes critical to innate immune function, was assessed in peripheral blood mononuclear cells (PBMCs) in tumor bearing mice treated with anti-PD1, TUSC2 alone and the combination. As shown in the graph below, the NK cell population increased strongly in the TUSC2 alone and TUSC2+PD1 groups which correlated with tumor regression. Anti-PD1 alone had no effect on NK cell proliferation.

Tumor free mice without mutations that lead to metastasis were injected intravenously with TUSC2 which caused a threefold up-regulation of NK cells in the peripheral blood of TUSC2 injected mice as compared with non-injected mice. CD8 T cells, which are cytotoxic T cells (CTL) for tumor killing, act as a prognostic marker of tumor regression. Increased numbers of CTL were found in the TUSC2 and TUSC2+PD1 groups as compared with that of the control group which directly correlated with the anti-tumor effect, as shown in the graph below. Lower levels of CD62L expression on T lymphocytes in TUSC2 treated mice suggests that TUSC2 regulates T cell activation. Moreover, TUSC2 induced down-regulation of regulatory T cells (Treg, CD4+CD25+). TUSC2 was shown to down-regulate checkpoint markers such as PD-1, CTLA-4, Tim-3, and LAG-3.

Effect of TUSC2 alone or in combination with anti-PD1 on immune cell populations in peripheral blood. Multi-color flow cytometry showed that TUSC2 significantly upregulated NK and cytotoxic T cells, and downregulated regulatory T cells, myeloid-derived suppressor cells (MDSCs), and B lymphocytes in tumor-bearing mice. The plot at the upper left shows that TUSC2 upregulated NK cells by 3-fold in tumor-free mice. All analyses were done 2 weeks after tumor cell implantation.



13-Effect of TUSC2 with Anti-PD1 on Immune Cell Populations in Peripheral Blood (Large)

Preclinical Study Showing that TUSC2 Immunogene Therapy is Synergistic with Anti-PD1 in Lung Cancer Syngeneic Mouse Models

Based on the prolonged responses that were observed in TUSC2 clinical trials, which suggest that TUSC2 may modulate the immune response, and on the fact that checkpoint blockade immunotherapy against PD1 and PD-L1 has yielded durable antitumor activity in a subset of NSCLC patients, MD Anderson researchers conducted a preclinical study to investigate the immune response to TUSC2 in immune cell populations and the synergistic antitumor effect of TUCS2 in combination with anti-PD1 checkpoint blockade in syngeneic mouse NSCLC models.

Two Kras-mutant syngeneic mouse models were used to explore the effect of TUSC2+anti-PD1 (+/- anti-CTLA-4) on immune cells infiltration into the tumor micro-environment. Activating Kras mutations are the most common driver mutations in lung adenocarcinomas. Lung cancer with mutant Kras has a poor prognosis, is often resistant to conventional therapy, and readily becomes resistant to targeted therapies with kinase inhibitors. Studies by researchers not at MD Anderson have found that PD1 expression was highly associated with the presence of Kras mutations and that PD-L1 expression was elevated in premalignant Kras-mutant cells, suggesting that Kras mutation may affect the function of the PD1/PD-L1 immune checkpoint pathway.

The first syngeneic mouse model used a murine lung carcinoma cell line CMT/167-luc with a Kras G12V mutation and a low level of TUSC2 expression, implanted subcutaneously in C57BL/6 mice. The second syngeneic mouse model optimized an aggressive experimental metastatic lung cancer model using 129SvE mice injected with SQ344 lung cancer cells, which contained KrasG12D allele. The SQ344 tumor model was found to be less sensitive to anti-PD1 single agent treatment.

The graph below shows the protocol for and results of this preclinical study, in which anti-PD-1, TUSC2 and anti-CTLA-4 treatments were administered in the SQ344 metastatic lung tumor mouse model. Figure A shows that SQ344 tumor cells have less expression of PD-L1 than in the CMT167 model, as determined by flow cytometry. The level of PD-L1 expression in SQ344 cells was only 4.5%, which was significantly lower than the level found in the CMT 167 mouse tumor model (23.7% vs. 4.5%, $p < 0.0001$), suggesting that SQ344 would respond less strongly to an anti-PD1 agent than the CMT167 model. Figure B shows the protocol for the experiment, in which treatments were administered every three or four days in the mouse tumor cells. Figure C shows the survival of the mice with the lung tumor cells treated with (a) no treatment, (b) a combination of anti-PD-1 and anti-CTLA-4, (c) TUSC2 alone, (d) a combination of TUSC2 and anti-PD-1, and (e) a combination of TUSC2, anti-PD-1 and anti-CTLA-4. Figure D shows samples of untreated lung tissue and lung tissue treated with TUSC2. Figure E shows tumor sizes after each of the treatments shown in Figure C after two weeks. Figures F, G and H shows the infiltration by NK cells, the concentration of T regulatory, or Treg, cells and the concentration of myeloid-derived suppressor, or MDSC, cells, a type of immune cells, in each case after treatment with (a) no treatment, (b) TUSC2 alone, (c) a combination of TUSC2 and anti-PD-1 and (d) a combination of anti-PD-1 and anti-CTLA-4.

The results of this preclinical study indicate that TUSC2-sensitization to anti-PD1 could be produced in both Kras-mutant lung cancer mouse models.

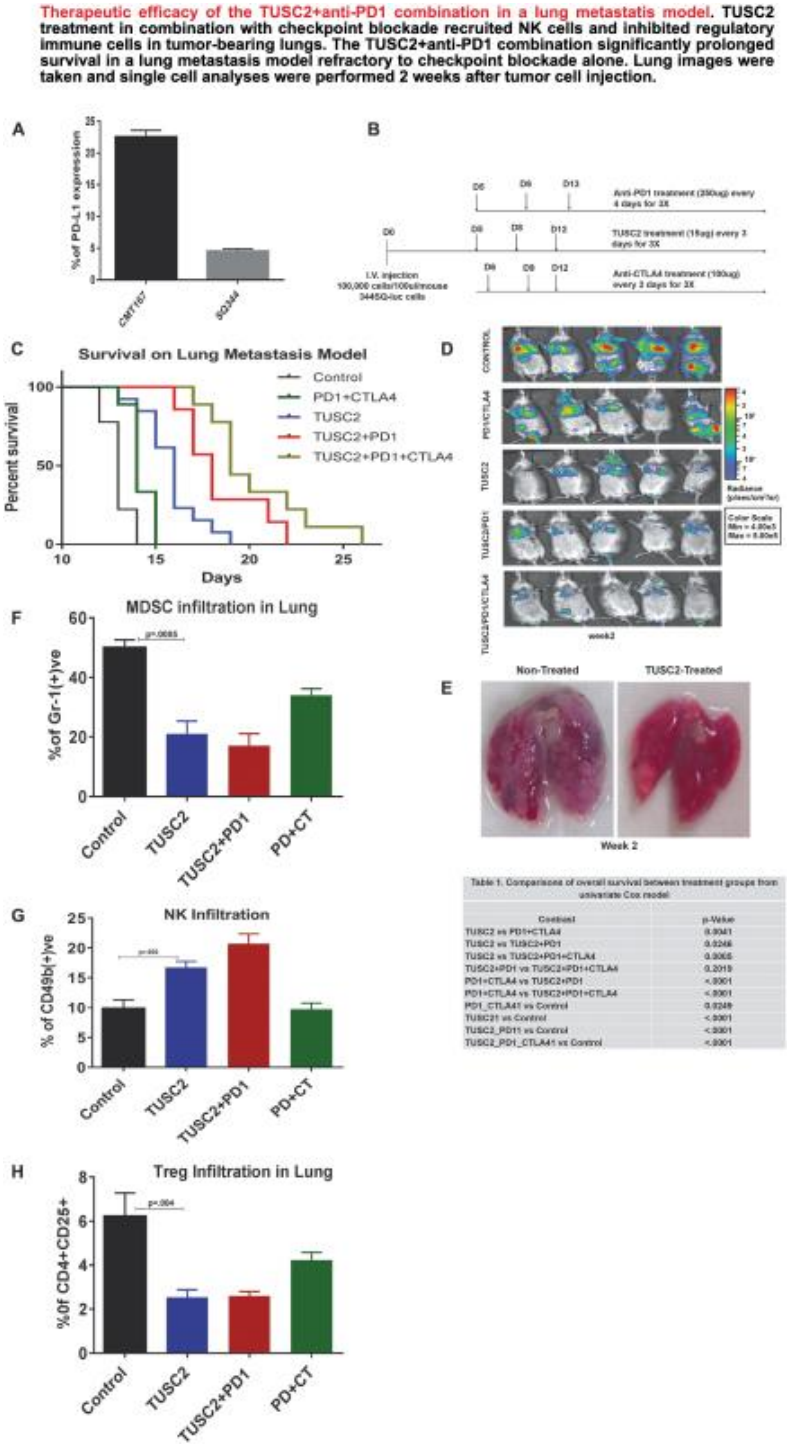


Table 1. Comparisons of overall survival between treatment groups from univariate Cox model

Contrast	p-Value
TUSC2 vs PD1+CTLA4	0.9341
TUSC2 vs TUSC2+PD1	0.0248
TUSC2 vs TUSC2+PD1+CTLA4	0.0065
TUSC2+PD1 vs TUSC2+PD1+CTLA4	0.2013
PD1+CTLA4 vs TUSC2+PD1	<.0001
PD1+CTLA4 vs TUSC2+PD1+CTLA4	<.0001
PD1_CTLA41 vs Control	0.0249
TUSC21 vs Control	<.0001
TUSC2_PD11 vs Control	<.0001
TUSC2_PD1_CTLA41 vs Control	<.0001

14-Therapeutic Efficacy of TUSC2+Anti-PD1 in a Lung Metastasis Model (Large)

Preclinical Studies of Additional 3p21.3 Genes with Cancer-Fighting Properties

We have licensed rights to a group of candidate tumor suppressor genes, including 101F6, NPRL2, CACNA2D2, PL6, BLU, RASSF1, HYAL 1 and HYAL2, in addition to TUSC2 (which is also referred to as FUS1), all of which are located in a sub-region of human chromosome 3 known as 3p21.3. Using a number of techniques, MD Anderson researchers and their collaborators have identified these genes as potentially having cancer-fighting characteristics. MD Anderson researchers have subsequently conducted a number of preclinical studies on certain of these genes, particularly 101F6 and NPRL2, as well as TUSC2, both alone and in combination with other compounds, in order to assess their actual effects on NSCLC. Three of these preclinical studies are described below. We plan to support continuing research into the cancer-fighting properties of these and other genes in the 3p21.3 sub-region as an important part of our strategy.

Preclinical Study Showing Expression of Several Genes in the Human Chromosome 3p21.3 Sub-region by an Adenovirus Vector Results in Tumor Suppressor Activities in Vitro and in Vivo

MD Anderson researchers conducted preclinical studies, both in vitro and in vivo, of several of the licensed genes located in the 3p21.3 sub-region, in order to assess their effects on tumor cell proliferation and apoptosis in human lung cancer cells. The researchers used adenoviral vectors to introduce individual wild-type genes into 3p-deficient tumor xenografts and tumor cell lines. This "forced expression" of the wild-type forms of TUSC2, 101F6, and NPRL2 resulted in inhibition of tumor cell growth by induction of apoptosis and/or alteration of cell cycle pathways in vitro, compared to control. Intratumoral injection of 101F6, TUSC2 and NPRL2 with adenoviral vectors, as well as systemic administration of these genes in an experimental mouse model, suppressed the growth of tumor xenografts (in this case, human tissue grafted onto the mouse model) and inhibited lung metastases. The results of these studies showed that the genes 101F6, NPRL2 and TUSC2 had the most significant anti-cancer effects of the tested genes and were therefore the most promising genes for further study.

Preclinical Study Showing that Tumor Suppressor 101F6 and Ascorbate Inhibit Non–Small Cell Lung Cancer Growth

One of the promising tumor suppressor gene candidates, 101F6, expresses a protein found in normal lung bronchial epithelial cells and fibroblasts but whose function is impaired in most lung cancers. This protein is involved in the regeneration of ascorbate, a well-known antioxidant that has been tested as a supplemental therapeutic agent for human cancer prevention and therapy. MD Anderson researchers studied the effect of 101F6 in combination with ascorbate on human lung cancer tissue, both in vitro and in vivo. In the in vitro portion of the study, 101F6 was transferred via nanoparticles similar to our Oncoprex nanovesicles, and in combination with ascorbate, selectively targeted cancer cells and inhibited lung cancer cell growth to a greater extent than either 101F6 or ascorbate alone. In vivo, the systemic injection of 101F6 nanoparticles in mouse tail veins, together with the intra-abdominal injection of ascorbate, inhibited both tumor formation and growth in human NSCLC H322 lung cancer xenograft mouse models ($P < 0.001$) with greater effect than either 101F6 or ascorbate administered alone.

Preclinical Study Showing NPRL2 Sensitizes Human Non-Small Cell Lung Cancer (NSCLC) Cells to Cisplatin Treatment by Regulating Key Components in the DNA Repair Pathway

Another of the promising tumor suppressor gene candidates, NPRL2, interacts with a kinase that is activated by cisplatin, an anti-cancer drug, leading to downstream activation of apoptosis in response to the presence of intracellular high-molecular weight DNA fragments, which themselves result from the breakup of DNA molecules induced by exposure to cisplatin. Mutations in the NPRL2 gene are associated with resistance to this cisplatin-mediated apoptosis. MD Anderson researchers have conducted preclinical studies of NPRL2 with cisplatin in vitro in lung cancer cell cultures and in vivo in an experimental mouse model of chest cavity cancer dissemination. Data from these studies suggest that the systemic introduction of the NPRL2 gene and the resulting expression of the NPRL2 protein in cancer cells activates the DNA damage checkpoint pathway in cisplatin-resistant and NPRL2-negative cells. These studies suggest that the combination of NPRL2 and cisplatin could resensitize cisplatin nonresponders to cisplatin treatment, helping to overcome resistance to cisplatin.

Process Development and Manufacturing

Through years of Oncoprex process development, including production of multiple clinical material batches in compliance with current Good Manufacturing Practices, or cGMP, we have developed a robust manufacturing system for Oncoprex. Unlike gene therapy agents in the past, which needed to be prepared individually for each patient or required viral vectors for gene delivery, we believe that our nanovesicle delivery system is scalable for commercial production, and the final product can be stored for later use. Manufacturing advances have resulted in improvements in scale, quality and formulation for cGMP clinical materials. We have worked with multiple contract manufacturing organizations, or CMOs, to use our proprietary processes and protocols to supply our clinical materials. We anticipate that our commercial product will continue to be manufactured for us by CMOs or pharmaceutical partners. Our management is experienced in securing, producing and releasing GMP materials.

The production process for Oncoprex utilizes well-defined steps of fermentation using master cell bank, or MCB, stocks, purification, and DOTAP:cholesterol (DC) nanovesicle production to incorporate the TUSC2 plasmid into nanovesicles for final formulation, packaging and storage. We have produced Chemistry, Manufacturing and Control, or CMC, documentation to the satisfaction of the FDA for our Phase I and Phase I/II clinical trials, and we have produced and tested and released MCB stocks for use. We intend to continue to improve our process development, formulation, packaging, storage, long-term stability, and distribution as part of our ongoing technical programs to coincide with our pivotal clinical and commercialization goals.

Our CMOs have demonstrated the ability to scale sufficiently both in timeliness and quantity required for clinical application, and based on our experience with those CMOs, we believe they will be able to scale production of Oncoprex in the future, both with respect to capacity and technology. Production by outside CMOs requires advance planning to schedule their production lines in coordination with other manufacturing orders they may have, as well as cost negotiation. Production costs may vary due to competition for production lines.

Currently, a CMO completes production of the TUSC2 DNA plasmids and transports them in a climate-controlled setting to our clinical test site at MD Anderson, where they are stored in cold storage until needed. Pursuant to our research agreements with MD Anderson, MD Anderson has developed thorough standard operating procedures for thawing, stabilizing, final formulation required for application, and short-term storage prior to administering Oncoprex. This standardized process is both transferable and replicable at other clinical pharmacies, and we plan to scale this process for expanded clinical and commercial use outside of MD Anderson.

MD Anderson is currently testing the shelf life of the final DOTAP:cholesterol formulation. A shelf life of at least one year has been established to date, and testing is ongoing.

Intellectual Property

We hold a worldwide, exclusive license to 32 issued patents and one allowed patent for technologies developed at MD Anderson and UTSWMC. These patents comprise various therapeutic, diagnostic, technical and processing claims.

The following table shows our families of issued patents and patent applications, together with information about the type of patent protection, the jurisdiction and the patent expiration dates.

Patent Family	Title and (Description)	Type of Patent Protection	Jurisdiction	Patent Expiration Dates
1	Chromosome 3p21.3 genes are tumor suppressors (Use of our platform genes, including TUSC2, and use of our non-viral nanovesicle delivery system)	The patents in this family have claims directed to compositions of matter, uses of the compositions and processes for preparing the compositions	United States (3 issued) Australia (2 issued) Japan (1 issued) Canada (1 issued) Europe (1 issued; validated in Switzerland, Germany, Denmark, Finland, France, United Kingdom, Ireland, Sweden, Netherlands)	7/10/2021, except for the issued US patents, which expire on 5/15/2024 and 7/29/2022
2	Bioactive FUS1 Peptides and Nanoparticle-Polypeptide Complexes (Pharmaceutical formulation of TUSC2 (also referred to as FUS1) nanoparticles, method of delivering TUSC2 to cancer cells, and method of treating cancer patients with TUSC2 nanoparticles)	The patents in this family have claims directed to compositions of matter, uses of the compositions and processes for preparing the compositions	United States (2 issued) Korea (1 issued)	1/23/2030, 3/14/2026 7/29/2022
3	Methods and Compositions of Non-Viral Gene Therapy for Treatment of Hyperproliferative Diseases (Methods of delivery, including our nanovesicle delivery system, of a series of genes that are licensed to us, including TUSC2, and genes that are not licensed to us)	The patents in this family have claims directed to compositions of matter, uses of the compositions and processes for preparing the compositions	United States (1 allowed) Canada (1 issued) Europe (1 issued) Belgium (1 issued) France (1 issued) Germany (1 issued) Italy (1 issued) Liechtenstein (1 issued) Spain (1 issued) Sweden (1 issued) Switzerland (1 issued) United Kingdom (1 issued)	5/24/2020
4	Methods and Compositions Related to Novel hTMC Promoter and Vectors for Tumor-Selective and High-Efficient Expression of Therapeutic Genes (A genetic technology to improve the effectiveness of gene therapy, relating to our platform genes and other genes)	The patents in this family have claims directed to compositions of matter, uses of the compositions and processes for preparing the compositions	United States (1 issued)	8/24/2029

Because the use of our platform genes, including TUSC2, and the use of our non-viral delivery system to deliver them, are covered by Family No. 1, we believe that expiration of the patents in Family 3 will not affect our intellectual property protection for use of the genes which are licensed to us and are part of our platform.

We also hold a non-exclusive license from the National Institutes of Health to 15 patents that expired on August 1, 2017. We are aware that others have also licensed these technologies from the NIH. These patents relate to the DOTAP:cholesterol liposomes for delivery of therapeutic DNA, which is the basic delivery system embodied in our nanovesicles. Through our license from MD Anderson, we have separate patent protection for the combination of our nanovesicles with the genes we have licensed from MD Anderson, as well as for improvements that MD Anderson has made to the nanovesicle delivery system. Because the license from the NIH is non-exclusive, we do not expect the expiration of the underlying patents to have a material effect on our business. We have an ongoing obligation to pay the NIH a total of $240,000 (together with an additional $20,000 each year starting in 2018) upon our receipt of regulatory approval for our current or potential product candidates.

In addition to the current licensed patents, Genprex is currently evaluating additional patent licenses from MD Anderson to add to the patent portfolio and expand our commercial potential. We expect to evaluate technology transfer opportunities to leverage the commercial potential of our platform delivery system and also seek complementary oncology therapies.

We have filed a trademark application for our company name and for the drug name “Oncoprex” for added protection of future product branding.

Licenses and Research Collaborations

Agreements with MD Anderson

We hold our Oncoprex technologies under a Patent and Technology License Agreement, referred to as the MD Anderson License Agreement, with MD Anderson and The Board of Regents of the University of Texas System. The MD Anderson License Agreement was originally entered into as of July 20, 1994 between the Board of Regents of The University of Texas System, MD Anderson and Intron Therapeutics, Inc. (which later changed its name to Introgen Therapeutics, Inc.), or Introgen.

The MD Anderson License Agreement originally covered a number of patents and technologies unrelated to TUSC2, but the TUSC2 technologies were added by Amendment No. 3 to the MD Anderson License Agreement dated October 4, 2001. Under the MD Anderson License Agreement, we have rights to patents covering use of various genes, including the TUSC2 gene, for treatment of cancer, as well as know-how and related intellectual property.

The exclusive licenses under the MD Anderson License Agreement, as amended, extend to the end of the term or terms for which patent rights under the agreement have not expired, and expire on the expiration of all patents covered by the agreement. The last licensed patent under the MD Anderson License Agreement will expire in January 2030. Upon the expiration of the exclusive licenses, the licensee will have a non-exclusive, fully paid-up right and license to use and otherwise exploit the technology rights licensed under the agreement. MD Anderson may terminate the agreement in the event of the licensee’s voluntary or involuntary bankruptcy or if the licensee’s business is placed in the hands of a receiver, assignee or trustee. In addition, MD Anderson may terminate the agreement in the event of the licensee’s uncured breach.

Pursuant to a Technology Sublicense Agreement dated March 7, 2007, referred to as the Sublicense Agreement, Introgen sublicensed its rights under the MD Anderson License Agreement to Introgen Research Institute, Inc. or IRI, a company formed and owned by Rodney Varner, our current President, CEO and Chairman of the board of directors.

Pursuant to an Assignment and Collaboration Agreement dated April 13, 2009, referred to as the 2009 IRI Collaboration Agreement, IRI assigned its rights under the Sublicense Agreement to us, and we granted back to IRI a non-exclusive, royalty-free license to use and practice the licensed technology for non-commercial research purposes. As consideration for this assignment, we agreed to assume all of IRI’s obligations to MD Anderson under the MD Anderson License Agreement, including ongoing patent related expenses and royalty obligations.

The 2009 IRI Collaboration Agreement was amended by an Amended Collaboration and Assignment Agreement dated July 1, 2011, referred to as the 2011 IRI Collaboration Agreement. The 2011 Collaboration Agreement provided that IRI would provide additional licensing opportunities and services to us, in return for monthly payments and our obligation to pay to IRI a royalty of one percent (1%) on sales of products licensed to us under the MD Anderson License Agreement. In 2012, IRI’s obligation to provide those opportunities and services, and our obligation to make monthly payments to IRI, were terminated. The 2011 IRI Collaboration Agreement had an initial term of two years and renews automatically for additional consecutive periods of one year each unless either we or IRI gives prior written notice of termination to the other party. In addition, either we or IRI may terminate the agreement in the event of the other party’s voluntary or involuntary bankruptcy or uncured default.

Pursuant to a Technology Sublicense Agreement dated June 1, 2011, we granted to IRI a non-exclusive sublicense, for non-commercial purposes, to the rights under the Sublicense Agreement.

At the time that we entered into the 2011 IRI Collaboration Agreement, Mr. Varner was not an officer or director of Genprex, but he was deemed to be an “affiliate of the Company due to his beneficial ownership of approximately 39% of our issued and outstanding shares. At the time we acquired the Oncoprex technologies under the 2009 IRI Collaboration Agreement, they were the subject of the Phase I Monotherapy Trial. We completed the Phase I Monotherapy Trial and did substantial process development, manufacturing and regulatory work necessary to bring the technologies into the currently ongoing Phase I/II Combination Trial.

Under the MD Anderson License Agreement, the Sublicense Agreement and the 2009 IRI Collaboration Agreement, we are obligated to pay all fees, patent related expenses, royalties, and other amounts that become due with respect to the licensed patents, patent application and other technologies. We are also obligated to pay to MD Anderson royalties of 1.5% of net sales attributed to sales of the licensed products, as well as 1.5% of advance payments received by us (excluding amounts paid to us in reimbursement of development or other costs) from third parties pursuant to sublicense, marketing, distribution or franchise arrangements. Under the 2011 IRI Collaboration Agreement, we are obligated to pay to IRI a royalty of 1.0% of net sales of licensed products and 1.0% of

certain other payments received by us. This royalty obligation continues for 21 years after the later of the termination of the MD Anderson License Agreement and the termination of the Sublicense Agreement. We have no other payment obligations to IRI under the 2009 IRI Collaboration Agreement or the 2011 IRI Collaboration Agreement. We were not required to make any up-front payments to MD Anderson or IRI when we entered into the MD Anderson License Agreement, the Sublicense Agreement or the 2009 IRI Collaboration Agreement. Under the 2011 IRI Collaboration Agreement, we were required to make payments of $30,000 per month to IRI. We made 14 of these monthly payments, totaling $420,000, to IRI in 2011 and 2012, and our obligation to make such monthly payments was terminated in 2012.

Our rights under the MD Anderson License Agreement are made subject to the rights of the U.S. government to the extent that the technology covered by the licensed intellectual property was developed under a funding agreement between MD Anderson and the U.S. government. Additionally, to the extent there is any conflict between the MD Anderson License Agreement and applicable laws or regulations, applicable laws and regulations will prevail. Similarly, to the extent there is any conflict between the MD Anderson License Agreement and MD Anderson's funding agreement with the US government, the terms of the funding agreement will prevail. Some, and possibly all, of our licensed intellectual property rights from MD Anderson have been developed in the course of research funded by the U.S. government. As a result, the U.S. government may have certain rights to intellectual property embodied in our current or future products pursuant to the Bayh-Dole Act of 1980. Government rights in certain inventions developed under a government-funded program include a nonexclusive, non-transferable, irrevocable worldwide license to use inventions for any governmental purpose. In addition, the U.S. government has the right to require us, or an assignee or exclusive licensee to such inventions, to grant licenses to any of these inventions to a third party if the U.S. government determines that adequate steps have not been taken to commercialize the invention, that government action is necessary to meet public health or safety needs, that government action is necessary to meet requirements for public use under federal regulations, or that the right to use or sell such inventions is exclusively licensed to an entity within the U.S. and substantially manufactured outside the U.S. without the U.S. government's prior approval. Additionally, we may be restricted from granting exclusive licenses for the right to use or sell our inventions created pursuant to such agreements unless the licensee agrees to additional restrictions (e.g., manufacturing substantially all of the invention in the U.S.). The U.S. government also has the right to take title to these inventions if we fail to disclose the invention to the government and fail to file an application to register the intellectual property within specified time limits. In addition, the U.S. government may acquire title in any country in which a patent application is not filed within specified time limits. Additionally, certain inventions are subject to transfer restrictions during the term of these agreements and for a period thereafter, including sales of products or components, transfers to foreign subsidiaries for the purpose of the relevant agreements, and transfers to certain foreign third parties. If any of our intellectual property becomes subject to any of the rights or remedies available to the U.S. government or third parties pursuant to the Bayh-Dole Act of 1980, this could impair the value of our intellectual property and could adversely affect our business. The U.S. government has not exercised any of these rights or provided us with any notice of its intent to exercise any of these rights with respect to any of the intellectual property licensed to us by MD Anderson. We are not aware of any instance in which the U.S. government has ever exercised any such rights with respect to any technologies or other intellectual property developed under funding agreements with the U.S. government.

Our current Phase I/II Combination Trial is being conducted at MD Anderson pursuant to a Clinical Study Agreement between Genprex and MD Anderson dated February 10, 2014. Under this agreement, MD Anderson agreed to conduct the Phase I/II Combination Trial under the study protocol, which includes treatment of up to 57 patients, and Genprex agreed to pay up to $1,738,818 to MD Anderson for conducting the clinical trial. As of December 31, 2018, we have paid approximately $530,000 to MD Anderson pursuant to this agreement, and a total of 28 patients have been enrolled in the Phase I/II Combination Trial. This Clinical Study Agreement has a term of five years and may be terminated earlier by us upon thirty days' notice, with due regard for the health and safety of the study subjects. In addition, we and MD Anderson may terminate the Clinical Study Agreement immediately by written agreement, MD Anderson may terminate the agreement immediately if the principal investigator of the Phase I/II Combination Trial is unable to continue to serve and we and MD Anderson cannot agree on an acceptable successor, and either we or MD Anderson may terminate the agreement if necessary for the safety, health or welfare of the clinical trial subjects.

In January 2015, we entered into an option agreement with MD Anderson. This option agreement, which was renewed in July 2018, grants exclusive rights to us to negotiate, until March 13, 2019, an exclusive license agreement related to patents covering both a method for treating cancer and biomarker technology that would allow us to identify patients who might benefit from this treatment. We have paid MD Anderson a total of $35,000 for this option agreement. We are negotiating with MD Anderson to extend the term of this option agreement.

In February 2017, we entered into a second option agreement with MD Anderson. This option agreement, which was renewed in July 2018, grants exclusive rights to us to negotiate, until March 13, 2019, an exclusive license agreement related to technology that would provide patent protection for the use of TUSC2 with checkpoint inhibitors. We have paid MD Anderson a total of $37,803 for this option agreement. We are negotiating with MD Anderson to extend the term of this option.

License Agreement with P53, Inc.

On February 26, 2010, IRI and P53, Inc. entered into a Technology License Agreement, referred to as the P53 License Agreement, pursuant to which IRI granted to P53, Inc., or P53, a worldwide, exclusive license under certain patents related to the nanovesicle delivery system that we are now using for the delivery of TUSC2, but only for P53's use in gene therapy products in which the sole active genes are p53 and MDA-7. As a result of the 2009 IRI Collaboration Agreement, we are the licensor under the P53 License Agreement.

The P53 License Agreement authorizes P53 to develop, make and have made, use, offer for sale, sell, import and otherwise distribute the licensed products. P53 agreed to submit quarterly reports of activities to IRI including at least such information as would allow IRI to calculate the amount owing to IRI on account of such activities, as well as P53's calculation of such amounts. As consideration for the P53 License Agreement, P53 agreed to pay IRI one-half of all amounts invoiced by MD Anderson to IRI, up to a maximum of $15,000 to be paid by P53, for patent prosecution expenses incurred prior to the effective date of the P53 License Agreement, as well as two-thirds (2/3) of IRI's ongoing patent prosecution expenses, in each case with respect to the licensed patents. Additionally, P53 agreed to pay all amounts that become due to IRI as a result of the P53 License Agreement or the sales, licensing, or other activities of P53 under the P53 License Agreement. Pursuant to the P53 License Agreement, P53 has granted to IRI a fully-paid license with respect to improvements made by P53 to the technology licensed to P53 under the P53 License Agreement. The P53 License Agreement remains in effect until the expiration of the last of the patents licensed under the agreement. The last licensed patent under the P53 License Agreement will expire in May 2020. We may terminate the agreement in the event of P53's voluntary or involuntary bankruptcy or dissolution, assignment for the benefit of creditors or if a receiver or trustee is appointed over P53's business or properties. In addition, we may terminate the agreement in the event of P53's breach of the agreement or if P53 challenges the validity or enforceability of any of the licensed patents. P53 may terminate the agreement upon 90 days' written notice.

Grants

We have received grants from the following entities: Texas Emerging Technology Fund, SBA—Small Business Innovation Research, or SBIR, program, the National Institutes of Health and the United States Department of the Treasury.

Competition

The biotechnology and pharmaceutical industries are intensely competitive and subject to rapid and significant technological change. We have competitors in the United States, Europe and elsewhere, including major multinational pharmaceutical companies, established biotechnology companies, specialty pharmaceutical and generic drug companies and universities and other research institutions. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large and established companies.

The unmet medical need for more effective cancer therapies is such that anticancer drugs are, by a significant margin, the leading class of drugs in development. These include a wide array of products against cancer targeting many of the same indications as our drug candidates. There are a number of drugs approved and under development for treatment of lung cancer. Treatments competitive with our primary product candidates generally fall into the following categories: chemotherapies such as cisplatin, carboplatin, docetaxel and pemetrexed; targeted therapies such as erlotinib, gefitinib, afatinib and osimertinib, and immunotherapies such as checkpoint inhibitors and CAR and CAR T cells, and oncolytic virus-based technology. Data indicate that Oncoprex, when combined with targeted therapies and immunotherapies, may enhance the benefit of those therapies; therefore, we believe that Oncoprex could be administered in combination with targeted therapies and immunotherapies and thus may not be a direct competitor of those drugs. In addition, new drug candidates are constantly being conceived and developed. Any such competing therapy may be more effective and/or cost-effective than ours.

Many of our competitors have greater financial and other resources, such as larger research and development staff and more experienced marketing and manufacturing organizations than we do. Large pharmaceutical companies, in particular, have extensive experience in clinical testing, obtaining regulatory approvals, recruiting patients and manufacturing pharmaceutical products. These companies also have significantly greater research, sales and marketing capabilities and collaborative arrangements in our target markets with leading companies and research institutions. Established pharmaceutical companies may also invest heavily to accelerate discovery and development of novel compounds or to in-license novel compounds that could make the product candidates that we develop obsolete. As a result of these factors, our competitors may succeed in obtaining patent protection and/or FDA approval or discovering, developing and commercializing drugs for the cancer indications that we are targeting before we do or may develop drugs that are deemed to be more effective or gain greater market acceptance than ours. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large, established companies. In addition, many universities and private and public research institutes may become active in our target disease areas. Our competitors may succeed in developing, acquiring or licensing on an exclusive basis, technologies and drug products that are more effective or less costly than any

product candidates that we are currently developing or that we may develop, which could render our products obsolete or noncompetitive. Any product candidates that we successfully develop and commercialize may compete with existing and new therapies that may become available in the future. The availability of reimbursement from government and other third-party payers will also significantly affect the pricing and competitiveness of our products.

Our commercial opportunities could be substantially limited in the event that our competitors develop and commercialize products that are more effective, safer, less toxic, more convenient or less expensive than our comparable products. In geographies that are critical to our commercial success, competitors may also obtain regulatory approvals before us, resulting in our competitors building a strong market position in advance of our product's entry. We believe the competitive factors that will determine the success of our programs will be the efficacy, safety, pricing and reimbursement, and convenience of our current and potential product candidates.

Government Regulation

Government authorities in the U.S., at the federal, state and local level, and other countries extensively regulate, among other things, the research, development, testing, manufacture, quality control, approval, labeling, packaging, storage, recordkeeping, promotion, advertising, distribution, post-approval monitoring and reporting, marketing and export and import of products such as those we are developing. The pharmaceutical drug product candidates that we develop must be approved by the FDA before they may be legally marketed.

In the United States, the Food and Drug Administration, or FDA, regulates pharmaceutical products under the Federal Food, Drug and Cosmetic Act and implementing regulations. Pharmaceutical products 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, the approval process or after approval, may subject an applicant to administrative or judicial sanctions. FDA sanctions could include refusal to approve pending applications, withdrawal of an approval, a clinical hold, warning letters, product recalls, 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.

Within the FDA, the Center for Biologics Evaluation and Research, or CBER, regulates gene therapy products. CBER works closely with the National Institutes of Health, or NIH, and its Recombinant DNA Advisory Committee, or RAC, which makes recommendations to the NIH on gene therapy issues and engages in a public discussion of scientific, safety, ethical and societal issues related to proposed and ongoing gene therapy protocols. The FDA and the NIH have published guidance documents with respect to the development and submission of gene therapy protocols, including informed consent documents. The FDA also has published guidance documents related to, among other things, gene therapy products in general, their preclinical assessment, observing patients involved in gene therapy studies for delayed adverse events, potency testing, and chemistry, manufacturing and control information in gene therapy Investigational New Drugs, or INDs.

Ethical, social, and legal concerns about gene therapy, genetic testing, and genetic research could result in additional regulations restricting or prohibiting the processes we may use. Federal and state agencies, congressional committees and foreign governments have expressed interest in further regulating biotechnology. More restrictive regulations or claims that our products are unsafe or pose a hazard could prevent us from commercializing any products. New government requirements may be established that could delay or prevent regulatory approval of our current and potential product candidates under development. It is impossible to predict whether legislative changes will be enacted, regulations, policies, or guidance changed, or interpretations by agencies or courts changed, or what the impact of such changes, if any, may be.

U.S. Biological Products Development Process

The process required by the FDA before a biological product, including our Oncoprex product candidate, may be marketed in the United States generally involves the following:

- completion of preclinical laboratory tests and animal studies according to good laboratory practices, or GLPs, and applicable requirements for the humane use of laboratory animals or other applicable regulations;
- submission to the FDA of an application for an IND, which must become effective before human clinical trials may begin;
- performance of adequate and well-controlled human clinical trials according to the FDA's regulations, commonly referred to as good clinical practices, or GCPs, and any additional requirements for the protection of human research patients and their health information, to establish the safety, purity, and potency of the proposed biological product for its intended use;

- submission to the FDA of a BLA for marketing approval that includes substantive evidence of safety, purity, and potency from results of nonclinical testing and clinical trials;
- satisfactory completion of an FDA inspection of the manufacturing facility or facilities where the product is produced and tested to assess compliance with 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 and purity;
- potential FDA audit of the nonclinical and clinical trial sites that generated the data in support of the BLA; and
- FDA review and approval, or licensure, of the BLA.

Before testing any product candidate, including a gene therapy product, in humans, the product candidate enters the preclinical testing stage. Preclinical tests, also referred to as nonclinical studies, include laboratory evaluations of product chemistry, toxicity and formulation, as well as animal studies to assess the potential safety and activity of the product candidate. The conduct of certain preclinical tests must comply with federal regulations and requirements, including GLPs.

Where a gene therapy study is conducted at, or sponsored by, institutions receiving NIH funding for recombinant DNA research, a protocol and related documentation has to be submitted to and the clinical trial registered with the NIH Office of Biotechnology Activities, or OBA, pursuant to the NIH Guidelines for Research Involving Recombinant DNA Molecules, or NIH Guidelines. Compliance with the NIH Guidelines is mandatory for investigators at institutions receiving NIH funds for research involving recombinant DNA; however, many companies and other institutions not otherwise subject to the NIH Guidelines voluntarily follow them. The NIH is responsible for convening the RAC, a federal advisory committee, which discusses protocols that raise novel or particularly important scientific, safety or ethical considerations at one of its quarterly public meetings. Current NIH guidelines specify that RAC review of human gene transfer protocols should be limited to cases in which an oversight body, such as an Institutional Biosafety Committee or an Institutional Review Board, or IRB, determines that a protocol would significantly benefit from RAC review, and has been determined to meet certain additional criteria. The OBA will notify the FDA and the sponsor of the RAC's decision regarding the necessity for full public review of a gene therapy protocol. RAC proceedings and reports are posted to the OBA web site and may be accessed by the public.

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

Clinical trials involve the administration of the product candidate to volunteers or patients under the supervision of qualified investigators, generally physicians not employed by or under the clinical trial sponsor's control. Clinical trials are conducted under protocols detailing, among other things, the objectives of the clinical trial, dosing procedures, patient selection and exclusion criteria, and the parameters to be used to monitor patient safety, including stopping rules that assure a clinical trial will be stopped if certain adverse events occur. Each protocol and any amendments to the protocol must be submitted to the FDA as part of the IND. Clinical trials must be conducted and monitored in accordance with the FDA's regulations comprising the GCP requirements, including the requirement that all patients provide informed consent. 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 clinical 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 form and content of the informed consent, which must be signed by each clinical trial patient or his or her legal representative, and must monitor the clinical trial until completed. Clinical trials involving biological product candidates also must be reviewed by an institutional biosafety committee, or IBC, a local institutional committee that reviews and oversees basic and clinical research conducted at that institution. The IBC assesses the safety of the research and identifies any potential risk to public health or the environment.

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

- Phase I. The investigational product candidate is initially introduced into human patients and tested for safety. In the case of some products for severe or life-threatening diseases, especially when the product candidate may be inherently too toxic to be ethically administered to healthy volunteers, the initial human testing is often conducted in patients; gene therapy is usually administered to patients in Phase I trials. This is also true in situations where toxicity can only be judged in patients with disease. An evaluation for preliminary evidence of efficacy can be performed at this time.
- Phase II. The investigational product candidate is evaluated in a limited patient population to identify possible adverse effects and safety risks, to evaluate preliminarily the efficacy of the product candidate for specific targeted diseases, and to generate hypotheses for the dosage tolerance, optimal dosage, and dosing schedule.
- Phase III. Clinical trials are undertaken to evaluate further dosage, clinical efficacy, potency, and safety in an expanded patient population at geographically dispersed clinical trial sites. These clinical trials are intended to establish the overall risk/benefit ratio of the product candidate and provide an adequate basis for product labeling.

Post-approval clinical trials, sometimes referred to as Phase IV clinical trials, may be conducted after initial marketing approval. These clinical trials are used to gain additional experience from the treatment of patients in the intended therapeutic indication, particularly for long-term safety follow-up. The FDA recommends that sponsors observe patients for potential gene therapy-related delayed adverse events with agents such as those we are developing for a period of up to 15 years, including a minimum of five years of annual examinations followed by ten years of annual queries, either in person or by questionnaire, of clinical trial patients.

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

There are also requirements governing the reporting of ongoing clinical trials and completed clinical trial results to public registries. Sponsors of clinical trials of FDA-regulated products, including biologics, are required to register and disclose certain clinical trial information, which is publicly available at www.clinicaltrials.gov. Information related to the product, patient population, phase of investigation, study sites and investigators, and other aspects of the clinical trial is then made public as part of the registration. Sponsors are also obligated to discuss the results of their clinical trials after completion. Disclosure of the results of these trials can be delayed until the new product or new indication being studied has been approved. The NIH and the FDA have a publicly accessible database, the Genetic Modification Clinical Research Information System, which includes information on gene therapy trials and serves as an electronic tool to facilitate the reporting and analysis of adverse events on these trials.

Concurrently with clinical trials, companies usually complete additional animal studies and also develop additional information about the physical characteristics of the components of a product as well as finalize processes for manufacturing the components in commercial quantities in accordance with cGMP requirements. To help reduce the risk of the introduction of adventitious agents with use of biological products, the Public Health Service Act, or PHS Act, emphasizes the importance of manufacturing control for products whose attributes cannot be precisely defined. The manufacturing process must be capable of consistently producing quality batches of the product candidate and, among other things, the sponsor must develop methods for testing the identity, strength, quality, potency and purity of the final product. Additionally, appropriate packaging must be selected and tested and stability studies must be conducted to demonstrate that the components of a product candidate do not undergo unacceptable deterioration over their shelf life.

U.S. Review and Approval Processes

After the completion of clinical trials of an investigational biologic product, FDA approval of a BLA must be obtained before commercial marketing of the product may begin. The BLA must include results of product development, laboratory, and animal studies, human trials, information on the manufacture and composition of the product, proposed labeling and other relevant information. The testing and approval processes require substantial time and effort and there can be no assurance that the FDA will accept the BLA for filing and, even if filed, that any approval will be granted on a timely basis, if at all.

Under the Prescription Drug User Fee Act, or PDUFA, as amended, each BLA must be accompanied by a significant user fee. The FDA adjusts the PDUFA user fees on an annual basis. PDUFA also imposes annual product fees and annual establishment fees on facilities used to manufacture prescription drugs or biologics. 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. No user fees are assessed on BLAs for products designated as orphan drugs, unless the application also includes a non-orphan indication.

Within 60 days following submission, the FDA reviews the BLA to determine if it is substantially complete before the agency accepts it for filing. The FDA may refuse to file any BLA that it deems incomplete or not properly reviewable at the time of submission and may request additional information.

In this event, the BLA must be resubmitted with the additional information. The resubmitted application also is subject to an initial filing review before the FDA accepts it for filing. Once the submission is accepted for filing, the FDA begins an in-depth substantive review of the BLA. The FDA reviews the BLA to determine, among other things, whether the proposed product is safe and potent, or effective, for its intended use, and has an acceptable purity profile, and whether the product is being manufactured in accordance with cGMP to assure and preserve the product's identity, safety, strength, quality, potency and purity. The FDA may refer applications for novel products or products that present difficult questions of safety or efficacy to an advisory committee, typically a panel that includes clinicians and other experts, for review, evaluation and a recommendation as to whether the application should be approved and under what conditions. The FDA is not bound by the recommendations of an advisory committee, but it considers such recommendations when making decisions. During the product approval process, the FDA also will determine whether a Risk Evaluation and Mitigation Strategy, or REMS, is necessary to assure the safe use of the product. If the FDA concludes that a REMS is needed, the sponsor of the BLA must submit a proposed REMS; the FDA will not approve the BLA without a REMS, if required.

Before approving a BLA, the FDA will inspect the facilities at which the product is manufactured. The FDA will not approve the product unless it determines that the manufacturing processes and facilities are in substantial compliance with cGMP requirements and adequate to assure consistent production of the product within required specifications. Additionally, before approving a BLA, the FDA will typically inspect one or more clinical sites, to assure that the clinical trials were conducted in compliance with GCP requirements. To assure cGMP, GLP and GCP compliance, an applicant must incur significant expenditure of time, money, and effort in the areas of training, record keeping, production, and quality control.

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

If a product candidate receives regulatory approval, the approval may be significantly limited to specific diseases and dosages or the indications for use may otherwise be limited, which could restrict the commercial value of the product. Further, the FDA may require that certain contraindications, warnings, or precautions be included in the product labeling. The FDA may impose restrictions and conditions on product distribution, prescribing, or dispensing in the form of a risk management plan, or otherwise limit the scope of any approval. In addition, the FDA may require post marketing clinical trials, sometimes referred to as Phase IV clinical trials, designed to assess further a biological product's safety and effectiveness, and testing and surveillance programs to monitor the safety of approved products that have been commercialized.

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

Orphan Drug Designation

Under the Orphan Drug Act, the FDA may grant orphan designation to a drug or biological product intended to treat a rare disease or condition, which is generally a disease or condition that affects fewer than 200,000 individuals in the United States, or more than 200,000 individuals in the United States for which there is no reasonable expectation that the cost of developing and making a drug or biological product available in the United States for this type of disease or condition will be recovered from sales of the product. Orphan product designation must be requested before submitting a BLA. After the FDA grants orphan product designation, the identity of the therapeutic agent and its potential orphan use are disclosed publicly by the FDA. Orphan product designation does not convey any advantage in or shorten the duration of the regulatory review and approval process. There can be no assurance that we will receive Orphan-Drug Designation for any indications or for any of our current and potential product candidates.

If a product candidate that has orphan designation subsequently receives the first FDA approval for the disease or condition for which it has such designation, the product is entitled to orphan product exclusivity, which means that the FDA may not approve any other applications to market the same drug or biological product for the same indication for seven years, except in limited circumstances, such as a showing of clinical superiority to the product with orphan exclusivity. Competitors, however, may receive approval of different products for the indication for which the orphan product has exclusivity or obtain approval for the same product but for a different indication for which the orphan product has exclusivity.

Expedited Development and Review Programs

The FDA has four programs in place intended to facilitate and expedite development and review of new drugs and biologics intended to address unmet medical needs in the treatment of serious or life-threatening conditions. These are Fast Track Designation, Breakthrough Therapy Designation, Accelerated Approval Program, and Priority Review Designation.

The Fast Track program is intended to expedite or facilitate the process for reviewing a new product if it is intended for the treatment of a serious or life-threatening disease or condition, and it demonstrates the potential to address unmet medical needs for such a disease or condition. Fast Track Designation applies to the combination of the product and the specific indication for which it is being studied. The sponsor of a new drug or biologic may request the FDA to designate the drug or biologic as a Fast Track product at any time during the clinical development of the product. Unique to a Fast Track product, the FDA may consider for review sections of the marketing application on a rolling basis before the complete application is submitted, if the sponsor provides a schedule for the submission of the sections of the application, the FDA agrees to accept sections of the application and determines that the schedule is acceptable, and the sponsor pays any required user fees upon submission of the first section of the application.

A new product can receive Breakthrough Therapy Designation if it 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 it may demonstrate substantial improvement over existing therapies on one or more clinically significant endpoints, such as substantial treatment effects observed early in clinical development. A Breakthrough Therapy Designation conveys all of the features of Fast Track Designation in addition to more intensive FDA guidance on an efficient development program, organizational commitment involving senior managers, and eligibility for priority review. Specifically, FDA intends to expedite the development and review of a Breakthrough Therapy by, where appropriate, intensively involving senior managers and experienced review staff in a proactive collaborative, cross-disciplinary review. Where appropriate, FDA also intends to assign a cross-disciplinary project lead for the review team to facilitate an efficient review of the development program. The FDA notes that a compressed drug development program still must generate adequate data to demonstrate that the drug or biologic meets the statutory standard for approval. Omitting components of the development program that are necessary for such a determination can significantly delay, or even preclude, marketing approval.

Breakthrough Therapy Designation indicates that preliminary clinical evidence demonstrates the drug may have substantial improvement on one or more clinically significant endpoints over available therapy. Breakthrough Therapy Designation intensifies FDA involvement to ensure an efficient drug development program and is an organizational commitment from the FDA to involve its senior managers. A sponsor receiving Breakthrough Therapy Designation has up to six months after receiving the Breakthrough Therapy Designation to request an Initial Comprehensive Multidisciplinary meeting to discuss the drug development program. This initial meeting is a Type B meeting, used to discuss the overarching, high-level plan for drug development. These discussions include topics such as planned clinical trials and endpoints, any resizing or adaptations to the trials, plans for expediting the manufacturing development strategy and studies that potentially could be completed after approval. When Breakthrough Therapy Designation has been granted, the FDA is encouraged to meet regularly with the sponsor and subsequent meetings are considered Type B meetings and are established based on the needs of the program.

The FDA may grant accelerated approval under its Accelerated Approval Program to a product candidate for a serious or life-threatening condition upon a determination that the product candidate has an effect on a surrogate endpoint that is reasonably likely to predict clinical benefit, or an effect on a clinical endpoint that can be measured earlier than an effect on irreversible morbidity or mortality, that is reasonably likely to predict an effect on irreversible morbidity or mortality or other clinical benefit, taking into account the severity, rarity, or prevalence of the condition and the availability or lack of alternative treatments. Accelerated approval is usually contingent on a sponsor's agreement to conduct adequate and well-controlled additional post-approval trials to verify and describe the product's clinical benefit. In addition, the FDA currently requires as a condition for accelerated approval pre-approval of promotional materials, which could adversely impact the timing of the commercial launch of the product.

Fast Track Designation, Breakthrough Therapy Designation, and Accelerated Approval do not change the standards for approval but may expedite the development process.

An application for a product candidate may be eligible to obtain Priority Review Designation if it is intended to treat a serious condition and, if approved, would provide a significant improvement in safety or effectiveness. The FDA will attempt to direct additional resources to the evaluation of an application for a new product designated for priority review in an effort to facilitate the review. A Priority Review Designation means FDA's goal is to take action on the marketing application within six months (compared to 10 months under standard review) of the 60-day filing date. Priority Review Designation does not change the standards for approval but may expedite the review process.

We believe that Oncoprex represents a breakthrough, in that the TUSC2 gene is delivered with a non-viral lipid-based nanoparticle, rather than a viral vector. In addition, Oncoprex may have broad applicability to many cancers, and we believe that Oncoprex represents a significant improvement in safety for systemic use over previously approved products. For these reasons, we believe that our ongoing Phase II clinical trial may provide sufficient data to support Accelerated Approval as a Breakthrough Therapy for Oncoprex immunogene therapy combined with erlotinib for the treatment of Stage IV non-small cell lung cancer patients with unmet medical needs whose cancer has progressed on approved therapies. We intend to enroll specifically patients with an EGFR mutation but without a T790M mutation. Patients in this group have benefited from Oncoprex + erlotinib therapy in our ongoing Phase II clinical trial, and they have no approved treatments and thus have an unmet medical need which we believe could qualify for Fast Track or Breakthrough Therapy designation. The current Phase II trial results represent a substantial improvement over the results of the Lux-Lung afatinib trial, which we believe may qualify Oncoprex in combination with erlotinib for Fast Track or Breakthrough Therapy designation. We believe that the unmet medical need may qualify for Priority Review based on a surrogate endpoint such as
clinical benefit, response rate, or progression free survival (PFS), with eligibility for Accelerated Approval.

Post-Approval Requirements

Maintaining post-approval compliance with applicable federal, state, and local statutes and regulations requires the expenditure of substantial time and financial resources. Rigorous and extensive FDA regulation of combination products continues after approval, particularly with respect to cGMP. We rely, and expect to continue to rely, on third parties for the production and distribution of clinical and commercial quantities of any products that we may commercialize. Manufacturers of our products are required to comply with applicable requirements in the cGMP regulations, including quality control and quality assurance and maintenance of records and documentation. Other post-approval requirements include reporting of cGMP deviations that may affect the identity, potency, purity and overall safety of a distributed product, record-keeping requirements, reporting of adverse effects, reporting updated safety and efficacy information, and complying with electronic record and signature requirements. After a BLA is approved, the product also may be subject to official lot release. As part of the manufacturing process, the manufacturer is required to perform certain tests on each lot of the product before it is released for distribution. If the product is subject to official release by the FDA, the manufacturer submits samples of each lot of product to the FDA together with a release protocol showing a summary of the history of manufacture of the lot and the results of all of the manufacturer's tests performed on the lot. The FDA also may perform certain confirmatory tests on lots of some products before releasing the lots for distribution by the manufacturer.

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

Manufacturers and other entities involved in the manufacture and distribution of approved products are required to register the establishments where the approved products are made with the FDA and certain state agencies, and are subject to periodic unannounced inspections by the FDA and certain state agencies for compliance with cGMPs and other laws. Accordingly, manufacturers must continue to expend time, money, and effort in the area of production and quality control to maintain cGMP compliance. Discovery of problems with a product after approval may result in restrictions on a product, manufacturer, or holder of an approved BLA, including withdrawal of the product from the market. In addition, changes to the manufacturing process or facility generally require prior FDA approval before being implemented. Other types of changes to the approved product, such as adding new indications and additional labeling claims, are also subject to further FDA review and approval.

U.S. Patent Term Restoration

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

Biosimilars and Exclusivity

The Biologics Price Competition and Innovation Act of 2009, or BPCIA, created an abbreviated approval pathway for biological products shown to be highly similar to, or interchangeable with, an FDA-licensed reference biological product. The FDA has issued several guidance documents outlining an approach to review and approval of biosimilars.

Biosimilarity, which requires that there be no clinically meaningful differences between the biological product and the reference product in terms of safety, purity, and potency, can be shown through analytical studies, animal studies, and a clinical study or studies. Interchangeability requires that a product is biosimilar to the reference product and the product must demonstrate that it can be expected to produce the same clinical results as the reference product in any given patient and, for products that are administered multiple times to an individual, the biologic and the reference biologic may be alternated or switched after one has been previously administered without increasing safety risks or risks of diminished efficacy relative to exclusive use of the reference biologic. However, complexities associated with the larger, and often more complex, structures of biological products, as well as the processes by which such products are manufactured, pose significant hurdles to implementation of the abbreviated approval pathway that are still being worked out by the FDA.

The BPCIA includes, among other provisions:

- A 12-year exclusivity period from the date of first licensure of the reference product, during which approval of a 351(k) application referencing that product may not be made effective;
- A four-year exclusivity period from the date of first licensure of the reference product, during which a 351(k) application referencing that product may not be submitted; and
- An exclusivity period for certain biological products that have been approved through the 351(k) pathway as interchangeable biosimilars.

The BPCIA also establishes procedures for identifying and resolving patent disputes involving applications submitted under section 351(k) of the PHS Act.

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

The BPCIA is complex and its interpretation and implementation by the FDA remains unpredictable. In addition, government proposals have sought to reduce the 12-year reference product exclusivity period. Other aspects of the BPCIA, some of which may impact the BPCIA exclusivity provisions, have also been the subject of recent litigation. As a result, the ultimate effect, implementation, and meaning of the BPCIA is subject to uncertainty.

Additional U.S. Regulation

In the United States, our activities are potentially subject to regulation by various federal, state and local authorities in addition to the FDA, including but not limited to, the Centers for Medicare and Medicaid Services, or CMS, other divisions of the U.S. Department of Health and Human Services, for instance the Office of Inspector General, the U.S. Department of Justice, or DOJ, and individual U.S. Attorney offices within the DOJ, and state and local governments. For example, sales, marketing and scientific/educational grant programs must comply with the anti-fraud and abuse provisions of the Social Security Act, the false claims laws, the physician payment transparency laws, the privacy and security provisions of the Health Insurance Portability and Accountability Act, or HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act, or HITECH, and similar state laws, each as amended.

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

Federal and State Fraud and Abuse Laws

In the United States, our activities are potentially subject to regulation by various federal, state and local authorities in addition to the FDA, including but not limited to, CMS, other divisions of the U.S. Department of Health and Human Services, for instance, the Office of Inspector General, DOJ, and individual U.S. Attorney offices within the DOJ, and state and local governments. These federal and state laws, which generally will not be applicable to us or our current and potential product candidates unless and until we obtain FDA marketing approval for any of our current and potential product candidates, include, among others, anti-kickback statutes, the False Claims Act and related stated state and federal laws, the Stark Law and related state and federal laws, transparency laws, privacy and regulation regarding providing drug samples, sales and marketing activities and our relationships with customers and payors as follows.

The federal Anti-Kickback Statute prohibits, among other things, individuals and entities from knowingly and willfully offering, paying, soliciting, or receiving any remuneration, directly or indirectly, overtly or covertly, to induce or in return for purchasing, leasing, recommending, ordering, or arranging for the purchase, lease, recommendation or order of any health care item or service reimbursable, in whole or in part, under Medicare, Medicaid, or other federally financed healthcare programs. This statute has been interpreted to apply to arrangements between pharmaceutical manufacturers on one hand and prescribers, purchasers, and formulary managers on the other. Although there are a number of statutory exemptions and regulatory safe harbors protecting certain common activities from prosecution, the exemptions and safe harbors are drawn narrowly, and practices that involve remuneration that may be alleged to be intended to induce prescribing, purchases or recommendations may be subject to scrutiny if they do not qualify for an exemption or safe harbor. Additionally, the intent standard under the Anti-Kickback Statute was amended by the Affordable Care Act 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 Affordable Care Act codified case law that a claim including items or services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the federal civil False Claims Act.

HIPAA created additional federal criminal statutes that prohibit, among other actions, knowingly and willfully executing, or attempting to execute, a scheme to defraud or to obtain, by means of false or fraudulent pretenses, representations or promises, any money or property owned by, or under the control or custody of, any healthcare benefit program, including private third-party payers, willfully obstructing a criminal investigation of a healthcare offense, and knowingly and willfully falsifying, concealing or covering up by trick, scheme or device, a material fact or making any materially false, fictitious or fraudulent statement in connection with the delivery of or payment for healthcare benefits, items or services. Similar to the federal 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.

Federal false claims and civil monetary penalties laws, including the federal civil False Claims Act, prohibit, among other things, any person or entity from knowingly presenting, or causing to be presented, a false, fictitious or fraudulent claim for payment to, or approval by, the federal government, or knowingly making, using, or causing to be made or used, a false statement to get a false claim paid. Several pharmaceutical and other health care companies have been prosecuted under these laws for allegedly providing free product to customers with the expectation that the customers would bill federal programs for the product. Other companies have been prosecuted for causing false claims to be submitted because of the company's marketing of the product for unapproved, and thus non-reimbursable, uses.

The majority of states also have statutes or regulations similar to the federal Anti-Kickback Statute and false claims laws, which apply to items and services, reimbursed under Medicaid and other state programs, or, in several states, apply regardless of the payer.

We may also be subject to data privacy and security regulations by both the federal government and the states in which we conduct our business. HIPAA, as amended by HITECH, and their respective implementing regulations, including the final Omnibus Rule published in 2013, imposes requirements on certain types of entities, including mandatory contractual terms, relating to the privacy, security, and transmission of individually identifiable health information. Among other things, HITECH makes HIPAA's security standards and certain privacy standards directly applicable to business associates, which are independent contractors or agents of covered entities that create, receive, maintain or transmit protected health information in connection with providing a service for or on behalf of a covered entity. HITECH also created four new tiers of civil monetary penalties, amended HIPAA to make civil and criminal penalties directly applicable to business associates, and gave state attorneys general new authority to file civil actions for damages or injunctions in federal courts to enforce the federal HIPAA laws and seek attorneys' fees and costs associated with pursuing federal civil actions. In addition, many state laws govern the privacy and security of health information in specified circumstances, many of which differ from each other and from HIPAA in significant ways and may not have the same requirements, thus complicating compliance efforts.

Additionally, the federal Physician Payments Sunshine Act under the Affordable Care Act, and its implementing regulations, require that certain manufacturers of drugs, devices, biological and medical supplies for which payment is available under Medicare, Medicaid or the Children's Health Insurance Program, with certain exceptions, annually report to CMS information related to certain payments or other transfers of value made or distributed to physicians and teaching hospitals, or to entities or individuals at the request of, or designated on behalf of, the physicians and teaching hospitals and to report annually certain ownership and investment interests held by physicians and their immediate family members. Failure to submit timely, accurately, and completely the required information may result in civil monetary penalties of up to an aggregate of $150,000 per year and up to an aggregate of $1 million per year for "knowing failures". Certain states also mandate implementation of compliance programs, impose restrictions on pharmaceutical manufacturer marketing practices, and/or require the tracking and reporting of gifts, compensation, and other remuneration to healthcare providers and entities.

Because of the breadth of these laws and the narrowness of the exceptions and safe harbors, it is possible that some of our business activities could be subject to challenge under one or more of such laws. Such a challenge could have a material adverse effect on our business, financial condition, and results of operations. If our operations are found to be in violation of any of these or any other health regulatory laws that may apply to us, we may be subject to, without limitation, significant penalties, including the imposition of significant civil, criminal and administrative penalties, damages, monetary fines, disgorgement, individual imprisonment, possible exclusion from participation in Medicare, Medicaid and other federal healthcare programs, contractual damages, reputational harm, diminished profits and future earnings, and curtailment or restructuring of our operations, any of which could adversely affect our ability to operate our business and our results of operations.

In addition, as part of the sales and marketing process, pharmaceutical companies frequently provide samples of approved products to physicians. This practice is regulated by the FDA and other governmental authorities, including, in particular, requirements concerning record keeping and control procedures. Any failure to comply with the regulations may result in significant criminal and civil penalties as well as damage to our credibility in the marketplace.

Coverage and Reimbursement

In many of the markets where we may do business in the future, the prices of pharmaceutical products are subject to direct price controls (by law) and to reimbursement programs with varying price control mechanisms. In the United States, significant uncertainty exists as to the coverage and reimbursement status of any product candidates for which we obtain product approval. Often private payers follow the coverage and reimbursement decisions of the Medicare program, and it is difficult to predict how CMS may decide to cover and reimburse approved products, especially novel products, and those determinations are subject to change.

Moreover, the process for determining whether a third-party payer will provide coverage for a drug product may be separate from the process for setting the price of a drug product or for establishing the reimbursement rate that such a payer will pay for the drug product. Third-party payers may limit coverage to specific products on an approved list, also known as a formulary, which might not include all of the FDA-approved drugs for a particular indication. A decision by a third-party payer not to cover our current and potential product candidates could reduce physician utilization of our products once approved. A payer's decision to provide coverage for a drug product does not imply that an adequate reimbursement rate will be approved. Further, one payer's determination to provide coverage for a drug product does not assure that other payers will also provide coverage for the drug product. Coverage and reimbursement for new products can differ significantly from payer to payer. As a result, the coverage determination process will require us to provide scientific and clinical support for the use of our products to each payer separately and will be a time-consuming process. Additionally, third-party reimbursement may not be available or may not be adequate to enable us to maintain price levels sufficient to realize an appropriate return on our investment in product development.

The marketability of any product candidates for which we or our collaborators receive regulatory approval for commercial sale may suffer if the government and third-party payers fail to provide adequate coverage and reimbursement. In addition, an emphasis on cost containment measures in the United States has increased and we expect will continue to increase the pressure on pharmaceutical pricing. Third-party payers are increasingly challenging the prices charged for medical products and services, examining the medical necessity and reviewing the cost-effectiveness of drugs, medical devices and medical services, in addition to questioning safety and efficacy. If these third-party payers do not consider our products to be cost-effective compared to other available therapies, they may not cover our products after FDA approval or, if they do, the level of payment may not be sufficient to allow us to sell our products at a profit. Coverage policies and third-party reimbursement rates may change at any time. Even if favorable coverage and reimbursement status is attained for one or more products for which we or our collaborators receive regulatory approval, less favorable coverage policies and reimbursement rates may be implemented in the future.

Health Care Reform

In March 2010, the Affordable Care Act was enacted, which affected, and may further affect, health care financing and delivery by both governmental and private insurers, and therefore the pharmaceutical and biotechnology industry. The Affordable Care Act has affected and may continue to affect existing government healthcare programs and may result in the development of new programs.

Among the Affordable Care Act's provisions of importance to the pharmaceutical and biotechnology industries, in addition to those otherwise described above, are the following:

- 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;
- an increase in 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;
- a new methodology by which rebates owed by manufacturers under the Medicaid Drug Rebate Program are calculated for certain drugs and biologics, including our current and potential product candidates, that are inhaled, infused, instilled, implanted or injected;
- extension of manufacturers' Medicaid rebate liability to covered drugs dispensed to individuals who are enrolled in Medicaid managed care organizations;
- expansion of 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;
- a new Medicare Part D coverage gap discount program, in which manufacturers must agree to offer 50% point-of-sale discounts off negotiated prices of applicable brand drugs to eligible beneficiaries during their coverage gap period, as a condition for the manufacturer's outpatient drugs to be covered under Medicare Part D;
- expansion of the entities eligible for discounts under the Public Health Service pharmaceutical pricing program;
- a new Patient-Centered Outcomes Research Institute to oversee, identify priorities in, and conduct comparative clinical effectiveness research, along with funding for such research;

- establishment of a Center for Medicare Innovation at 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
- a licensure framework for follow on biologic products.

There have been judicial and Congressional challenges to certain aspects of the Affordable Care Act. As a result, there have been delays in the implementation of, and action taken to repeal or replace, certain aspects of the Affordable Care Act. In January 2017, President Trump signed an Executive Order directing federal agencies with authorities and responsibilities under the Affordable Care Act to waive, defer, grant exemptions from or delay the implementation of any provision of the Affordable Care Act that would impose a fiscal or regulatory burden on states, individuals, healthcare providers, health insurers or manufacturers of pharmaceuticals or medical devices. In December 2018 a judge for the United States District Court for the Northern District of Texas ruled that the entire Affordable Care Act is unconstitutional. The ruling, which is on hold pending appeal, was followed by a brief from the Department of Justice stating that the district court's ruling should be affirmed. While the Affordable Care Act remains in effect at the time of this filing, its future is uncertain. With respect to repeal or revision of the Affordable Care and its replacement with new or revised legislation, it is unclear when such legislation will be enacted, what it will provide and what impact it will have on the availability of healthcare and containing or lowering costs of healthcare.

The Trump Administration's proposed fiscal year, or FY, 2020 budget includes extensive health policy provisions, the impact of which is unpredictable. Among other changes, the proposed FY 2020 budget would authorize an administrative penalty for providers for ordering high-risk, high-cost items or services without proper documentation, authorize civil monetary penalties for failure to report changes to information provided during Medicaid enrollment or revalidation, and extend the Affordable Care Act Cost-Sharing Reduction payments through calendar year 2020. It is unclear how these and other provisions of the FY 2020 budget resolution may affect our business in the future.

Other legislative changes have been proposed and adopted in the United States since the Affordable Care Act was enacted. For example, in August 2011, the Budget Control Act of 2011, among other things, created measures for spending reductions by Congress. A Joint Select Committee on Deficit Reduction, tasked with recommending a targeted deficit reduction of at least $1.2 trillion for the fiscal year 2012 through 2021, was unable to reach required goals, thereby triggering the legislation's automatic reduction to several government programs. This includes aggregate reductions of Medicare payments to providers of up to 2% per fiscal year, which went into effect in April 2013 and, due to the Bipartisan Budget Act of 2015, will remain in effect through 2025 unless additional Congressional action is taken. Further, in January 2013, President Obama signed into law the American Taxpayer Relief Act of 2012, which, among other things, further reduced Medicare payments to several providers, including hospitals, imaging centers and cancer treatment centers, and increased the statute of limitations period for the government to recover overpayments to providers from three to five years.

We anticipate that the Affordable Care Act and other legislative reforms will result in additional downward pressure on the price that we receive for any approved product, if covered, and could seriously harm our business. Any reduction in reimbursement from Medicare and other government programs may result in a similar reduction in payments from private payers. The implementation of cost containment measures or other healthcare reforms may prevent us from being able to generate revenue, attain profitability, or commercialize our products. In addition, it is possible that there will be further legislation or regulation that could harm our business, financial condition, and results of operations.

Environmental Regulation

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

U.S. Foreign Corrupt Practices Act

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

Government Regulation Outside of the United States

In addition to regulations in the United States, we will be subject to a variety of regulations in other jurisdictions governing, among other things, clinical trials and any commercial sales and distribution of our products. Because biologically-sourced raw materials are subject to unique contamination risks, their use may be subjected to different types of restrictions in different countries.

Whether or not we obtain FDA approval for a product, we must obtain the required approvals from regulatory authorities in foreign countries prior to the commencement of clinical trials or marketing of the product in those countries. Certain countries outside of the United States have a similar process that requires the submission of a clinical trial application equivalent to an IND prior to the commencement of human clinical trials. In the European Union, for example, a clinical trial authorization, or CTA, must be submitted to each country's national health authority and an independent ethics committee, much like the FDA and the IRB, respectively. Once the CTA is approved in accordance with a country's requirements, clinical trials may start.

The requirements and process governing the conduct of clinical trials, product licensing, pricing, and reimbursement vary from country to country. In all cases, the clinical trials are to be conducted in accordance with GCP, applicable regulatory requirements, and the ethical principles that have their origin in the Declaration of Helsinki.

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

Employees

As of March 25, 2019, we had seven full-time employees, and accordingly, a high percentage of the work performed for our development projects is outsourced to qualified independent contractors.

Corporate Information

We were incorporated in Delaware in April 2009. Our principal executive offices are located at 1601 Trinity Street, Bldg B, Suite 3.322, Austin, TX 78712, and our telephone number is (877) 774-4679. Our corporate website address is www.genprex.com.

Information contained on, or that can be accessed through, our website or social medial sites does not constitute part of this Annual Report on Form 10-K or any other report or document we file with the SEC, and any references to our website and social media sites are intended to be inactive textual references only.

This Annual Report on Form 10-K, our Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, and any amendments to those reports filed or furnished pursuant to Sections 13(a) and 15(d) of the Securities Exchange Act of 1934, as amended, or the Exchange Act, are 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 SEC.

We have proprietary rights to a number of trademarks, including Oncoprex™, that are used in this Annual Report on Form 10-K. Solely for convenience, the trademarks and trade names in this Annual Report on From 10-K are generally referred to without the ® and ™ symbols, but such references should not be construed as any indicator that their respective owners will not assert, to the fullest extent under applicable law, their rights thereto. All other trademarks, trade names and service marks appearing in this Annual Report on Form 10-K are the property of their respective owners.

We qualify as an "emerging growth company" as the term is used in The Jumpstart Our Business Startups Act of 2012, or the JOBS Act, and therefore, we may take advantage of certain exemptions from various public company reporting requirements, including:

- a requirement to only have two years of audited financial statements and only two years of related selected financial data and management's discussion and analysis;
- exemption from the auditor attestation requirement on the effectiveness of our internal controls over financial reporting;
- reduced disclosure obligations regarding executive compensation; and
- exemptions from the requirements of holding a nonbinding advisory stockholder vote on executive compensation and any golden parachute payments.

We may take advantage of these provisions for up to five years or such earlier time that we are no longer an emerging growth company. We would cease to be an emerging growth company if we have more than $1.0 billion in annual revenues, have more than $700 million in market value of our capital stock held by nonaffiliates or issue more than $1.0 billion of non-convertible debt over a three-year period. We may choose to take advantage of some, but not all, of the available benefits of the JOBS Act. We have taken advantage of some of the reduced reporting requirements in this Annual Report on Form 10-K. Accordingly, the information contained herein may be different than the information you receive from other public companies in which you hold stock. In addition, the JOBS Act provides that an emerging growth company can delay adopting new or revised accounting standards until such time as those standards apply to private companies. We have irrevocably elected not to avail ourselves of this exemption from new or revised accounting standards and, therefore, we will be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies.

Item 1A. Risk Factors.

Investing in our common stock involves a high degree of risk. You should carefully consider each of the following risks, together with all other information set forth in this Annual Report on Form 10-K, including the financial statements and the related notes and "Management's Discussion and Analysis of Financial Conditions and Results of Operations", before making a decision to purchase, hold or sell our common stock. The occurrence of any of the following risks could harm our business, financial condition, results of operations and/or growth prospects or cause our actual results to differ materially from those contained in forward-looking statements we have made in this report and those we may make from time to time. If any of the following risks actually occurs, our business, financial condition, results of operations and future growth prospects would likely be materially and adversely affected. In these circumstances, the market price of our common stock would likely decline and you may lose all or part of your investments. Additional risks and uncertainties not presently known to us or that we currently deem immaterial also may impair our business operations.

Risks Related to Our Financial Position and Need for Additional Capital

We will require substantial additional funding, which may not be available to us on acceptable terms, or at all, and, if not so available, may require us to delay, limit, reduce or cease our operations.

We are using the proceeds from our initial public offering and private placement of our securities to advance Oncoprex through clinical development, as well as for other purposes. Developing pharmaceutical products, including conducting preclinical studies and clinical trials, is expensive. We will require substantial additional future capital in order to complete clinical development and commercialize Oncoprex. If the FDA requires that we perform additional preclinical studies or clinical trials, our expenses will further increase beyond what we currently expect and the anticipated timing of any potential approval of Oncoprex would likely be delayed. Further, there can be no assurance that the costs we will need to incur to obtain regulatory approval of Oncoprex will not increase.

We will continue to require substantial additional capital to continue our clinical development and commercialization activities. Because successful development of our current and potential product candidates is uncertain, we are unable to estimate the actual amount of funding we will require to complete research and development and commercialize our products under development.

The amount and timing of our future funding requirements will depend on many factors, including but not limited to:

- the progress, costs, results and timing of our clinical trials for Oncoprex;
- the outcome, costs and timing of seeking and obtaining FDA and any other regulatory approvals;
- the ability of third parties to deliver materials and provide services for us;
- the costs associated with securing and establishing commercialization and manufacturing capabilities;
- market acceptance of our current and potential product candidates;
- the costs of acquiring, licensing or investing in businesses, products, product candidates and technologies;
- our ability to maintain, expand and enforce the scope of our intellectual property portfolio, including the amount and timing of any payments we may be required to make, or that we may receive, in connection with the licensing, filing, prosecution, defense and enforcement of any patents or other intellectual property rights;
- our need and ability to hire additional management and scientific and medical personnel;
- the effect of competing drug candidates and new product approvals;
- our need to implement additional internal systems and infrastructure, including financial and reporting systems; and
- the economic and other terms, timing of and success of our existing licensing arrangements and any collaboration,

licensing or other arrangements into which we may enter in the future.

Some of these factors are outside of our control. We expect that our existing cash, and marketable securities will be sufficient to fund our current operations through at least the next 15 months. This period could be shortened if there are any significant increases in planned spending on development programs or more rapid progress of development programs than anticipated. We believe that our existing capital may not be sufficient to enable us to complete the development and commercialization of Oncoprex. Accordingly, we expect that we may need to raise additional funds in the future.

We may seek additional funding through a combination of equity offerings, debt financings, government or other third-party funding, commercialization, marketing and distribution arrangements and other collaborations, strategic alliances and licensing arrangements. Additional funding may not be available to us on acceptable terms or at all. In addition, the terms of any financing may adversely affect the holdings or the rights of our stockholders. Any new equity securities we issue could have rights, preferences, and privileges superior to those of holders of our existing capital stock. In addition, the issuance of additional shares by us, or the possibility of such issuance, may cause the market price of our shares to decline. Any debt financing secured by us in the future could involve restrictive covenants relating to our capital-raising activities and other financial and operational matters, which may make it more difficult for us to obtain additional capital and to pursue business opportunities.

If we are unable to obtain funding on a timely basis, we may be required to significantly curtail one or more of our research or development programs, our ability to continue to support our business growth and to respond to business challenges could be significantly limited, and we could be forced to halt operations. Accordingly, our business may fail, in which case you would lose the entire amount of your investment in our common stock.

In the past, our independent registered public accounting firm has included in its audit opinion a statement relating to our ability to continue as a going concern, and in future years our financial condition and results of operations could result in a similar qualification. The reaction of investors to the inclusion of a going concern statement by our auditors, and our potential inability to continue as a going concern, in future years could materially adversely affect our share price and our ability to raise new capital or enter into strategic alliances.

We also could be required to seek funds through arrangements with collaborative partners or otherwise that may require us to relinquish rights to some of our technologies or product candidates or otherwise agree to terms unfavorable to us.

We have never been profitable, we have no products approved for commercial sale, and to date we have not generated any revenue from product sales. As a result, our ability to reduce our losses and reach profitability is unproven, and we may never achieve or sustain profitability.

We have never been profitable and do not expect to be profitable in the foreseeable future. We have not yet submitted any drug candidates for approval by regulatory authorities in the United States or elsewhere. From our inception on April 1, 2009, to December 31, 2018, we incurred an accumulated deficit of approximately $29.8 million. We incurred net losses of approximately $12.4 million and approximately $3.3 million for the years ended December 31, 2018 and 2017, respectively.

To date, we have devoted most of our financial resources to our corporate overhead and research and development, including our preclinical development activities and clinical trials. We have not generated any revenues from product sales. We expect to continue to incur losses for the foreseeable future, and we expect these losses to increase as we continue our development of, and seek regulatory approvals for our current and potential product candidates, prepare for and begin the commercialization of any approved products, and add infrastructure and personnel to support our continuing product development efforts. We anticipate that any such losses could be significant for the next several years. If Oncoprex or any of our other potential product candidates fails in clinical trials or does not gain regulatory approval, or if our drug candidates do not achieve market acceptance, we may never become profitable. As a result of the foregoing, we expect to continue to experience net losses and negative cash flows for the foreseeable future. These net losses and negative cash flows have had, and will continue to have, an adverse effect on our stockholders' equity and working capital.

Because of the numerous risks and uncertainties associated with pharmaceutical product development, we are unable to accurately predict the timing or amount of increased expenses or when, or if, we will be able to achieve profitability. In addition, our expenses could increase if we are required by the FDA to perform studies or trials in addition to those currently expected, or if there are any delays in completing our clinical trials or the development of any of our drug candidates. The amount of future net losses will depend, in part, on the rate of future growth of our expenses and our ability to generate revenues.

We have a limited operating history and we expect a number of factors to cause our operating results to fluctuate on an annual basis, which may make it difficult to predict our future performance.

We are a clinical stage company with a limited operating history. Our operations to date have been limited to conducting clinical and preclinical research. We have not yet obtained any regulatory approvals for any of our drug candidates. Consequently, any predictions made about our future success or viability may not be as accurate as they could be if we had a longer operating history or approved products on the market. Our operating results are expected to significantly fluctuate from quarter to quarter and year to year due to a variety of factors, many of which are beyond our control. Factors relating to our business that may contribute to these fluctuations include:

- any delays in regulatory review and approval of our current and potential product candidates in clinical development, including our ability to receive approval from the FDA for Oncoprex;
- delays in the commencement, enrollment and timing of clinical trials;
- the success of our clinical trials through all phases of clinical development;
- potential side effects of our current and potential product candidates that could delay or prevent approval or cause an approved drug to be taken off the market;
- our ability to obtain additional funding to develop product candidates;
- our ability to identify and develop additional drug candidates beyond Oncoprex;
- competition from existing products or new products that continue to emerge;
- the ability of patients or healthcare providers to obtain coverage or sufficient reimbursement for our products;
- our ability to adhere to clinical trial requirements directly or with third parties such as contract research organizations, or CROs;
- our dependency on third-party manufacturers to manufacture our products and key ingredients;
- our ability to establish or maintain collaborations, licensing or other arrangements, particularly with MD Anderson;
- our ability to defend against any challenges to our intellectual property including, claims of patent infringement;
- our ability to enforce our intellectual property rights against potential competitors;
- our ability to secure additional intellectual property protection for our drug candidates in development and associated technologies;
- our ability to attract and retain key personnel to manage our business effectively; and
- potential product liability claims.

Accordingly, the results of any historical quarterly or annual periods should not be relied upon as indications of future operating performance.

Risks Related to Development and Commercialization of Our Current and Potential Product Candidates

Our success depends greatly on the success of our development of Oncoprex for the treatment of non-small cell lung cancer, and our pipeline of product candidates beyond this lead indication is extremely early stage and limited. Oncoprex and our product candidates are based on novel technology, which makes it difficult to predict the time and cost of development and of subsequently obtaining regulatory approval.

At this time we are actively pursuing development of only one product candidate, Oncoprex for non-small cell lung cancer. Therefore, we are dependent on the success of Oncoprex in the near term. We cannot provide you any assurance that we will be able to successfully advance Oncoprex through the development process, or that any development problems we experience in the future will not cause significant delays or unanticipated costs, or that such development problems can be solved. We may also experience delays in developing a sustainable, reproducible and scalable manufacturing process or transferring that process to commercial partners, or developing or validating product release assays in a timely manner, which may prevent us from completing our clinical trials or commercializing our products on a timely or profitable basis, if at all. Immunotherapy, gene therapy and biopharmaceutical product development are highly speculative undertakings and involve a substantial degree of uncertainty. Because Oncoprex and our other potential product candidates are based upon novel technology, it is difficult to predict whether, either as stand-alone therapies or in combination with other drugs, they will show consistently favorable results and to predict the time and cost of their development

and of subsequently obtaining regulatory approval. Few gene therapy products have been approved in the United States or Europe. We may find it difficult to enroll patients in our clinical studies, which could delay or prevent clinical studies of our current and potential product candidates. We may encounter delays in our clinical studies, or we may fail to demonstrate safety and efficacy to the satisfaction of FDA and other regulatory authorities. We may not be successful in our efforts to identify or discover additional product candidates, or to develop product candidates that we have identified.

In addition, the clinical trial requirements of FDA, the European Commission, the European Medicines Agency, or the EMA, the competent authorities of the European Union, or EU, Member States and other regulatory authorities and the criteria these regulators use to determine the safety and efficacy of a product candidate vary substantially according to the type, complexity, novelty and intended use and market of such product candidates. The regulatory approval process for novel product candidates such as ours can be more expensive and take longer than for other, better known or more extensively studied product candidates. Even if we are successful in developing additional product candidates, it is difficult to determine how long it will take or how much it will cost to obtain regulatory approvals for these product candidates in either the United States or the EU, or how long it will take to commercialize any other products for which we receive marketing approval. In addition, any future marketing authorization granted by the European Commission may not be indicative of what FDA may require for approval and vice versa.

Negative public opinion and increased regulatory scrutiny of gene therapy and genetic research may damage public perception of our current and potential product candidates or adversely affect our ability to conduct our business or obtain regulatory approvals for our current and potential product candidates.

Public perception may be influenced by claims that gene therapy is unsafe, and gene therapy may not gain the acceptance of the public or the medical community. In particular, our success will depend upon physicians specializing in the treatment of those diseases that our current and potential product candidates target prescribing treatments that involve the use of our current and potential product candidates in lieu of, or in addition to, existing treatments with which they are already familiar and for which greater clinical data may be available. More restrictive government regulations or negative public opinion would have a negative effect on our business or financial condition and may delay or impair the development and commercialization of our current and potential product candidates or demand for any products we may develop. Adverse events in our clinical trials, even if not ultimately attributable to our current and potential product candidates, and the resulting publicity could lead to increased governmental regulation, unfavorable public perception, potential regulatory delays in the testing or approval of our potential product candidates, stricter labeling requirements for those product candidates that are approved and a decrease in demand for any such product candidates. Concern about the environmental spread of our product, whether real or anticipated, could also hinder the commercialization of our products.

Prior to receiving Oncoprex, patients are required to undergo genetic screening to detect EGFR mutations and other mutations relevant to cancer. Genetic testing has raised concerns regarding the appropriate utilization and the confidentiality of information provided by genetic testing. Genetic tests for assessing a person's likelihood of developing a chronic disease have focused public attention on the need to protect the privacy of genetic information. Genetic testing information is also subject to significant restrictions under both federal and state law. For example, concerns have been expressed that insurance carriers and employers may use these tests to discriminate on the basis of genetic information, resulting in barriers to the acceptance of genetic tests by consumers. This could lead to governmental authorities restricting genetic testing or calling for limits on or regulating the use of genetic testing, particularly for diseases for which there is no known cure. Any of these scenarios could decrease demand for Oncoprex or any other products for which we may obtain marketing approval.

Delays in the commencement, enrollment and completion of clinical trials could result in increased costs to us and delay or limit our ability to obtain regulatory approval for Oncoprex and our other potential product candidates.

Oncoprex has been tested in only one prior Phase I clinical study, involving 31 patients. In that study, Oncoprex was tested as a monotherapy. We believe that the best path for development is to develop a combination therapy of Oncoprex in combination with erlotinib, immunotherapies, and possibly other drugs. We have an ongoing Phase I/II clinical trial testing Oncoprex in combination with erlotinib. Enrollment was completed in March 2015 for the Phase I portion of this clinical trial, in which 18 patients were enrolled. The Phase II portion of our Phase I/II clinical trial is at an early stage, with a limited number of patients enrolled, and the favorable results observed so far may not continue in the current clinical trial or be replicated in other clinical trials, especially those involving larger numbers of patients. Even if the Phase I/II trial is successful, success in early clinical studies may not be indicative of results obtained in later studies. The results from our Phase I/II trial may not demonstrate sufficient safety and efficacy to support the submission of marketing approval for Oncoprex. Before we request marketing approval, the FDA may require us to conduct additional clinical studies or evaluate subjects for an additional follow-up. Unless an accelerated approval process is allowed by the FDA, one or more Phase III studies is normally required for approval.

Delays in the commencement, enrollment and/or completion of clinical trials could increase our product development costs or delay or limit the regulatory approval of our current and potential product candidates. We do not know whether any future trials or studies of our other potential product candidates will begin on time or will be completed on schedule, if at all. The start or end of a

clinical study is often delayed or halted due to changing regulatory requirements, changes in the proposed regulatory approval pathway for a drug candidate, manufacturing challenges, including delays or shortages in available drug product, required clinical trial administrative actions, slower than anticipated patient enrollment, changing standards of care, availability or prevalence of use of a comparative drug or required prior therapy, clinical outcomes or financial constraints. For instance, delays or difficulties in patient enrollment or difficulties in retaining trial participants can result in increased costs, longer development times or termination of a clinical trial. Clinical trials of a new product candidate require the enrollment of a sufficient number of patients, including patients who are suffering from the disease the product candidate is intended to treat and who meet other eligibility criteria. Rates of patient enrollment are affected by many factors, including the size of the patient population, the eligibility criteria for the clinical trial, that include the age and condition of the patients and the stage and severity of disease, the nature of the protocol, the proximity of patients to clinical sites and the availability of effective treatments and/or availability of other investigational treatment options for the relevant disease.

As the second phase of a Phase I/II clinical trial, MD Anderson researchers are conducting a Phase II clinical trial evaluating Oncoprex in combination with erlotinib in NSCLC. Enrollment eligibility criteria for this clinical trial are broad and include stage IV and recurrent NSCLC not potentially curable by radiotherapy or surgery, whether or not the patients have received prior chemotherapy, and whether or not they have an activating EGFR mutation. The Phase II trial began in June 2015 and is ongoing at MD Anderson. Ten patients have been entered and nine are evaluable for response under the trial protocol, because they have received two or more cycles of treatment. Preliminary analysis of the data from these patients further support our belief that Oncoprex may provide medical benefit in several subpopulations of NSCLC patients for which there is an unmet medical need and may provide pathways for accelerated approval.

As a result of these initial findings, in April 2016, we suspended enrollment of new patients in this Phase II clinical trial to collect additional trial data and have it analyzed in order to seek FDA guidance as to whether the protocol for this clinical trial could be modified to expand enrollment and also to divide the patients into cohorts with a view toward seeking accelerated approval in one or more of these cohort populations. We expect to present our findings to the FDA within the next several months. We now have decided to continue this clinical trial under the current protocol without major modification at this time. We are maintaining our plan to seek a pathway toward accelerated approval in one or more patient cohort populations. Although the clinical trial is currently closed to new patient enrollment, it is not terminated, and is considered “ongoing” because activities such as patient follow-up and further data collection and analysis continue.

We plan to reopen enrollment under the current protocol at MD Anderson and several additional clinical trial sites. Adding additional sites will require approval of the Investigational Review Board, or IRB, of each additional site where the trial is conducted. In June 2018, we entered into an Amendment No. 2 to our Clinical Trial Agreement with MD Anderson under which we and MD Anderson agreed upon plans and funding to move ahead with the trial. We intend to use a portion of our available funds to add additional clinical trial sites.

A product candidate can unexpectedly fail at any stage of preclinical and clinical development. The historical failure rate for product candidates is high due to scientific feasibility, safety, efficacy, changing standards of medical care and other variables. The results from preclinical testing or early clinical trials of a product candidate may not predict the results that will be obtained in later phase clinical trials of the product candidate. We, the FDA or other applicable regulatory authorities may suspend clinical trials of a product candidate at any time for various reasons, including, but not limited to, a belief that subjects participating in such trials are being exposed to unacceptable health risks or adverse side effects, or other adverse initial experiences or findings. We may not have the financial resources to continue development of, or to enter into collaborations for, a product candidate if we experience any problems or other unforeseen events that delay or prevent regulatory approval of, or our ability to commercialize, product candidates, including:

- inability to obtain sufficient funds required for a clinical trial;
- inability to reach agreements on acceptable terms with current or prospective contract research organizations, or CROs, and trial sites, the terms of which can be subject to extensive negotiation and
- may vary significantly among different CROs and trial sites;
- negative or inconclusive results from our clinical trials or the clinical trials of others for product candidates similar to ours, leading to a decision or requirement to conduct additional preclinical testing or clinical trials or abandon a program;
- serious and unexpected side effects experienced by subjects in our clinical trials or by individuals using drugs similar to our current and potential product candidates;
- conditions imposed by the FDA or comparable foreign authorities regarding the scope or design of our clinical trials;
- delays in enrolling research subjects in clinical trials;

- high drop-out rates and high fail rates of research subjects;
- inadequate supply or quality of product candidate components or materials or other supplies necessary for the conduct of our clinical trials;
- greater than anticipated clinical trial costs;
- poor effectiveness of our current and potential product candidates during clinical trials; or
- unfavorable FDA or other regulatory agency inspection and review of a clinical trial site or vendor.

We may have difficulty engaging or retaining clinical trial sites and/or enrolling patients in our clinical trials, which could delay or prevent development of our current and potential product candidates.

Identifying and qualifying patients to participate in clinical trials of our current and potential product candidates is critical to our success. The timing of our clinical trials depends on the speed at which we can engage and retain clinical trial sites and recruit patients to participate in testing our current and potential product candidates. We have experienced delays in some of our clinical trials in the past due to difficulties with enrollment and we may experience similar delays in the future. We have suspended enrollment of new patients in the Phase II portion of our Phase I/II clinical trial evaluating Oncoprex in combination with erlotinib in NSCLC, and we may experience difficulties with enrollment upon reopening enrollment for the trial under the current protocol or a modified protocol. If patients are unwilling to participate in our clinical trials because of negative publicity from adverse events in the industry or in the trials for other third party product candidates, or for other reasons, including competitive clinical trials for similar patient populations, the timeline for engaging sites, recruiting patients, conducting studies and obtaining regulatory approval of potential products may be delayed. These delays could result in increased costs, delays in advancing our product development, delays in testing the effectiveness of our technology or termination of the clinical trials altogether.

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

- severity of the disease under investigation;
- design of the clinical trial protocol, including the fact that certain of our clinical trials are randomized to current treatments;
- size of the patient population;
- eligibility criteria for the clinical trial in question;
- perceived risks and benefits of the product candidate under study;
- general level of excitement for the treatment approach;
- comments on social media;
- proximity and availability of clinical trial sites for prospective patients;
- availability of competing therapies and clinical trials;
- efforts to facilitate timely enrollment in clinical trials;
- patient referral practices of physicians; and
- ability to monitor patients adequately during and after treatment.

We currently plan to seek initial marketing approval in the United States and subsequently in Europe. We may not be able to initiate or continue clinical trials if we cannot enroll a sufficient number of eligible patients to participate in the clinical trials required by the FDA or the EMA, or other regulatory agencies. Our ability to successfully initiate, enroll and complete a clinical trial in any foreign country is subject to numerous risks unique to conducting business in foreign countries, including:

- difficulty in establishing or managing relationships with CROs and physicians;
- different standards for the conduct of clinical trials;
- our inability to locate qualified local consultants, physicians and partners; and

- the potential burden of complying with a variety of foreign laws, medical standards and regulatory requirements, including the regulation of pharmaceutical and biotechnology products and treatments.

If we have difficulty enrolling a sufficient number of patients to conduct our clinical trials as planned, we may need to delay, limit or terminate ongoing or planned clinical trials, any of which would have an adverse effect on our business.

Any product candidate we advance through clinical trials may not have favorable results in later clinical trials or receive regulatory approval. Even if we complete the necessary clinical trials, we cannot predict when, or if, we will obtain regulatory approval to commercialize a product candidate, and the approval may be for a narrower indication than we seek.

Clinical failure can occur at any stage of our clinical development. Clinical trials may produce negative or inconclusive results, and we may decide, or regulators may require us, to conduct additional clinical trials or nonclinical studies. In addition, data obtained from trials and studies are susceptible to varying interpretations, and regulators may not interpret our data as favorably as we do, which may delay, limit or prevent regulatory approval. Success in preclinical studies and early clinical trials does not ensure that subsequent clinical trials will generate the same or similar results or otherwise provide adequate data to demonstrate the efficacy and safety of a product candidate. Thirty-one patients were treated in our first Phase I clinical trial of Oncoprex used as a monotherapy, and 28 patients have been enrolled to date (out of a possible total of 57) in our current Phase I/II clinical trial of Oncoprex in combination with erlotinib in NSCLC. Of the 28 patients, 18 were enrolled in the Phase I portion of the Phase I/II trial, and three of these 18 are also enrolled in the Phase II portion. Safety and efficacy results to date may not continue to be obtained as additional patients are treated and may not be duplicated in future clinical trials. A number of companies in the pharmaceutical industry, including those with greater resources and experience than ours, have suffered significant setbacks in clinical trials, even after seeing promising results in earlier clinical trials.

In addition, the design of a clinical trial can determine whether its results will support approval of a product and flaws in the design of a clinical trial may not become apparent until the clinical trial is well advanced. We may be unable to design and execute a clinical trial to support regulatory approval. Further, clinical trials of potential products often reveal that it is not practical or feasible to continue development efforts.

If Oncoprex is found to be unsafe or lack efficacy, we will not be able to obtain regulatory approval for it and our business would be harmed.

In some instances, there can be significant variability in safety and/or efficacy results between different trials of the same product candidate due to numerous factors, including changes in trial protocols, differences in composition of the patient populations, adherence to the dosing regimen and other trial protocols and the rate of drop out among clinical trial participants. We do not know whether any clinical trials we or any of our potential future collaborators may conduct will demonstrate the consistent or adequate efficacy and safety that would be required to obtain regulatory approval and market any products. If we are unable to bring Oncoprex to market, or to acquire other products that are on the market or can be developed, our ability to create stockholder value will be limited.

Regulatory authorities also may approve a product candidate for more limited indications than requested, or they may impose significant limitations in the form of narrow indications. These regulatory authorities may require warnings or precautions with respect to conditions of use or they may grant approval subject to the performance of costly post-marketing clinical trials. In addition, regulatory authorities may not approve the labeling claims or allow the promotional claims that are necessary or desirable for the successful commercialization of our product candidates. Any of the foregoing scenarios could materially harm the commercial prospects for our product candidates and materially and adversely affect our business, financial condition, results of operations and prospects.

Even if we obtain regulatory approval of our current and potential product candidates, the products may not gain market acceptance among physicians, patients, hospitals, cancer treatment centers, third-party payors and others in the medical community.

Ethical, social and legal concerns about gene therapy and genetic research could result in additional regulations restricting or prohibiting the products and processes we may use. Even with the requisite approvals, the commercial success of our current and potential product candidates will depend in part on the medical community, patients, and third-party payors accepting gene therapy products in general, and our current and potential product candidates in particular, as medically useful, cost-effective and safe. Any product that we bring to the market may not gain market acceptance by physicians, patients, third-party payors and others in the medical community. If these products do not achieve an adequate level of acceptance, we may not generate significant product revenue and may not become profitable. The degree of market acceptance of these product candidates, if approved for commercial sale, will depend on a number of factors, including:

- the clinical indications for which our current and potential product candidates are approved;
- physicians, hospitals, cancer treatment centers and patients considering our current and potential product candidates as a safe and effective treatment;
- the potential and perceived advantages of our current and potential product candidates over alternative treatments;
- the prevalence and severity of any side effects;
- product labeling or product insert requirements of the FDA or other regulatory authorities;
- limitations or warnings contained in the labeling approved by the FDA;
- the timing of market introduction of our current and potential product candidates as well as competitive products;
- the cost of treatment – both in absolute terms and in relation to alternative treatments;
- the availability of coverage, reimbursement and pricing by third-party payors and government authorities and the adequacy thereof;
- the willingness of patients to pay out-of-pocket in the absence of coverage by third-party payors, including government authorities;
- the willingness, ability and availability of healthcare providers that can comply with the transportation, handling, and temperature-controlled storage requirements associated with our current and potential product candidates;
- relative convenience and ease of administration, including as compared to alternative treatments and competitive therapies; and
- the effectiveness of our sales and marketing efforts, which are subject to various limitations under applicable law.

Even if a potential product displays a favorable efficacy and safety profile in preclinical and clinical trials, market acceptance of the product will not be known until after it is launched. Our efforts to educate the medical community and third-party payors on the benefits of the product candidates may require significant resources and may never be successful. Such efforts to educate the marketplace may require more resources than are required by the conventional technologies marketed by our competitors and may be restricted by the allowed label.

Our current and potential product candidates may have undesirable side effects that may delay or prevent marketing approval, or, if approval is received, require them to be taken off the market, require them to include safety warnings or otherwise limit their sales.

In our Phase I clinical trial of Oncoprex as a monotherapy, the only serious adverse events, defined as grade 3, 4 or 5 events under the Common Terminology Criteria for Adverse Events, or CTCAE, published by the U.S. Department of Health and Human Services, were grade 3 fever and grade 3 hypotension, and the only dose-limiting toxicities were two episodes of transient grade 3 hypophosphatemia (abnormally low levels of phosphate in the blood).

The Phase I portion of our Phase I/II trial combining Oncoprex with erlotinib was a dose escalation study with the primary purpose of determining the MTD. Dose Limiting Toxicities were defined as grade 3, 4 or 5 events during the first cycle of treatment that were considered to be treatment related. At dose level 1 (Oncoprex .045 mg/kg plus erlotinib 100 mg), one subject had grade 3 adverse events of fatigue, muscle weakness and hyponatremia (low sodium level) considered to be related to the study treatment (erlotinib); therefore, three additional subjects were treated at this dose level (six subjects total), none of whom suffered a Dose Limiting Toxicity. At dose level 2 (Oncoprex .06 mg/kg plus erlotinib 100 mg), there were no Dose Limiting Toxicities. At dose level

3 (Oncoprex .45 mg/kg plus erlotinib 150 mg), one subject had a grade 3 rash considered to be related to the study treatment (erlotinib); therefore, an additional three subjects were treated at this dose level (six subjects total). No additional subjects suffered a Dose Limiting Toxicity at dose level 3. At dose level 4 (Oncoprex .06 mg/kg plus erlotinib 150 mg), there were no Dose Limiting Toxicities; thus dose level 4 was determined to be the MTD. None of the 10 subjects treated to date in the Phase II portion of the Phase I/II trial suffered a Dose Limiting Toxicity.

Additional or unforeseen side effects from Oncoprex or any of our other potential product candidates could arise either during clinical development or, if approved, after the approved product has been marketed. A showing that Oncoprex or any other product candidate causes undesirable or unacceptable side effects could interrupt, delay or halt clinical trials and result in the failure to obtain or suspension or termination of marketing approval from the FDA and other regulatory authorities, or result in marketing approval from the FDA and other regulatory authorities only with restrictive label warnings.

If any of our current and potential product candidates receives marketing approval and we or others later identify undesirable or unacceptable side effects caused by such products:

- regulatory authorities may require the addition of labeling statements, specific warnings, a contraindication or field alerts to physicians and pharmacies;
- we may be required to change instructions regarding the way the product is administered, conduct additional clinical trials or change the labeling of the product;
- we may be subject to limitations on how we may promote the product;
- sales of the product may decrease significantly;
- regulatory authorities may require us to take our approved product off the market;
- we may be subject to litigation or product liability claims; and
- our reputation may suffer.

Any of these events could prevent us or our potential future collaborators from achieving or maintaining market acceptance of the affected product or could substantially increase commercialization costs and expenses, which in turn could delay or prevent us from generating significant revenues from the sale of our products.

Potential product liability lawsuits against us could cause us to incur substantial liabilities and could limit commercialization of Oncoprex and any other products that we may develop.

In the event Oncoprex or any of our other potential product candidates is approved for marketing by the FDA and other regulatory authorities, we may face potential product liability. If successful claims are brought against us, we may incur substantial liability and costs. If the use of our current and potential product candidates harms patients, or is perceived to harm patients even when such harm is unrelated to our current and potential product candidates, our regulatory approvals could be revoked or otherwise negatively affected, and we could be subject to costly and damaging product liability claims. We may not be able to maintain insurance coverage at a reasonable cost or in an amount adequate to satisfy any liability that may arise.

Our internal computer systems, or those used by our CROs, contractors or consultants, may fail or suffer security breaches. There is also the potential for other data breaches (e.g., via paper documents) or otherwise.

Despite the implementation of security measures, our internal computer systems and those of our CROs, contractors and consultants are vulnerable to damage from computer viruses and unauthorized access, as well as being vulnerable to other system difficulties, failures or disruptions. If such an event were to occur and cause interruptions in our operations, it could result in a material disruption of our development programs and our business operations. For example, the loss of clinical trial data from completed or future clinical trials could result in delays in our regulatory approval efforts and significantly increase our costs to recover or reproduce the data. To the extent that any disruption or security breach were to result in a loss of, or damage to, our data or applications, or inappropriate disclosure of confidential or proprietary information, we could incur liability, and the further development and commercialization of our current and potential product candidates could be delayed.

Business disruptions could seriously harm our future revenue and financial condition and increase our costs and expenses.

Our operations, and those of our CROs, contractors and consultants, could be subject to power shortages, telecommunications failures, wildfires, water shortages, floods, earthquakes, hurricanes, typhoons, fires, extreme weather conditions, medical epidemics and other natural or man-made disasters or business interruptions. The occurrence of any of these business disruptions could seriously

harm our operations and financial condition and increase our costs and expenses. Our ability to obtain clinical supplies of our current and potential product candidates could be disrupted if the operations of our contract manufacturers are affected by a man-made or natural disaster or other business interruption. Unfavorable global economic conditions could adversely affect our business, financial condition, or results of operations.

We do not carry insurance for all categories of risk that our business may encounter. In particular, we do not carry product liability insurance covering any clinical trials liability that we may incur. Although we intend to obtain such insurance before we market any product, there can be no assurance that we will secure adequate insurance coverage or that any such insurance coverage will be sufficient to protect our operations to significant potential liability in the future. Any significant uninsured liability may require us to pay substantial amounts, which would adversely affect our financial position and results of operations.

We face competition from other biotechnology and pharmaceutical companies and our operating results will suffer if we fail to compete effectively.

The biotechnology and pharmaceutical industries are intensely competitive and subject to rapid and significant technological change. We have competitors in the United States, Europe and elsewhere, including major multinational pharmaceutical companies, established biotechnology companies, specialty pharmaceutical and generic drug companies and universities and other research institutions. Many of our competitors have greater financial and other resources, such as larger research and development staff and more experienced marketing and manufacturing organizations than we do. Large pharmaceutical companies, in particular, have extensive experience in clinical testing, obtaining regulatory approvals, recruiting patients and manufacturing pharmaceutical products. These companies also have significantly greater research, sales and marketing capabilities and collaborative arrangements in our target markets with leading companies and research institutions. Established pharmaceutical companies may also invest heavily to accelerate discovery and development of novel compounds or to in-license novel compounds that could make the product candidates that we develop obsolete. As a result of these factors, our competitors may succeed in obtaining patent protection and/or FDA approval or in discovering, developing and commercializing drugs for the cancer indications that we are targeting before we do or may develop drugs that are deemed to be more effective or gain greater market acceptance than ours. Smaller or early-stage companies may also prove to be significant competitors, particularly through collaborative arrangements with large, established companies. In addition, many universities and private and public research institutes may become active in our target disease areas. Our competitors may succeed in developing, acquiring or licensing on an exclusive basis, technologies and drug products that are more effective or less costly than any product candidates that we are currently developing or that we may develop, which could render our products obsolete or noncompetitive.

There are a number of drugs approved and under development for treatment of lung cancer. Treatments competitive with our primary product candidates generally fall into the following categories: chemotherapies such as cisplatin, carboplatin, docetaxel and pemetrexed; targeted therapies such as erlotinib, gefitinib, afatinib and osimertinib, and immunotherapies such as checkpoint inhibitors and CAR and CAR T cells, and oncolytic virus-based technology. Data indicate that Oncoprex, when combined with certain targeted therapies and immunotherapies, may enhance the benefit of those therapies; therefore, we believe that Oncoprex could be administered in combination with targeted therapies and immunotherapies and thus may not be a direct competitor of those drugs. In addition, new drug candidates are constantly being conceived and developed. Any such competing therapy may be more effective and/or cost-effective than ours.

If our competitors market products that are more effective, safer or less expensive or that reach the market sooner than our future products, if any, we may not achieve commercial success. In addition, because of our limited resources, it may be difficult for us to stay abreast of the rapid changes in each technology. If we fail to stay at the forefront of technological change, we may be unable to compete effectively. Technological advances or products developed by our competitors may render our technologies or product candidates obsolete, less competitive or not economical.

Risks Related to Regulatory Approval and Marketing of Our Current and Potential Product Candidates and Other Legal Compliance Matters

We cannot be certain that Oncoprex will receive regulatory approval, and without regulatory approval we will not be able to market Oncoprex.

Our business currently depends largely on the successful development and commercialization of Oncoprex. Our ability to generate revenue related to product sales will depend on the successful development and regulatory approval of Oncoprex for the treatment of cancer. Even if we complete the necessary clinical studies, we cannot predict when or if we will obtain regulatory approval to commercialize a product candidate. Further, if we do obtain regulatory approval, it may only apply to a more narrow indication than we expect. Even if we obtain regulatory approval for a product candidate, our products will remain subject to regulatory scrutiny.

We currently have no products approved for sale and we cannot guarantee that we will ever have marketable products. The development of a product candidate and issues relating to its approval and marketing are subject to extensive regulation by the FDA in the United States and regulatory authorities in other countries, with regulations differing from country to country. We are not permitted to market our current and potential product candidates in the United States until we receive approval of a Biologics License Application, or BLA, from the FDA. We have not submitted any marketing applications for any of our current and potential product candidates.

BLAs must include extensive preclinical and clinical data and supporting information to establish the product candidate's safety and effectiveness for each desired indication. BLAs must also include significant information regarding the chemistry, manufacturing and controls for the product. Obtaining approval of a BLA is a lengthy, expensive and uncertain process, and we may not be successful in obtaining approval. The FDA review processes can take years to complete, and approval is never guaranteed. If we submit a BLA to the FDA, the FDA must decide whether to accept or reject the submission for filing. We cannot be certain that any submissions will be accepted for filing and review by the FDA. Regulators in other jurisdictions have their own procedures for approval of product candidates. Even if a product is approved, the FDA may limit the indications for which the product may be marketed, require extensive warnings on the product labeling or require expensive and time-consuming clinical trials or reporting as conditions of approval. Regulatory authorities in countries outside of the United States and Europe also have requirements for approval of drug candidates with which we must comply prior to marketing in those countries. Obtaining regulatory approval for marketing of a product candidate in one country does not ensure that we will be able to obtain regulatory approval in any other country. In addition, delays in approvals or rejections of marketing applications in the United States, Europe or other countries may be based upon many factors, including regulatory requests for additional analyses, reports, data, preclinical studies and clinical trials, regulatory questions regarding different interpretations of data and results, changes in regulatory policy during the period of product development and the emergence of new information regarding our current and potential product candidates or other products. Also, regulatory approval for any of our current and potential product candidates may be withdrawn.

If we are unable to obtain approval from the FDA or other regulatory agencies for Oncoprex, or if, subsequent to approval, we are unable to successfully commercialize Oncoprex or our other potential product candidates, we will not be able to generate sufficient revenue to become profitable or to continue our operations.

In addition, the clinical trial requirements of the FDA, the EMA, and other regulatory agencies and the criteria these regulators use to determine the safety and efficacy of a product candidate vary substantially according to the type, complexity, novelty and intended use and market of the potential products. The regulatory approval process for novel product candidates such as ours can be more expensive and take longer than for other, better known or extensively studied pharmaceutical or other product candidates.

Regulatory requirements governing gene therapy products have changed frequently and may continue to change in the future. For example, in January 2017, the FDA Oncology Center of Excellence, or the Center of Excellence, was created to leverage the combined skills of regulatory scientists and reviewers with expertise in drugs, biologics, and devices (including diagnostics). While the Center of Excellence is designed to help expedite the development of oncology and malignant hematology-related medical products and support an integrated approach in the clinical evaluation of drugs, biologics and devices for the treatment of cancer, the new Center of Excellence may initially create confusion within the FDA and especially in the Center of Biologics and Research that is the primary review division for Oncoprex. Gene therapy clinical trials conducted at institutions that receive funding for recombinant DNA research from the U.S. National Institutes of Health, or the NIH, are also subject to review by the NIH Office of Biotechnology Activities' Recombinant DNA Advisory Committee, or the RAC. Although the FDA decides whether individual gene therapy protocols may proceed, the RAC review process can impede the initiation of a clinical trial, even if the FDA has reviewed the study and approved its initiation. Conversely, the FDA can put an Investigational New Drug application, or IND, on a partial or complete clinical hold even if the RAC has provided a favorable review. Also, before a clinical trial can begin at an NIH-funded institution, that institution's institutional review board, or IRB, and its Institutional Biosafety Committee will have to review the proposed clinical trial to assess the safety of the study. In addition, adverse developments in clinical trials of gene therapy products conducted by others may cause the FDA or other regulatory bodies to change the requirements for performing studies or for obtaining approval of any of our current and potential product candidates.

These regulatory review committees and advisory groups, and the new guidelines they promulgate, may lengthen the regulatory review process, require us to perform additional studies, increase our development costs, lead to changes in regulatory positions and interpretations, delay or prevent approval and commercialization of our current and potential product candidates or lead to significant post-approval limitations or restrictions. As we advance our current and potential product candidates, we will be required to consult with these regulatory and advisory groups and comply with applicable guidelines. Delay or failure to obtain, or unexpected costs in obtaining, the regulatory approval necessary to bring a potential product to market could decrease our ability to generate sufficient revenue to maintain our business.

Even if we obtain regulatory approval for Oncoprex and/or another product candidate, our products will remain subject to regulatory oversight.

Oncoprex and/or any of our product candidates for which we obtain regulatory approval, will be subject to ongoing regulatory requirements for manufacturing, labeling, packaging, storage, advertising, promotion, record-keeping and submission of safety and other post-market information. Any regulatory approvals that we receive for our product candidates also may be subject to the specific obligations imposed as a condition for marketing authorization by equivalent authorities in a foreign jurisdiction, particularly by the European Commission, limitations on the approved indicated uses for which the product may be marketed or to the conditions of approval, or contain requirements for potentially costly post-marketing testing, including Phase 4 clinical trials, and surveillance to monitor the quality, safety and efficacy of the product.

For example, in the United States, the holder of an approved BLA is obligated to monitor and report adverse events and any failure of a product to meet the specifications in the BLA. The holder of an approved BLA also must submit new or supplemental applications and obtain FDA approval for certain changes to the approved product, product labeling or manufacturing process. Advertising and promotional materials must comply with the Federal Food Drug and Cosmetic Act, or the FDCA, and implementing regulations and are subject to FDA oversight and post-marketing reporting obligations, in addition to other potentially applicable federal and state laws.

In the EU, any future advertising and promotion of our products will be subject to EU laws governing promotion of medicinal products, interactions with physicians, misleading and comparative advertising and unfair commercial practices. In addition, other legislation adopted by individual EU Member States may apply to the advertising and promotion of medicinal products. These laws may limit or restrict the advertising and promotion of our products to the general public and may impose limitations on our promotional activities with health care professionals. These laws require that promotional materials and advertising for medicinal products are consistent with the product's Summary of Product Characteristics, or SmPC, as approved by the competent authorities. The SmPC is the document that provides information to physicians concerning the safe and effective use of the medicinal product. It forms an intrinsic and integral part of the marketing authorization granted for the medicinal product. Promotion of a medicinal product that does not comport with the SmPC is considered to constitute off-label promotion, which is prohibited in the EU. The applicable laws at EU level and in the individual EU Member States also prohibit the direct-to-consumer advertising of prescription-only medicinal products. Violations of the rules governing the promotion of medicinal products in the EU could be penalized by administrative measures, fines and imprisonment.

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

If we fail to comply with applicable regulatory requirements for any product following approval, a regulatory authority may:

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

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

If the FDA does not find the manufacturing facilities of our future contract manufacturers acceptable for commercial production, we may not be able to commercialize any of our current and potential product candidates.

We do not intend to manufacture the pharmaceutical products that we plan to sell. We are currently utilizing contract manufacturers for the production of the active pharmaceutical ingredients and the formulation of drug product for the trials of Oncoprex currently being conducted or that will need to be conducted prior to seeking regulatory approval. However, we do not have agreements for supplies of Oncoprex or any of our other potential product candidates, and we may not be able to reach agreements with these or other contract manufacturers for sufficient supplies to commercialize Oncoprex if it is approved. Additionally, the facilities used by any contract manufacturer to manufacture Oncoprex or any of our other potential product candidates must be the subject of a satisfactory inspection before the FDA approves the product candidate manufactured at that facility. We are completely dependent on these third-party manufacturers for compliance with the requirements of U.S. and non-U.S. regulators for the manufacture of our finished products. If our manufacturers cannot successfully manufacture materials that conform to our specifications and the FDA's current good manufacturing practices, or cGMP, standards and other requirements of any governmental agency to whose jurisdiction we are subject, our current and potential product candidates will not be approved or, if already approved, may be subject to recalls. Reliance on third-party manufacturers entails risks to which we would not be subject if we manufactured our current and potential product candidates, including:

- the possibility that we are unable to enter into a manufacturing agreement with a third party to manufacture our current and potential product candidates;
- the possible breach of the manufacturing agreements by the third parties because of factors beyond our control; and
- the possibility of termination or nonrenewal of the agreements by the third parties before we are able to arrange for a qualified replacement third-party manufacturer.

Any of these factors could cause the delay of approval or commercialization of our current and potential product candidates, cause us to incur higher costs or prevent us from commercializing our current and potential product candidates successfully. Furthermore, if any of our current and potential product candidates are approved and contract manufacturers fail to deliver the required commercial quantities of finished product on a timely basis at commercially reasonable prices, and we are unable to find one or more replacement manufacturers capable of production at a substantially equivalent cost, in substantially equivalent volumes and quality and on a timely basis, we would likely be unable to meet demand for our products and could lose potential revenue. It may take several years to establish an alternative source of supply for our current and potential product candidates and to have any such new source approved by the government agencies that regulate our products.

We may be subject, directly or indirectly, to federal and state healthcare fraud and abuse laws, false claims laws and other federal and state healthcare laws, and the failure to comply with such laws could result in substantial penalties. Our employees, independent contractors, consultants, principal investigators, CROs, commercial partners and vendors may engage in misconduct or other improper activities, including noncompliance with regulatory standards and requirements.*

State and federal regulatory and enforcement agencies continue actively to investigate violations of health care laws and regulations, and the United States Congress continues to strengthen the arsenal of enforcement tools. Recently, the Bipartisan Budget Act of 2018, or the BBA, increased the criminal and civil penalties that can be imposed for violating certain federal health care laws, including the Anti-Kickback Statute. Enforcement agencies also continue to pursue novel theories of liability under these laws. Government agencies have recently increased regulatory scrutiny and enforcement activity with respect to programs supported or sponsored by pharmaceutical companies, including reimbursement and co-pay support, funding of independent charitable foundations and other programs that offer benefits for patients. Several investigations into these types of programs have resulted in significant civil and criminal settlements.

We are exposed to the risk of fraud, misconduct or other illegal activity by our employees, independent contractors, consultants, principal investigators, CROs, commercial partners and vendors. Misconduct by these parties could include intentional, reckless and/or negligent conduct that fails to: comply with the laws of the FDA and similar foreign regulatory bodies; provide true, complete and accurate information to the FDA and similar foreign regulatory bodies; comply with manufacturing standards we have established; comply with federal and state data privacy, security, fraud and abuse and other healthcare laws and regulations in the United States and similar foreign fraudulent misconduct laws; or report financial information or data accurately or to disclose unauthorized activities to us. If we obtain FDA approval for any of our current and potential product candidates and begin commercializing those products in the United States, our potential exposure under such laws would increase significantly, and our costs associated with compliance with such laws would likely also increase. These laws may impact, among other things, our current activities with principal investigators and research patients, as well as proposed and future sales, marketing and education programs and interactions with physicians and other health care providers. In particular, the promotion, sales and marketing of healthcare items and services, as well as certain 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 may restrict or prohibit a

wide range of pricing, discounting, marketing and promotion, including off-label uses of our products, structuring and commission(s), certain customer incentive programs and other business arrangements generally. Activities subject to these laws also involve the improper use or misrepresentation of information obtained in the course of patient recruitment for clinical trials, creating fraudulent data in our preclinical studies or clinical trials or illegal misappropriation of drug product, which could result in regulatory sanctions and cause serious harm to our reputation. It is not always possible to identify and deter misconduct by employees and other third parties, 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 governmental investigations or other actions or lawsuits stemming from a failure to comply with these laws or regulations. Additionally, we are subject to the risk that a person or government could allege such fraud or other misconduct, even if none occurred. 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, including the imposition of fines or other sanctions. The laws that may affect our ability to operate include, but are not limited to:

- the Federal Anti-Kickback Statute, which prohibits, among other things, individuals and entities from knowingly and willfully soliciting, receiving, offering or paying any remuneration (including any kickback, bribe, or rebate), directly or indirectly, overtly or covertly, in cash or in kind, to induce, or in return for, either the referral of an individual for, or the purchase, lease, order or recommendation of, any good, facility, item or service for which payment may be made, in whole or in part, under a federal healthcare program, such as the Medicare and Medicaid programs. 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;
- federal civil and criminal false claims laws and civil monetary penalty laws, including the civil False Claims Act, which impose criminal and civil penalties, through government, civil whistleblower or qui tam actions, on individuals and entities for, among other things, knowingly presenting, or causing to be presented, claims for payment or approval from Medicare, Medicaid, or other third-party payors that are false, fictitious or fraudulent, or knowingly making, using or causing to be made or used, a false statement to avoid, decrease or conceal an obligation to pay money to the federal government. In addition, the government may assert that a claim including items and services resulting from a violation of the federal Anti-Kickback Statute constitutes a false or fraudulent claim for purposes of the False Claims Act;
- the Federal Health Insurance Portability and Accountability Act of 1996, or HIPAA, which imposes criminal and civil liability for, among other things, knowingly and willfully executing, or attempting to execute, a scheme to defraud or to obtain any healthcare benefit program or obtain, by means of false or fraudulent pretenses, representations, or promises, any of the money or property owned by, or under the custody or control of, any healthcare benefit program, regardless of the payor (e.g., public or private), willfully obstructing a criminal investigation of a healthcare offense, and knowingly and willfully falsifying, concealing or covering up by any trick or device a material fact or making any materially false, fictitious or fraudulent statements in connection with the delivery of, or payment for, healthcare benefits, items or services relating to healthcare matters;
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act of 2009, or HITECH, and their respective implementing regulations, which impose requirements on certain covered healthcare providers, health plans, and healthcare clearinghouses, as well as their respective business associates that perform services for them that involve the creation, use, maintenance or disclosure of, individually identifiable health information, relating to the privacy, security and transmission of individually identifiable health information without appropriate authorization;
- the federal physician payment transparency requirements, sometimes referred to as the “Physician Payments Sunshine Act,” created under the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Reconciliation Act, collectively the Affordable Care Act, and its implementing regulations, which require 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 United States Department of Health and Human Services information related to payments or other transfers of value made to physicians (defined to include doctors, dentists, optometrists, podiatrists and chiropractors) and teaching hospitals, as well as ownership and investment interests held by physicians and their immediate family members;
- the U.S. FDCA, which prohibits, among other things, the adulteration or misbranding of drugs and medical devices;
- the Foreign Corrupt Practices Act, or FCPA, and similar worldwide anti-bribery laws, which generally prohibit companies and their intermediaries from making improper payments to non-U.S. officials for the purpose of obtaining or retaining business;
- federal consumer protection and unfair competition laws, which broadly regulate marketplace activities and activities that potentially harm consumers; and
- we are subject to state and foreign equivalents of each of the healthcare laws described above, among others, some of which may be broader in scope and may apply regardless of the payor.

It is not always possible to identify and deter employee misconduct, and the precautions we take to detect and prevent inappropriate conduct may not be effective in controlling unknown or unmanaged risks or losses or in protecting us from governmental investigations or other actions or lawsuits stemming from a failure to be in compliance with such laws or regulations. Efforts to ensure that our business arrangements will comply with applicable healthcare laws and regulations will involve substantial costs. It is possible that governmental and enforcement authorities will conclude that our business practices may not comply with current or future statutes, regulations or case law interpreting applicable fraud and abuse or other healthcare laws and regulations. If any such actions are instituted against us, and we are not successful in defending ourselves or asserting our rights, those actions could have a significant impact on our business, including the imposition of civil, criminal and administrative penalties, damages, disgorgement, monetary fines, possible exclusion from participation in Medicare, Medicaid and other federal healthcare programs, contractual damages, reputational harm, diminished profits and future earnings, and curtailment or restructuring of our operations, any of which could adversely affect our ability to operate our business and our results of operations. In addition, the approval and commercialization of any of our current and potential product candidates outside the United States will also likely subject us to foreign equivalents of the healthcare laws mentioned above, among other foreign laws.

Coverage and reimbursement may be limited or unavailable in certain market segments for our current and potential product candidates, if approved, which could make it difficult for us to sell our current and potential product candidates profitably.

The commercial success of any current or future product candidate will depend upon the degree of market acceptance by physicians, patients, insurance companies and other third party payors, and others in the medical community. Even if we obtain approval to commercialize our current and potential product candidates outside of the United States, a variety of risks associated with international operations could materially affect our business. Due to the novel nature of our technology, we face uncertainty related to pricing and reimbursement for our current and potential product candidates. The insurance coverage and reimbursement status of newly approved products is uncertain. Failure to obtain or maintain adequate coverage and reimbursement for new or current products could limit our ability to market those products and decrease our ability to generate revenue. If market opportunities for our current and potential product candidates are smaller than we believe they are, our revenues may be adversely affected and our business may suffer.

Successful sales of our products, if our current and potential product candidates are approved, depend on the availability of coverage and adequate reimbursement from third-party payors. In addition, because our current and potential product candidates represent new approaches to the treatment of cancer, we cannot be sure that coverage and reimbursement will be available for, or accurately estimate the potential revenue from, our current and potential product candidates. Patients who are provided medical treatment for their conditions generally rely on third-party payors to reimburse all or part of the costs associated with their treatment. Coverage and adequate reimbursement from governmental healthcare programs, such as Medicare and Medicaid, and commercial payors are critical to new product acceptance.

Government authorities and other third-party payors, such as private health insurers and health maintenance organizations, decide which drugs and treatments they will cover and the amount of reimbursement. Coverage and reimbursement by a third-party payor may depend upon a number of factors, including, but not limited to, the third-party payor's determination that use of a product is:

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

In the United States, no uniform policy of coverage and reimbursement for products exists among third-party payors, and coverage and reimbursement for products can differ significantly from payor to payor. As a result, obtaining coverage and reimbursement approval of a product from a government or other third-party payor is a time-consuming and costly process that could require us to provide to each payor supporting scientific, clinical and cost-effectiveness data for the use of our products and to justify the level of coverage and reimbursement relative to other therapies, with no assurance that coverage and adequate reimbursement will be obtained. Third party payors may also have difficulty in determining the appropriate coverage of Oncoprex and our other potential product candidates that are combination products, if approved, due to the fact that they are combination products that include another drug. To the extent there are any delays in determining such coverage or inadequate coverage and reimbursement for all aspects of our combination therapies, it would adversely affect the market acceptance, demand and use of our current and potential product candidates. Any denial in coverage or reduction in reimbursement from Medicare or other government programs may result in a similar denial or reduction in payments from private payors, which may adversely affect our future profitability.

We intend to seek approval to market our current and potential product candidates in both the United States and in selected foreign jurisdictions. If we obtain approval in one or more foreign jurisdictions for our current and potential product candidates, we will be subject to rules and regulations in those jurisdictions. In some foreign countries, particularly those in the European Union, the pricing of biologics is subject to governmental control and other market regulations which could put pressure on the pricing and usage of our current and potential product candidates. In these countries, pricing negotiations with governmental authorities can take considerable time after obtaining marketing approval of a product candidate. In addition, market acceptance and sales of our current and potential product candidates will depend significantly on the availability of coverage and adequate reimbursement from third-party payors for our current and potential product candidates and may be affected by existing and future health care reform measures.

Healthcare legislative reform measures may have a material adverse effect on our business and results of operations.

Third-party payors, whether domestic or foreign, or governmental or commercial, are developing increasingly sophisticated methods of controlling healthcare costs. In both the United States and certain foreign jurisdictions, there have been a number of legislative and regulatory changes to the health care system that could affect our ability to sell our products profitably. In particular the Affordable Care Act and its implementing regulations, among other things, subjected biological products to potential competition by lower-cost biosimilars, revised the methodology by which rebates owed by manufacturers to the state and federal government for covered outpatient drugs and certain biologics, including our current and potential product candidates, under the Medicaid Drug Rebate Program are calculated, increased the minimum Medicaid rebates owed by most manufacturers under the Medicaid Drug Rebate Program, extended the Medicaid Drug Rebate program to utilization of prescriptions of individuals enrolled in Medicaid managed care organizations, subjected manufacturers to new annual fees and taxes for certain branded prescription drugs, and provided incentives to programs that increase the federal government's comparative effectiveness research. The current Presidential Administration and U.S. Congress may seek to modify, repeal, or otherwise invalidate all, or certain provisions of, the Affordable Care Act. There have been judicial and Congressional challenges to certain aspects of the Affordable Care Act. As a result, there have been delays in the implementation of, and action taken to repeal or replace, certain aspects of the Affordable Care Act. While the extent to which any such changes may affect our business is uncertain, steps have been taken to repeal and replace certain aspects of the Affordable Care Act.

Since January 2017, President Trump has signed two Executive Orders designed to delay the implementation of certain provisions of the Affordable Care Act or otherwise circumvent some of the requirements for health insurance mandated by the Affordable Care Act. Concurrently, Congress has considered legislation that would repeal or repeal and replace all or part of the Affordable Care Act. While Congress has not passed comprehensive repeal legislation, two bills affecting the implementation of certain taxes under the Affordable Care Act have been signed into law. The Tax Cuts and Jobs Act of 2017 includes a provision repealing, effective January 1, 2019, the tax-based shared responsibility payment imposed by the Affordable Care Act on certain individuals who fail to maintain qualifying health coverage for all or part of a year that is commonly referred to as the "individual mandate". Additionally, on January 22, 2018, President Trump signed a continuing resolution on appropriations for fiscal year 2018 that delayed the implementation of certain Affordable Care Act-mandated fees, including the so-called "Cadillac" tax on certain high cost employer-sponsored insurance plans, the annual fee imposed on certain health insurance providers based on market share, and the medical device excise tax on non-exempt medical devices. Further, the BBA, among other things, amends the Affordable Care Act, effective January 1, 2019, to close the coverage gap in most Medicare drug plans, commonly referred to as the "donut hole". Congress also could consider subsequent legislation to repeal or repeal and replace other elements of the Affordable Care Act. We continue to evaluate the possible impact of the Affordable Care Act, as amended, and the possible repeal and/or replacement of the Affordable Care Act on our business.

In late 2018, the Centers for Medicare & Medicaid Services, or CMS, issued an advance notice of proposed rulemaking describing a potential mandatory model to test Medicare reimbursement based on an "International Pricing Index", or IPI. CMS is considering issuing a proposed rule that would describe the model in more detail in spring 2019, with the goal of starting the model in spring 2020. If a model would proceed as described, we cannot predict the requisite infrastructure and reporting requirements, existing and new data sources required to establish an IPI and the impact on price reporting and reporting mechanics.

There have been, and likely will continue to be, legislative and regulatory proposals at the foreign, federal and state levels directed at broadening the availability of healthcare and containing or lowering the cost of healthcare. We cannot predict the initiatives that may be adopted in the future. The continuing efforts of the government, insurance companies, managed care organizations and other payors of healthcare services to contain or reduce costs of healthcare and/or impose price controls may adversely affect:

- the demand for our current and potential product candidates, if we obtain regulatory approval;
- our ability to set a price that we believe is fair for our products;
- our ability to generate revenue and achieve or maintain profitability;

- the level of taxes that we are required to pay; and
- the availability of capital.

We and our contract manufacturers are subject to significant regulation with respect to manufacturing our products. The manufacturing facilities on which we rely may not continue to meet regulatory requirements and have limited capacity.

We are currently utilizing contract manufacturers for the production of the active pharmaceutical ingredients and the formulation of drug product for our trials of Oncoprex. However, we do not have agreements for supplies of Oncoprex or any of our other potential product candidates. Each supplier may require licenses to manufacture such components if such processes are not owned by the supplier or in the public domain and we may be unable to transfer or sublicense the intellectual property rights we may have or later obtain with respect to such activities.

All entities involved in the preparation of therapeutics for clinical trials or commercial sale, including our existing contract manufacturers for Oncoprex, are subject to extensive regulation. Components of a finished therapeutic product approved for commercial sale or used in late-stage clinical trials must be manufactured in accordance with cGMP. These regulations govern manufacturing processes and procedures (including record keeping) and the implementation and operation of quality systems to control and assure the quality of investigational products and products approved for sale. Poor control of production processes can lead to the introduction of contaminants, or to inadvertent changes in the properties or stability of our current and potential product candidates that may not be detectable in final product testing. We or our contract manufacturers must supply all necessary documentation in support of a BLA on a timely basis and must adhere to the FDA's good laboratory practices, or GLP, and cGMP regulations enforced by the FDA through its facilities inspection program. Our facilities and quality systems and the facilities and quality systems of some or all of our third-party contractors must pass a pre-approval inspection for compliance with the applicable regulations as a condition of regulatory approval of our current and potential product candidates or any of our other potential products. In addition, the regulatory authorities may, at any time, audit or inspect a manufacturing facility involved with the preparation of our current and potential product candidates or our other potential products or the associated quality systems for compliance with the regulations applicable to the activities being conducted. If these facilities do not pass a pre-approval plant inspection, FDA approval of the products may not be granted.

The regulatory authorities also may, at any time following approval of a product for sale, audit our manufacturing facilities or those of our third-party contractors. If any such inspection or audit identifies a failure to comply with applicable regulations or if a violation of our product specifications or applicable regulations occurs independent of such an inspection or audit, we or the relevant regulatory authority may require remedial measures that may be costly and/or time-consuming for us or a third party to implement and that may include the temporary or permanent suspension of a clinical trial or commercial sales or the temporary or permanent closure of a facility. Any such remedial measures imposed upon us or third parties with whom we contract could materially harm our business.

If we or any of our third-party manufacturers fail to maintain regulatory compliance, the FDA can impose regulatory sanctions including, among other things, refusal to approve a pending application for a new drug product or biologic product or revocation of a pre-existing approval. As a result, our business, financial condition and results of operations may be materially harmed.

Additionally, if supply from one approved manufacturer is interrupted, there could be a significant disruption in commercial supply. An alternative manufacturer would need to be qualified through a BLA supplement which could result in further delay. The regulatory agencies may also require additional studies if a new manufacturer is relied upon for commercial production. Switching manufacturers may involve substantial costs and is likely to result in a delay in our desired clinical and commercial timelines.

These factors could cause the delay of clinical trials, regulatory submissions, required approvals or commercialization of our current and potential product candidates, cause us to incur higher costs and prevent us from commercializing our products successfully. Furthermore, if our suppliers fail to meet contractual requirements, and we are unable to secure one or more replacement suppliers capable of production at a substantially equivalent cost, our clinical trials may be delayed or we could lose potential revenue.

If we obtain approval to commercialize any of our product candidates outside the United States, in particular in the EU, a variety of risks associated with international operations could materially adversely affect our business.

We expect that we will be subject to additional risks in commercializing any of our product candidates outside the United States, including:

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

If we fail to comply with environmental, health and safety laws and regulations, we could become subject to fines or penalties or incur costs that could have a material adverse effect on the success of our business.

We may become subject to federal, state and local laws and regulations governing the use, manufacture, storage, handling and disposal of hazardous materials and certain waste products, including numerous environmental, health and safety laws and regulations, such as those governing laboratory procedures and the handling, use, storage, treatment and disposal of hazardous materials and wastes. Our operations may in the future involve the use of hazardous materials, including chemicals and biological materials. Our operations may also produce hazardous waste products. We generally contract with third parties for the disposal of these materials and wastes. We cannot eliminate the risk of contamination or injury from these materials. In the event of contamination or injury resulting from our use of hazardous materials, we could be held liable for any resulting damages, and any liability could exceed our resources. We also could incur significant costs associated with civil or criminal fines and penalties. In addition, we may incur substantial costs in order to comply with current or future environmental, health and safety laws and regulations. These current or future laws and regulations may impair our research, development or production efforts. Failure to comply with these laws and regulations also may result in substantial fines, penalties or other sanctions.

Risks Related to Our Dependence on Third Parties

We may not be successful in establishing and maintaining development and commercialization collaborations, which could adversely affect our ability to develop certain of our current and potential product candidates and our financial condition and operating results.

Because developing pharmaceutical products, conducting clinical trials, obtaining regulatory approval, establishing manufacturing capabilities and marketing approved products are expensive, we may enter into collaborations with companies that have the required expertise. Additionally, if any of our current and potential product candidates receives marketing approval, we may enter into sales and marketing arrangements with third parties. If we are unable to enter into arrangements on acceptable terms, if at all, we may be unable to effectively market and sell our products in our target markets. We expect to face competition in seeking appropriate collaborators. Moreover, collaboration arrangements are complex and time consuming to negotiate, document and implement and they may require substantial resources to maintain. We may not be successful in our efforts to establish and implement collaborations or other alternative arrangements for the development of our current and potential product candidates.

When we collaborate with a third party for development and commercialization of a product candidate, we can expect to relinquish some or all of the control over the future success of that product candidate to the third party.

One or more of our collaboration partners may not devote sufficient resources to the commercialization of our current and potential product candidates or may otherwise fail in their commercialization. The terms of any collaboration or other arrangement that we establish may contain provisions that are not favorable to us. In addition, any collaboration that we enter into may be

unsuccessful in the development and commercialization of our current and potential product candidates. In some cases, we may be responsible for continuing preclinical and initial clinical development of a product candidate or research program under a collaboration arrangement, and the payment we receive from our collaboration partner may be insufficient to cover the cost of this development. If we are unable to reach agreements with suitable collaborators for our current and potential product candidates, we would face increased costs, we may be forced to limit the number of our current and potential product candidates we can commercially develop or the territories in which we commercialize them. As a result, we might fail to commercialize products or programs for which a suitable collaborator cannot be found. If we fail to achieve successful collaborations, our operating results and financial condition could be materially and adversely affected.

We rely, and expect to continue to rely, on third parties to conduct, supervise and monitor our clinical trials, and if these third parties perform in an unsatisfactory manner, it may harm our business.

We rely on CROs and clinical trial sites to ensure our clinical trials are conducted properly and on time. While we have agreements governing their activities, we may have limited influence over their actual performance. We control only certain aspects of our CROs' activities. Nevertheless, we are responsible for ensuring that each of our clinical trials is conducted in accordance with the applicable protocol, legal, regulatory and scientific standards, and our reliance on the CROs does not relieve us of our regulatory responsibilities.

We and our CROs are required to comply with the GCPs for conducting, recording and reporting the results of clinical trials to assure that the data and reported results are credible and accurate and that the rights, integrity and confidentiality of clinical trial participants are protected. The FDA enforces these GCPs through periodic inspections of study sponsors, principal investigators and clinical trial sites. If we or our CROs fail to comply with applicable GCPs, the clinical data generated in our future clinical trials may be deemed unreliable, and the FDA may require us to perform additional clinical trials before approving any marketing applications. Upon inspection, the FDA may determine that our clinical trials did not comply with GCPs. In addition, our ongoing and future clinical trials will require a sufficient number of test subjects to evaluate the safety and effectiveness of our current and potential product candidates. Accordingly, if our CROs fail to comply with these regulations or fail to recruit a sufficient number of patients, we may be required to repeat such clinical trials, which would delay the regulatory approval process.

Our CROs are not our employees, and we are not able to directly monitor whether or not they devote sufficient time and resources to our clinical and nonclinical programs. These CROs may also have relationships with other commercial entities, including our competitors, for whom they may also be conducting clinical trials or other drug development activities that could harm our competitive position. If our CROs do not successfully carry out their contractual duties or obligations, fail to meet expected deadlines, or if the quality or accuracy of the clinical data they obtain is compromised due to their failure to adhere to our clinical protocols or regulatory requirements, or for any 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 current and potential product candidates. As a result, our financial results and the commercial prospects for our current and potential product candidates would be harmed, our costs could increase and our ability to generate revenues could be delayed.

We rely, and expect to continue to rely, on third parties to distribute, manufacture and perform release testing for our current and potential product candidates and other key materials and if such third parties do not carry out their contractual duties or meet expected deadlines, we may not be able to obtain regulatory approvals for our current and potential product candidates.

We intend to continue to rely on third-party contract manufacturing organizations, or CMOs, to produce our current and potential product candidates and other key materials and on third-party contract testing organizations, or CTOs, for the establishment and performance of validated product release assays, but we have not entered into binding agreements with any such CMOs or CTOs to support commercialization. Additionally, any CMO may not have experience producing our current and potential product candidates at commercial levels and may not achieve the necessary regulatory approvals or produce our products at the quality, quantities, locations and timing needed to support commercialization. We may change our manufacturing process, and there can be no guarantee that the regulatory authorities will approve any new process in a timely manner or ever. Also, as a consequence of the manufacturing change, there may be a requirement to conduct additional preclinical safety or efficacy studies, develop new manufacturing and release assays and/or repeat all or part of the ascending dose safety study in animals or humans. Regulatory requirements ultimately imposed could adversely affect our ability to test, manufacture or market products.

Although we intend to rely on third-party manufacturers for commercialization, we currently utilize a sole source manufacturer to support our clinical trials. We may be unable to negotiate binding agreements with this manufacturer or additional manufacturers to support our commercialization activities at commercially reasonable terms.

No manufacturer we know of currently has the experience or ability to produce our current and potential product candidates at reasonable commercial levels or under full commercial requirements. We may encounter technical or scientific issues related to

manufacturing or development that we may be unable to resolve in a timely manner or with available funds. Further, we have not completed the characterization and validation activities necessary for commercial and regulatory approvals. If our manufacturing and testing partners do not obtain such regulatory approvals, our commercialization efforts may be harmed.

Even if we timely develop a manufacturing process for Oncoprex and successfully transfer it to third-party manufacturers, if such third-party manufacturers are unable to produce our current and potential product candidates in the necessary quantities, or in compliance with current Good Manufacturing Practices, or cGMP, or in compliance with pertinent regulatory requirements, and within our planned time frame and cost parameters, the development and sales of our products, if approved, may be materially harmed. The facilities used by our contract manufacturers to manufacture our current and potential product candidates must be approved by the FDA pursuant to inspections that will be conducted after we submit our BLA to the FDA. We do not control the manufacturing process of, and are completely dependent on, our contract manufacturing partners for compliance with cGMPs for the manufacture of our current and potential product candidates. If our contract manufacturers cannot successfully manufacture material that conforms to our specifications and the strict regulatory requirements of the FDA or others, they will not be able to secure and/or maintain regulatory approval for their manufacturing facilities. In addition, we have no control over the ability of our contract manufacturers to maintain adequate quality control, quality assurance and qualified personnel. If the FDA or a comparable foreign regulatory authority does not approve these facilities for the manufacture of our current and potential product candidates or if it withdraws any such approval in the future, we may need to find alternative manufacturing facilities, which would significantly affect our ability to develop, obtain regulatory approval for or market our current and potential product candidates, if approved. In addition, any failure to achieve and maintain compliance with these laws, regulations and standards could subject us to the risk that we may have to suspend the manufacturing of our current and potential product candidates or that obtained approvals could be revoked, which would adversely affect our business and reputation.

In addition, any significant disruption in our supplier relationships could harm our business. We source key materials, devices and equipment from third parties, either directly through agreements with suppliers or indirectly through our manufacturers who have agreements with suppliers. There is a small number of suppliers for certain key materials and components that are used to manufacture our current and potential product candidates. Such suppliers may not sell these key materials to our manufacturers at the times or quantities we need them or on commercially reasonable terms. We may not have any control over the process or timing of the acquisition of these key materials by our manufacturers.

We also expect to rely on other third parties to store and distribute our products for our clinical trials. Any performance failure on the part of our distributors could delay clinical development or marketing approval of our current and potential product candidates or commercialization of our products, if approved, producing additional losses and depriving us of potential product revenue.

We have completed and may in the future complete related party transactions that were not and may not be conducted on an arm's length basis.

Our leading drug candidate, Oncoprex, is based upon patents and related technology covered by a patent and technology license agreement between The University of Texas MD Anderson Cancer Center, or MD Anderson, and Introgen Therapeutics, Inc. (such technology license agreement is referred to as the "MD Anderson License Agreement"), under which we have rights to patents covering use of various genes, including the TUSC2 gene, for treatment of cancer, as well as know-how and related intellectual property. In 2007, the MD Anderson License Agreement was sublicensed by Introgen Therapeutics, Inc. to Introgen Research Institute, Inc., a Texas corporation (IRI) and in 2009 this sublicense was assigned by IRI to us, and we granted back to IRI a nonexclusive, royalty-free license to use and practice the licensed technology for non-commercial research purposes. As consideration for this assignment, we agreed to assume all of IRI's obligations to MD Anderson under the MD Anderson License Agreement, including ongoing patent related expenses and royalty obligations. IRI also agreed in 2011 to provide additional technology licensing opportunities and services to us in return for monthly payments and our obligation to pay to IRI a royalty of one percent (1%) on sales of products licensed to us under the MD Anderson License Agreement. We also granted a non-exclusive, royalty-free sublicense to IRI in 2011 for non-commercial research purposes. IRI's obligations to provide additional technology licensing opportunities and services to us, and our obligation to make monthly payments to IRI, were terminated in 2012; however, our obligation to pay the one percent (1%) royalty to IRI upon sales of products licensed to us under the MD Anderson License Agreement is ongoing. This royalty obligation continues for 21 years after the later of the termination of the MD Anderson License Agreement and the termination of the sublicense assigned by IRI to us. IRI is controlled by Rodney Varner and his immediate family members. Mr. Varner is currently Chairman of our board of directors, having joined our board of directors on August 15, 2012, and has been our Chief Executive Officer since August 29, 2012; accordingly, in 2009 and 2011, when the above referenced agreements between IRI and Genprex were entered into, Mr. Varner was neither a member of our board of directors nor an executive officer of Genprex. When the 2011 agreement was entered into, Mr. Varner was deemed to be an "affiliate" of the Company due to his beneficial ownership of approximately 39% of our issued and outstanding shares. Although we believe that these transactions were conducted on an arm's length basis, it is possible that the terms were less favorable to us than they might have been in a transaction with an unrelated party.

We have adopted a written related-person transactions policy that sets forth our policies and procedures regarding the identification, review, consideration and oversight of related-person transactions.

Risks Related to Our Intellectual Property

If we fail to obtain or protect our intellectual property, our business will be impaired.

If we are unable to obtain or protect intellectual property rights related to our current and potential product candidates, we may not be able to compete effectively in our markets. Third party claims of intellectual property infringement may prevent or delay our development and commercialization efforts. We may not be successful in obtaining or maintaining necessary rights to product components and processes for our development pipeline through acquisitions and end licenses.

If we fail to comply with our obligations in the agreements under which we license intellectual property rights from third parties or otherwise experience disruptions to our business relationships with our licensors, we could lose license rights that are important to our business. We may be involved in lawsuits to protect or enforce our patents or the patents or our licensors, which could be expensive, time-consuming, and/or unsuccessful.

Obtaining and maintaining patent protection depends upon compliance with various procedural, document submission, fee payment, and other requirements imposed by governmental patent agencies, and our patent protection could be reduced or eliminated for noncompliance with these requirements. Issued patents covering our current and potential product candidates could be found invalid or unenforceable if challenged in court, or could expire before we obtain product approval. The scope of our issued patents could be found to be narrower and provide less protection than we anticipate.

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

Under our license agreement with MD Anderson, we hold a worldwide, exclusive license to, among other things, manufacture and market products utilizing certain inventions that are critical to our business. We expect to enter into additional license agreements in the future. Our existing license agreement imposes various diligence, royalty and other obligations on us, and we expect that future license agreements will impose various diligence, milestone payment, royalty and other obligations on us. If we fail to comply with our obligations under these agreements, or we are subject to a bankruptcy, the licensor may have the right to terminate the license, in which event we would not be able to market products covered by the license.

We may need to obtain licenses from third parties to advance our research or allow commercialization of our current and potential product candidates. We may fail to obtain any of these licenses at a reasonable cost or on reasonable terms, if at all. In that event, we may be required to expend significant time and resources to develop or license replacement technology. If we are unable to do so, we may be unable to develop or commercialize the affected product candidates, which could harm our business significantly. We cannot provide any assurances that third-party patents do not exist which might be enforced against our current product candidates or future products, resulting in either an injunction prohibiting our sales, or, with respect to our sales, an obligation on our part to pay royalties and/or other forms of compensation to third parties.

In certain cases, patent prosecution of our licensed technology may be controlled solely by the licensor. If our licensors fail to obtain and maintain patent or other protection for the proprietary intellectual property we license from them, we could lose our rights to the intellectual property or our exclusivity with respect to those rights, and our competitors could market competing products using the intellectual property. In certain cases, we control the prosecution of patents resulting from licensed technology. In the event we breach any of our obligations related to such prosecution, we may incur significant liability to our licensing partners. Licensing of intellectual property is of critical importance to our business and involves complex legal, business and scientific issues and is complicated by the rapid pace of scientific discovery in our industry. Disputes may arise regarding intellectual property subject to a licensing agreement, including:

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

- the ownership of inventions and know-how resulting from the joint creation or use of intellectual property by our licensors and us and our partners; and
- the priority of invention of patented technology.

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

The intellectual property rights we have licensed from MD Anderson are subject to the rights of the U.S. government.

The rights we have obtained pursuant to our license agreement with MD Anderson are made subject to the rights of the U.S. government to the extent that the technology covered by the licensed intellectual property was developed under a funding agreement between MD Anderson and the U.S. government. Additionally, to the extent there is any conflict between our license agreement with MD Anderson and applicable laws or regulations, applicable laws and regulations will prevail. Similarly, to the extent there is any conflict between our license agreement with MD Anderson and MD Anderson's funding agreement with the US government, the terms of the funding agreement will prevail. Some, and possibly all, of our licensed intellectual property rights from MD Anderson have been developed in the course of research funded by the U.S. government. As a result, the U.S. government may have certain rights to intellectual property embodied in our current or future products pursuant to the Bayh-Dole Act of 1980. Government rights in certain inventions developed under a government-funded program include a non-exclusive, non-transferable, irrevocable worldwide license to use inventions for any governmental purpose. In addition, the U.S. government has the right to require us, or an assignee or exclusive licensee to such inventions, to grant licenses to any of these inventions to a third party if the U.S. government determines that adequate steps have not been taken to commercialize the invention, that government action is necessary to meet public health or safety needs, that government action is necessary to meet requirements for public use under federal regulations, or that the right to use or sell such inventions is exclusively licensed to an entity within the U.S. and substantially manufactured outside the U.S. without the U.S. government's prior approval. Additionally, we may be restricted from granting exclusive licenses for the right to use or sell our inventions created pursuant to such agreements unless the licensee agrees to additional restrictions (e.g., manufacturing substantially all of the invention in the U.S.). The U.S. government also has the right to take title to these inventions if we fail to disclose the invention to the government and fail to file an application to register the intellectual property within specified time limits. In addition, the U.S. government may acquire title in any country in which a patent application is not filed within specified time limits. Additionally, certain inventions are subject to transfer restrictions during the term of these agreements and for a period thereafter, including sales of products or components, transfers to foreign subsidiaries for the purpose of the relevant agreements, and transfers to certain foreign third parties. If any of our intellectual property becomes subject to any of the rights or remedies available to the U.S. government or third parties pursuant to the Bayh-Dole Act of 1980, this could impair the value of our intellectual property and could adversely affect our business. The U.S. government has not exercised any of these rights or provided us with any notice of its intent to exercise any of these rights with respect to any of the intellectual property licensed to us by MD Anderson. We are not aware of any instance in which the U.S. government has ever exercised any such rights with respect to any technologies or other intellectual property developed under funding agreements with the U.S. government.

If we are unable to protect our intellectual property rights or if our intellectual property rights are inadequate for our technology and product candidates, our competitive position could be harmed.

Our commercial success will depend in part on our ability and the ability of our licensors to obtain and maintain patent and other intellectual property protection in the United States and other countries with respect to our proprietary technology and products. We rely on trade secret, patent, copyright and trademark laws, and confidentiality, licensing and other agreements with employees and third parties, all of which offer only limited protection. We seek to protect our proprietary position by filing and prosecuting patent applications in the United States and abroad related to our novel technologies and products that are important to our business.

The patent positions of biotechnology and pharmaceutical companies generally are highly uncertain, involve complex legal and factual questions and have in recent years been the subject of much litigation. As a result, the issuance, scope, validity, enforceability and commercial value of our patents, including those patent rights licensed to us by third parties, are highly uncertain. The steps we or our licensors have taken to protect our proprietary rights may not be adequate to preclude misappropriation of our proprietary information or infringement of our intellectual property rights, both inside and outside of the United States. Further, the examination process may require us or our licensors to narrow the claims for our pending patent applications, which may limit the scope of patent protection that may be obtained if these applications issue. The rights already granted under any of our currently issued patents or those licensed to us and those that may be granted under future issued patents may not provide us with the proprietary protection or competitive advantages we are seeking. If we or our licensors are unable to obtain and maintain patent protection for our technology and products, or if the scope of the patent protection obtained is not sufficient, our competitors could develop and commercialize technology and products similar or superior to ours, and our ability to successfully commercialize our technology and products may be adversely affected. It is also possible that we or our licensors will fail to identify patentable aspects of inventions made in the course of

our development and commercialization activities before it is too late to obtain patent protection on them. It is also possible that as research and development progresses, the direction of our intellectual property strategy and patent portfolio will change, resulting in strategic business decisions to allow certain patents or patent applications to be abandoned or lapse.

With respect to patent rights, we do not know whether any of the pending patent applications relating to any of our current and potential product candidates will result in the issuance of patents that effectively protect our technology or products, or if any of our licensors' issued patents will effectively prevent others from commercializing competitive technologies and products. Publications of discoveries in the scientific literature often lag behind the actual discoveries, and patent applications in the United States and other jurisdictions are typically not published until 18 months after filing or in some cases not at all, until they are issued as a patent. Therefore, we cannot be certain that we or our licensors were the first to make the inventions claimed in our owned or licensed patents or pending patent applications, or that we or our licensors were the first to file for patent protection of such inventions.

Our pending applications cannot be enforced against third parties practicing the technology claimed in such applications unless and until a patent issues from such applications. Because the issuance of a patent is not conclusive as to its inventorship, scope, validity or enforceability, issued patents that we have licensed from third parties may be challenged in the courts or patent offices in the United States and abroad. Such challenges may result in the loss of patent protection, the narrowing of claims in such patents or the invalidity or unenforceability of such patents, which could limit our ability to stop others from using or commercializing similar or identical technology and products, or limit the duration of the patent protection for our technology and products. Protecting against the unauthorized use of our or our licensor's patented technology, trademarks and other intellectual property rights is expensive, difficult and may in some cases not be possible. In some cases, it may be difficult or impossible to detect third-party infringement or misappropriation of our intellectual property rights, even in relation to issued patent claims, and proving any such infringement may be even more difficult.

Third-party claims of intellectual property infringement may prevent or delay our development and commercialization efforts.

Our commercial success depends in part on our avoiding infringement of the patents and proprietary rights of third parties. There is a substantial amount of litigation, both within and outside the United States, involving patent and other intellectual property rights in the biotechnology and pharmaceutical industries, including patent infringement lawsuits, interferences, oppositions and *inter partes* reexamination proceedings before the US Patent and Trademark Office, or US PTO, and corresponding foreign patent offices. Numerous US and foreign issued patents and pending patent applications, which are owned by third parties, exist in the fields in which we are pursuing development candidates. As the biotechnology and pharmaceutical industries expand and more patents are issued, the risk increases that our current and potential product candidates may be subject to claims of infringement of the patent rights of third parties.

Third parties may in the future assert that we are employing their proprietary technology without authorization. There may be third-party patents or patent applications with claims to materials, formulations, methods of manufacture or methods for treatment related to the use or manufacture of our current and potential product candidates. Because patent applications can take many years to issue, there may be currently pending patent applications which may later result in issued patents that our current and potential product candidates may infringe. In addition, third parties may obtain patents in the future and claim that use of our technologies infringes upon these patents. If any third-party patents were held by a court of competent jurisdiction to cover the manufacturing process of any of our current and potential product candidates, or any final product itself, the holders of any such patents may be able to block our ability to commercialize such product candidate unless we obtained a license under the applicable patents, or until such patents expire.

Similarly, if any third-party patents were held by a court of competent jurisdiction to cover aspects of our formulations, processes for manufacture or methods of use, including combination therapy, the holders of any such patents may be able to block our ability to develop and commercialize the applicable product candidate unless we obtained a license or until such patent expires. In either case, such a license may not be available on commercially reasonable terms or at all.

Parties making claims against us may obtain injunctive or other equitable relief, which could effectively block our ability to further develop and commercialize one or more of our current and potential product candidates. Defense of these claims, regardless of their merit, may involve substantial litigation expense and would be a substantial diversion of employee resources from our business. In the event of a successful claim of infringement against us, we may have to pay substantial damages, including treble damages and attorneys' fees for willful infringement, pay royalties, redesign our infringing products or obtain one or more licenses from third parties, which may be impossible or require substantial time and monetary expenditure.

We may not be successful in obtaining or maintaining necessary rights to product components and processes for our development pipeline through acquisitions and in-licenses.

Presently we believe that we have rights to the intellectual property, through licenses from third parties and under patents that we own, to develop our current and potential product candidates. Because our programs may involve additional product candidates that may require the use of proprietary rights held by third parties, the growth of our business may depend in part on our ability to acquire, in-license or use these proprietary rights. In addition, our current and potential product candidates may require specific formulations to work effectively and efficiently and these rights may be held by others. We may be unable to acquire or in-license any compositions, methods of use, processes or other third-party intellectual property rights from third parties that we identify. The licensing and acquisition of third-party intellectual property rights is a competitive area, and a number of more established companies are also pursuing strategies to license or acquire third-party intellectual property rights that we may consider attractive. These established companies may have a competitive advantage over us due to their size, cash resources and greater clinical development and commercialization capabilities.

In addition, companies that perceive us to be a competitor may be unwilling to assign or license rights to us. We also may be unable to license or acquire third-party intellectual property rights on terms that would allow us to make an appropriate return on our investment. If we are unable to successfully obtain rights to required third-party intellectual property rights, our business, financial condition and prospects for growth could suffer.

We may incur substantial costs as a result of litigation or other proceedings relating to patent and other intellectual property rights.

We may from time to time seek to enforce our intellectual property rights against infringers when we determine that a successful outcome is probable and may lead to an increase in the value of the intellectual property. If we choose to enforce our patent rights against a party, then that individual or company has the right to ask the court to rule that such patents are invalid or should not be enforced. Additionally, the validity of our patents and the patents we have licensed may be challenged if a petition for post grant proceedings such as *inter partes* review and post grant review is filed within the statutorily applicable time with the US PTO. These lawsuits and proceedings are expensive and would consume time and resources and divert the attention of managerial and scientific personnel even if we were successful in stopping the infringement of such patents. In addition, there is a risk that the court will decide that such patents are not valid and that we do not have the right to stop the other party from using the inventions. There is also the risk that, even if the validity of such patents is upheld, the court will refuse to stop the other party on the ground that such other party's activities do not infringe our intellectual property rights. In addition, in recent years the U.S. Supreme Court modified some tests used by the US PTO in granting patents over the past 20 years, which may decrease the likelihood that we will be able to obtain patents and increase the likelihood of a challenge of any patents we obtain or license.

If we are not able to adequately prevent disclosure of trade secrets and other proprietary information, the value of our technology and products could be significantly diminished.

We rely on trade secrets to protect our proprietary technologies, especially where we do not believe patent protection is appropriate or obtainable. However, trade secrets are difficult to protect. We rely in part on confidentiality agreements with our employees, consultants, outside scientific collaborators, sponsored researchers and other advisors to protect our trade secrets and other proprietary information. These agreements may not effectively prevent disclosure of confidential information and may not provide an adequate remedy in the event of unauthorized disclosure of confidential information. In addition, others may independently discover our trade secrets and proprietary information. Costly and time-consuming litigation could be necessary to enforce and determine the scope of our proprietary rights, and failure to obtain or maintain trade secret protection could adversely affect our competitive business position.

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

Because we rely on third parties to manufacture our current and potential product candidates, and because we collaborate with various organizations and academic institutions on the advancement of our current and potential product candidates, we must, at times, share trade secrets with them. We seek to protect our proprietary technology in part by entering into confidentiality agreements and, if applicable, material transfer agreements, collaborative research agreements, consulting agreements or other similar agreements with our manufacturers, collaborators, advisors, employees and consultants prior to beginning research or disclosing proprietary information. These agreements typically limit the rights of the third parties to use or disclose our confidential information, such as trade secrets. Despite the contractual provisions employed when working with third parties, the need to share trade secrets and other confidential information increases the risk that such trade secrets become known by our competitors, are inadvertently incorporated into the technology of others, are used inappropriately to create new inventions or are disclosed or used in violation of these agreements. Given that our proprietary position is based, in part, on our know-how and trade secrets, a competitor's discovery of our

trade secrets or other unauthorized use or disclosure would impair our competitive position and may have a material adverse effect on our business.

In addition, these agreements typically restrict the ability of our collaborators, advisors, employees and consultants to publish data potentially relating to our trade secrets. Our academic collaborators typically have rights to publish data, provided that we are notified in advance and may delay publication for a specified time in order to secure our intellectual property rights arising from the collaboration. In other cases, publication rights are controlled exclusively by us, although in some cases we may share these rights with other parties. We may also conduct joint research and development programs that may require us to share trade secrets under the terms of research and development partnerships or similar agreements. Despite our efforts to protect our trade secrets, our competitors may discover our trade secrets through breach of these agreements, independent development or publication of information including our trade secrets in cases where we do not have proprietary or otherwise protected rights at the time of publication. A competitor's discovery of our trade secrets may impair our competitive position and have an adverse impact on our business.

We may be involved in lawsuits to protect or enforce our patents or the patents of our licensors, which could be expensive, time-consuming and unsuccessful.

Competitors may infringe our patents or the patents of our licensors. To counter infringement or unauthorized use, we may be required to file infringement claims, which can be expensive and time-consuming. In addition, in an infringement proceeding, a court may decide that a patent of ours or our licensors is not valid, is unenforceable and/or is not infringed, or may refuse to stop the other party from using the technology at issue on the grounds that our patents do not cover the technology in question. An adverse result in any litigation or defense proceedings could put one or more of our patents at risk of being invalidated or interpreted narrowly and could put our patent applications at risk of not issuing.

Interference proceedings provoked by third parties or brought by us may be necessary to determine the priority of inventions with respect to our patents or patent applications or those of our licensors. An unfavorable outcome could require us to cease using the related technology or to attempt to license rights to it from the prevailing party. Our business could be harmed if the prevailing party does not offer us a license on commercially reasonable terms. Our defense of litigation or interference proceedings may fail and, even if successful, may result in substantial costs and distract our management and other employees. We may not be able to prevent, alone or with our licensors, misappropriation of our intellectual property rights, particularly in countries where the laws may not protect those rights as fully as in the United States.

Furthermore, because of the substantial amount of discovery required in connection with intellectual property litigation, there is a risk that some of our confidential information could be compromised by disclosure during this type of litigation. There could also be public announcements of the results of hearings, motions or other interim proceedings or developments. If securities analysts or investors perceive these results to be negative, it could have a material adverse effect on the price of our common stock.

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

Periodic maintenance fees, renewal fees, annuity fees and various other governmental fees on patents and/or applications will be due to be paid to the US PTO and various governmental patent agencies outside of the United States in several stages over the lifetime of the patents and/or applications. We employ an outside firm and rely on our outside counsel to pay these fees due to non-US patent agencies. The US PTO and various non-US governmental patent agencies require compliance with a number of procedural, documentary, fee payment and other similar provisions during the patent application process. We employ reputable law firms and other professionals to help us comply, and in many cases, an inadvertent lapse can be cured by payment of a late fee or by other means in accordance with the applicable rules. However, there are situations in which non-compliance can result in abandonment or lapse of the patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. In such an event, our competitors might be able to enter the market and this circumstance would have a material adverse effect on our business.

Issued patents covering our current and potential product candidates could be found invalid or unenforceable if challenged in court.

If we, MD Anderson or one of our future licensing partners initiated legal proceedings against a third party to enforce a patent covering one of our current and potential product candidates, the defendant could counterclaim that the patent covering our product candidate is invalid and/or unenforceable. In patent litigation in the United States, defendant counterclaims alleging invalidity and/or unenforceability are commonplace. Grounds for a validity challenge could be an alleged failure to meet any of several statutory requirements, including lack of novelty, obviousness or non-enablement. Grounds for an unenforceability assertion could be an allegation that someone connected with prosecution of the patent withheld relevant information from the US PTO, or made a misleading statement, during prosecution. Third parties may also raise similar claims before administrative bodies in the United States

or abroad, even outside the context of litigation. Such mechanisms include re-examination, post grant review and equivalent proceedings in foreign jurisdictions (e.g., opposition proceedings). Such proceedings could result in revocation or amendment to our patents in such a way that they no longer cover our current and potential product candidates. The outcome following legal assertions of invalidity and unenforceability is unpredictable. With respect to the validity question, for example, we cannot be certain that there is no invalidating prior art, of which we and the patent examiner were unaware during prosecution. If a defendant were to prevail on a legal assertion of invalidity and/or unenforceability, we would lose at least part, and perhaps all, of the patent protection on our current and potential product candidates. Such a loss of patent protection would have a material adverse impact on our business.

We may be subject to claims that our employees, consultants or independent contractors have wrongfully used or disclosed confidential information of third parties or that our employees have wrongfully used or disclosed alleged trade secrets of their former employers.

We may now and in the future employ individuals who were previously employed at universities or other biotechnology or pharmaceutical companies, including our competitors or potential competitors. Although we try to ensure that our employees, consultants and independent contractors do not use the proprietary information or know-how of others in their work for us, we may be subject to claims that we or our employees, consultants or independent contractors have inadvertently or otherwise used or disclosed intellectual property, including trade secrets or other proprietary information, of any of our employee's former employer or other third parties. Litigation may be necessary to defend against these claims. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights or personnel, which could adversely impact our business. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management and other employees.

We may be subject to claims challenging the inventorship or ownership of our patents and other intellectual property.

We may be subject to claims that former employees, collaborators or other third parties have an ownership interest in our patents or other intellectual property. We may have potential ownership disputes arising, for example, from conflicting obligations of consultants, collaborators or others who are involved in developing our current and potential product candidates. Litigation may be necessary to defend against these and other claims challenging inventorship or ownership. If we fail in defending any such claims, in addition to paying monetary damages, we may lose valuable intellectual property rights, such as exclusive ownership of, or right to use, valuable intellectual property. Such an outcome could have a material adverse effect on our business. Even if we are successful in defending against such claims, litigation could result in substantial costs and be a distraction to management and other employees.

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

The United States has enacted and is currently implementing wide-ranging patent reform legislation. Recent U.S. Supreme Court rulings have narrowed the scope of patent protection available in certain circumstances and weakened the rights of patent owners in certain situations. In addition to increasing uncertainty with regard to our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of patents, once obtained. Depending on decisions by the U.S. Congress, the federal courts and the U.S. PTO, the laws and regulations governing patents could change in unpredictable ways that would weaken our ability to obtain new patents or to enforce our existing patents and patents that we might obtain in the future.

We have not yet registered the trademark for Oncoprex, and failure to secure such registration could adversely affect our business.

While we own pending trademark applications for the marks "GENPREX" and "ONCOPREX", these marks have not yet been approved by the U.S. Patent and Trademark Office. During trademark registration proceedings, we may receive rejections. Although we would be given an opportunity to respond to those rejections, we may be unable to overcome such rejections. In addition, in the US PTO 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. Moreover, any name we propose to use with our current and potential product candidates in the United States must be approved by the FDA, regardless of whether we have registered it, or applied to register it, as a trademark. The FDA typically conducts a review of proposed product names, including an evaluation of potential for confusion with other product names. If the FDA objects to any of our proposed proprietary product names, we may be required to expend significant additional resources in an effort to identify a suitable substitute name that would qualify under applicable trademark laws, not infringe the existing rights of third parties and be acceptable to the FDA.

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

Filing, prosecuting and defending patents on product candidates in all countries throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the United States can be less extensive than those in the United States. In addition, the laws of some foreign countries do not protect intellectual property rights to the same extent as federal

and state laws in the United States. Consequently, we may not be able to prevent third parties from practicing our inventions in all countries outside the United States, or from selling or importing products made using our inventions in and into the United States or other jurisdictions. Competitors may use our technologies in jurisdictions where we have not obtained patent protection to develop their own products and further, may export otherwise infringing products to territories where we have patent protection, but enforcement is not as strong as that in the United States. These products may compete with our products and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing.

Many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions. The legal systems of certain countries, particularly certain developing countries, do not favor the enforcement of patents, trade secrets and other intellectual property protection, particularly those relating to biotechnology products, which could make it difficult for us to stop the infringement of our patents or marketing of competing products in violation of our proprietary rights generally. Proceedings to enforce our patent rights in foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business, could put our patents at risk of being invalidated or interpreted narrowly and our patent applications at risk of not issuing and could provoke third parties to assert claims against us. We may not prevail in any lawsuits that we initiate, and the damages or other remedies awarded, if any, may not be commercially meaningful. Accordingly, our efforts to enforce our intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license.

Risks Related to Employee Matters and Managing Growth

We have no sales, marketing or distribution experience and we will have to invest significant resources to develop those capabilities or enter into acceptable third-party sales and marketing arrangements.

We have no sales, marketing or distribution experience. To develop sales, distribution and marketing capabilities, we will have to invest significant amounts of financial and management resources, some of which will need to be committed prior to any confirmation that Oncoprex or any of our other potential product candidates will be approved by the FDA. For product candidates for which we decide to perform sales, marketing and distribution functions ourselves or through third parties, we could face a number of additional risks, including that we or our third-party sales collaborators may not be able to build and maintain an effective marketing or sales force, and we may experience difficulty in managing the growth of our organization. If we use third parties to market and sell our products, we may have limited or no control over their sales, marketing and distribution activities on which our future revenues may depend.

We will need to expand our operations and increase the size of our company, and we may experience difficulties in managing growth.

As of March 25, 2019, we had seven full-time employees. As we advance our current and potential product candidates through preclinical studies and clinical trials, we will need to increase our product development, scientific and administrative headcount to manage these programs. In addition, to meet our obligations as a public company, we may need to increase our general and administrative capabilities. Our management, personnel and systems currently in place may not be adequate to support this future growth. If we are unable to successfully manage this growth and increased complexity of operations, our business may be adversely affected.

We may not be able to manage our business effectively if we are unable to attract and retain key personnel and consultants.

We may not be able to attract or retain qualified management, finance, scientific and clinical personnel and consultants due to the intense competition for qualified personnel and consultants among biotechnology, pharmaceutical and other businesses. If we are not able to attract and retain necessary personnel and consultants to accomplish our business objectives, we may experience constraints that will significantly impede the achievement of our development objectives, our ability to raise additional capital and our ability to implement our business strategy.

We are highly dependent on the development, regulatory, commercialization and business development expertise of our management team, key employees and consultants. Any of our executive officers or key employees or consultants may terminate their employment at any time. If we lose one or more of our executive officers or key employees or consultants, our ability to implement our business strategy successfully could be seriously harmed. Replacing executive officers, key employees and consultants may be difficult and may take an extended period of time because of the limited number of individuals in our industry with the breadth of skills and experience required to develop, gain regulatory approval of and commercialize products successfully. Competition to hire and retain employees and consultants from this limited pool is intense, and we may be unable to hire, train, retain or motivate these additional key personnel and consultants. Our failure to retain key personnel or consultants could materially harm our business.

In addition, we have scientific and clinical advisors and consultants who assist us in formulating our research, development and clinical strategies. These advisors are not our employees and may have commitments to, or consulting or advisory contracts with, other entities that may limit their availability to us and typically they will not enter into non-compete agreements with us. If a conflict of interest arises between their work for us and their work for another entity, we may lose their services. In addition, our advisors may have arrangements with other companies to assist those companies in developing products or technologies that may compete with ours.

We may use our financial and human resources to pursue a particular research program or product candidate and fail to capitalize on programs or product candidates that may be more profitable or for which there is a greater likelihood of success.

Because we have limited resources, we may forego or delay pursuit of opportunities with certain programs or product candidates or for indications that later prove to have greater commercial potential. Our resource allocation decisions may cause us to fail to capitalize on viable commercial products or profitable market opportunities. Our spending on current and future research and development programs for product candidates may not yield any commercially viable products. If we do not accurately evaluate the commercial potential or target market for a particular product candidate, we may relinquish valuable rights to that product candidate through strategic collaboration, licensing or other royalty arrangements in cases in which it would have been more advantageous for us to retain sole development and commercialization rights to such product candidate, or we may allocate internal resources to a product candidate in a therapeutic area in which it would have been more advantageous to enter into a partnering arrangement.

If we engage in future acquisitions or strategic partnerships, this may increase our capital requirements, dilute our stockholders, cause us to incur debt or assume contingent liabilities, and subject us to other risks.

We may evaluate and enter into various acquisitions and strategic partnerships, including licensing or acquiring complementary products, intellectual property rights, technologies, or businesses. Any potential acquisition or strategic partnership may entail numerous risks, including:

- increased operating expenses and cash requirements;
- the assumption of additional indebtedness or contingent liabilities;
- the issuance of our equity securities;
- assimilation of operations, intellectual property and products of an acquired company, including difficulties associated with integrating new personnel;
- the diversion of our management's attention from our existing product programs and initiatives in pursuing such a strategic merger or acquisition;
- retention of key employees, the loss of key personnel, and uncertainties in our ability to maintain key business relationships;
- risks and uncertainties associated with the other party to such a transaction, including the prospects of that party and their existing products or product candidates and marketing approvals; and
- our inability to generate revenue from acquired technology and/or products sufficient to meet our objectives in undertaking the acquisition or even to offset the associated acquisition and maintenance costs.

In addition, if we undertake acquisitions, we may issue dilutive securities, assume or incur debt obligations, incur large one-time expenses and acquire intangible assets that could result in significant future amortization expense. Moreover, we may not be able to locate suitable acquisition opportunities and this inability could impair our ability to grow or obtain access to technology or products that may be important to the development of our business.

Risks Related to Owning Our Common Stock

The market price of our common stock may be highly volatile, and you may lose all or part of your investment.

The market price of our common stock is likely to be volatile. Our stock price could be subject to wide fluctuations in response to a variety of factors, including the following:

- adverse results or delays in preclinical or clinical trials;
- reports of adverse events in other gene therapy products or clinical trials of such products;
- inability to obtain additional funding;

- any delay in filing an IND or BLA for any of our current and potential product candidates and any adverse development or perceived adverse development with respect to the FDA's review of that IND or BLA;
- failure to develop successfully and commercialize our current and potential product candidates;
- failure to maintain our existing strategic collaboration or enter into new collaborations;
- failure by us or our licensors and strategic collaboration partners to prosecute, maintain or enforce our intellectual property rights;
- changes in laws or regulations applicable to future products;
- inability to obtain adequate product supply for our current and potential product candidates or inability to do so at acceptable prices;
- adverse regulatory decisions;
- introduction of new products, services or technologies by our competitors;
- failure to meet or exceed financial projections we may provide to the public;
- failure to meet or exceed the financial projections of the investment community;
- the perception of the pharmaceutical industry by the public, legislatures, regulators and the investment community;
- announcements of significant acquisitions, strategic partnerships, joint ventures or capital commitments by us, our strategic collaboration partners or our competitors;
- disputes or other developments relating to proprietary rights, including patents, litigation matters and our ability to obtain patent protection for our technologies;
- additions or departures of key scientific or management personnel;
- significant lawsuits, including patent or stockholder litigation;
- changes in the market valuations of similar companies;
- sales of our common stock by us or our stockholders in the future; and
- trading volume of our common stock.

In addition, companies trading in the stock market in general, and The Nasdaq Capital Market in particular, have experienced extreme price and volume fluctuations that have often been unrelated or disproportionate to the operating performance of these companies. Broad market and industry factors may negatively affect the market price of our common stock, regardless of our actual operating performance.

Nasdaq may delist our securities from its exchange, which could limit investors' ability to make transactions in our securities and subject us to additional trading restrictions.

Our common stock is listed on The Nasdaq Capital Market. We cannot assure you that, in the future, our securities will meet the continued listing requirements to be listed on The Nasdaq Capital Market. If The Nasdaq Capital Market delists our common stock, we could face significant material adverse consequences, including:

- a limited availability of market quotations for our securities;
- a determination that our common stock is a "penny stock" which will require brokers trading in our common stock to adhere to more stringent rules and possibly resulting in a reduced level of trading activity in the secondary trading market for our common stock;
- a limited amount of news and analyst coverage for our company; and
- a decreased ability to issue additional securities or obtain additional financing in the future.

Unstable market and economic conditions may have serious adverse consequences on our business, financial condition and stock price.

Global credit and financial markets have experienced volatility and disruptions in past years, including severely diminished liquidity and credit availability, declines in consumer confidence, declines in economic growth, increases in unemployment rates and uncertainty about economic stability. We cannot assure you that further deterioration in credit and financial markets and confidence in

economic conditions will not occur. Our general business strategy may be adversely affected by any such economic downturn, volatile business environment or continued unpredictable and unstable market conditions. If the current equity and credit markets deteriorate, or do not improve, it may make any necessary debt or equity financing more difficult, more costly and more dilutive. Failure to secure any necessary financing in a timely manner and on favorable terms could have a material adverse effect on our growth strategy, financial performance and stock price and could require us to delay or abandon clinical development plans. In addition, there is a risk that one or more of our current service providers, manufacturers and other partners may not survive difficult economic times, which could directly affect our ability to attain our operating goals on schedule and on budget.

We have no intention of declaring dividends in the foreseeable future.

The decision to pay cash dividends on our common stock rests with our board of directors and will depend on our earnings, unencumbered cash, capital requirements and financial condition. We do not anticipate declaring any dividends in the foreseeable future, as we intend to use any excess cash to fund our operations. Investors in our common stock should not expect to receive dividend income on their investment, and investors will be dependent on the appreciation of our common stock to earn a return on their investment.

We are an emerging growth company, and we cannot be certain if the reduced reporting requirements applicable to emerging growth companies will make our common stock less attractive to investors.

We are an emerging growth company, as defined in the JOBS Act. For as long as we continue to be an emerging growth company, we may take advantage of exemptions from various reporting requirements that are applicable to other public companies that are not emerging growth companies, including not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act, reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements and exemptions from the requirements of holding nonbinding advisory votes on executive compensation and stockholder approval of any golden parachute payments not previously approved. We could be an emerging growth company for up to five years following the year in which we completed our initial public offering, although circumstances could cause us to lose that status earlier. We will remain an emerging growth company until the earlier of (1) the last day of the fiscal year (a) following the fifth anniversary of the completion of our initial public offering, (b) in which we have total annual gross revenue of at least $1 billion or (c) in which we are deemed to be a large accelerated filer, which requires the market value of our common stock that is held by non-affiliates to exceed $700 million as of the prior June 30th, and (2) the date on which we have issued more than $1 billion in nonconvertible debt during the prior three-year period.

Even after we no longer qualify as an emerging growth company, we may still qualify as a “smaller reporting company” which would allow us to take advantage of many of the same exemptions from disclosure requirements including not being required to comply with the auditor attestation requirements of Section 404 of the Sarbanes-Oxley Act and reduced disclosure obligations regarding executive compensation in our periodic reports and proxy statements. We cannot predict if investors will find our common stock less attractive because we may rely on these exemptions. If some investors find our common stock less attractive as a result, there may be a less active trading market for our common stock and our stock price may be more volatile.

Under the JOBS Act, emerging growth companies can also delay adopting new or revised accounting standards until such time as those standards apply to private companies. We have irrevocably elected not to avail ourselves of this exemption from new or revised accounting standards and, therefore, will be subject to the same new or revised accounting standards as other public companies that are not emerging growth companies. As a result, changes in rules of U.S. generally accepted accounting principles or their interpretation, the adoption of new guidance or the application of existing guidance to changes in our business could significantly affect our financial position and results of operations.

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

As a public company, we incur, and will continue to incur, significant legal, accounting and other expenses. We are subject to the reporting requirements of the Exchange Act, which require, among other things, that we file with the Securities and Exchange Commission, or the SEC, annual, quarterly and current reports with respect to our business and financial condition. In addition, the Sarbanes-Oxley Act, as well as rules subsequently adopted by the SEC and The Nasdaq Capital Market to implement provisions of the Sarbanes-Oxley Act, impose significant requirements on public companies, including requiring establishment and maintenance of effective disclosure and financial controls and changes in corporate governance practices. Further, in July 2010, the Dodd-Frank Wall Street Reform and Consumer Protection Act, or the Dodd-Frank Act, was enacted. There are significant corporate governance and executive compensation related provisions in the Dodd-Frank Act that require the SEC to adopt additional rules and regulations in these areas such as “say on pay” and proxy access. Recent legislation permits emerging growth companies to implement many of these requirements over a longer period and up to five years from their initial public offering. We intend to take advantage of this new legislation but cannot guarantee that we will not be required to implement these requirements sooner than budgeted or planned and

thereby incur unexpected expenses. Stockholder activism, the political environment and government intervention and regulatory reform may lead to substantial new regulations and disclosure obligations, which may lead to additional compliance costs and impact the manner in which we operate our business in ways we cannot currently anticipate.

We expect the rules and regulations applicable to public companies to continue to result in significant and possibly increasing legal and financial compliance costs and to make some activities more time-consuming and costly. If these requirements divert the attention of our management and personnel from other business concerns, they could have a material adverse effect on our business, financial condition and results of operations. The costs will decrease our net income or increase our net loss, and may require us to reduce costs in other areas of our business or increase the prices of our products or services. For example, we expect these rules and regulations to make it difficult and expensive for us to obtain and maintain director and officer liability insurance. We cannot predict or estimate the amount or timing of additional costs we may incur to respond to these requirements. The impact of these requirements could also make it more difficult for us to attract and retain qualified persons to serve on our board of directors, our board committees or as executive officers.

Failure to maintain effective internal control over our financial reporting in accordance with Section 404 of the Sarbanes-Oxley Act could cause our financial reports to be inaccurate.

We are required pursuant to Section 404 of the Sarbanes-Oxley Act of 2002, or Section 404, to maintain internal control over financial reporting and to assess and report on the effectiveness of those controls. This assessment includes disclosure of any material weaknesses identified by our management in our internal control over financial reporting.. Although we prepare our financial statements in accordance with accounting principles generally accepted in the United States of America, our internal accounting controls may not meet all standards applicable to companies with publicly traded securities. If we fail to implement any required improvements to our disclosure controls and procedures, we may be obligated to report control deficiencies and our independent registered public accounting firm may not be able to certify the effectiveness of our internal controls over financial reporting. In either case, we could become subject to regulatory sanction or investigation. Further, these outcomes could damage investor confidence in the accuracy and reliability of our financial statements.

Our management has concluded that our internal controls over financial reporting were, and continue to be, ineffective, and as of the year ended December 31, 2018, identified a material weakness in our internal controls due to the lack of segregation of duties. While management is working to remediate the material weakness, there is no assurance that such changes, when economically feasible and sustainable, will remediate the identified material weaknesses or that the controls will prevent or detect future material weaknesses. If we are not able to maintain effective internal control over financial reporting, our financial statements, including related disclosures, may be inaccurate, which could have a material adverse effect on our business.

Failure to continue improving our accounting systems and controls could impair our ability to comply with the financial reporting and internal controls requirements for publicly traded companies.

As a public company, we operate in a demanding regulatory environment, which requires us to comply with the Sarbanes-Oxley Act of 2002, and the related rules and regulations of the SEC. Company responsibilities required by the Sarbanes-Oxley Act include establishing corporate oversight and adequate internal control over financial reporting and disclosure controls and procedures. Effective internal controls are necessary for us to produce reliable financial reports and are important to help prevent financial fraud.

Management performed an annual assessment as of December 31, 2018 of the effectiveness of our internal control over financial reporting for its annual report. Our management concluded that our internal control over financial reporting was, and continues to be, ineffective and as of the year ended December 31, 2018, due to a material weakness in our internal controls due to the lack of segregation of duties. For as long as we remain an “emerging growth company” as defined in the JOBS Act, we have and intend to continue to take advantage of certain exemptions from various reporting requirements that are applicable to other public companies that are not “emerging growth companies” including, but not limited to, not being required to comply with the auditor attestation requirements of Section 404(b) of the Sarbanes-Oxley Act. We may continue to take advantage of these reporting exemptions until we are no longer an “emerging growth company.” To remediate the identified material weakness, we engaged an outside firm to assist management with such accounting and will continue to use outside firms as a resource to deal with other non-recurring or unusual transactions. However, notwithstanding our remediation efforts, there is no assurance we will not encounter future accounting errors in the future. If we cannot provide reliable financial reports or prevent fraud, our business and results of operations could be harmed and investors could lose confidence in our reported financial information.

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

Under Sections 382 and 383 of the Internal Revenue Code of 1986, as amended, or the Code, if a corporation undergoes an “ownership change,” generally defined as a cumulative change in its equity ownership by “5-percent shareholders” of greater than 50

percentage points (by value) over a three-year period, the corporation's ability to use its pre-change net operating loss carryforwards, or NOLs, and certain other pre-change tax attributes (such as research tax credits) to offset its post-change taxable income and taxes, as applicable, may be limited. We have completed multiple rounds of financing since our inception which may have resulted in an ownership change or could result in an ownership change in the future. We have not completed a Section 382 and 383 analysis regarding any limitations on our NOLs and research and development credit carryforwards and such limitations could be significant. We may also experience ownership changes in the future as a result of subsequent shifts in our stock ownership. As a result, our ability to use our NOLs and research and development credit carryforwards to offset our U.S. federal taxable income and taxes, as applicable, may be subject to limitations, which could potentially result in increased future tax liability to us. In addition, at the state level, similar rules may apply and there may be periods during which the use of NOLs is suspended or otherwise limited, which could accelerate or permanently increase state taxes owed.

Sales of a substantial number of shares of our common stock in the public market could cause our stock price to fall.

If our existing stockholders sell, or indicate an intention to sell, substantial amounts of our common stock in the public market the market price of our common stock could decline. There were 9,772,516 shares of our common stock outstanding as of March 25, 2019 that are subject to certain resale restrictions under the securities laws. We are unable to predict the effect that sales of these shares may have on the market price of our common stock. In addition, as of March 25, 2019, 11,483,449 shares of common stock that are either subject to outstanding options, reserved for future issuance under our equity incentive plan, subject to outstanding warrants or issuable by us upon the instruction of one of our investors, will become eligible for sale in the public market to the extent permitted by the provisions of various vesting schedules, lock-up agreements and applicable securities laws, disregarding the ownership blockers relating to the securities under our 2018 private placement. We intend to file with the SEC a registration statement on Form S-8 under the Securities Act covering the shares of common stock reserved for issuance under the 2009 Plan, the 2018 Plan and the ESPP. Shares registered under the S-8 registration statement would be available for sale in the open market following its effective date, subject to Rule 144 volume limitations and the lock-up agreements described above, if applicable. If these additional shares of common stock are sold, or if it is perceived that they will be sold, in the public market, the market price of our common stock could decline If these additional shares of common stock are sold, or if it is perceived that they will be sold, in the public market, the market price of our common stock could decline.

Future sales and issuances of our common stock or rights to purchase common stock, including pursuant to our equity incentive plans, could result in additional dilution of the percentage ownership of our stockholders and could cause our stock price to fall.

We intend to seek to raise additional funds, and we may finance acquisitions or develop strategic relationships, in each case by issuing equity or convertible debt securities in addition to the shares issued in our initial public offering, which would reduce the percentage ownership of our existing stockholders. Our board of directors has the authority, in some instances without action or vote of the stockholders, to issue our authorized but unissued shares of common or preferred stock. Our amended and restated certificate of incorporation authorizes us to issue up to 200,000,000 shares of voting common stock and 10,000,000 shares of preferred stock. Future issuances of common or preferred stock would reduce your influence over matters on which stockholders vote and would be dilutive to earnings per share. In addition, any newly issued preferred stock could have rights, preferences and privileges senior to those of the common stock. Those rights, preferences and privileges could include, among other things, the establishment of dividends that must be paid prior to declaring or paying dividends or other distributions to holders of our common stock or providing for preferential liquidation rights. These rights, preferences and privileges could negatively affect the rights of holders of our common stock, and the right to convert such preferred stock into shares of our common stock at a rate or price that would have a dilutive effect on the outstanding shares of our common stock.

Initially, the aggregate number of shares of our common stock that may be issued pursuant to stock awards under our 2018 Plan is 6,788,749 shares. Additionally, the number of shares of our common stock reserved for issuance under our 2018 Plan will automatically increase on January 1 of each year, beginning on January 1, 2019 and continuing through and including January 1, 2028, by 5% of the total number of shares of our capital stock outstanding on December 31 of the preceding calendar year, or a lesser number of shares determined by our board of directors. Unless our board of directors elects not to increase the number of shares available for future grant each year, our stockholders may experience additional dilution, which could cause our stock price to fall.

If securities or industry analysts do not publish research or reports about us, or if they adversely change their recommendations regarding our common stock, then our stock price and trading volume could decline.

The trading market for our common stock will be influenced by the research and reports that industry or securities analysts publish about us, our industry and our market. If no analyst elects to cover us and publish research or reports about us, the market for our common stock could be severely limited and our stock price could be adversely affected. In addition, if one or more analysts ceases coverage of us or fails to regularly publish reports on us, we could lose visibility in the financial markets, which in turn could

cause our stock price or trading volume to decline. If one or more analysts who elect to cover us issue negative reports or adversely change their recommendations regarding our common stock, our stock price could decline.

The concentration of our common stock ownership by our current management may limit your ability to influence corporate matters.

Our directors and executive officers beneficially own and are able to vote in the aggregate approximately 32.9% of our outstanding common stock, assuming the exercise of all outstanding options held by our directors and executive officers. Accordingly, our directors and executive officers, as stockholders, will continue to have the ability to exert significant influence over all corporate activities, including the election or removal of directors and the outcome of tender offers, mergers, proxy contests or other purchases of common stock that could give our stockholders the opportunity to realize a premium over the then-prevailing market price for their shares of common stock. This concentrated control will limit the ability of other stockholders to influence corporate matters. In addition, such concentrated control could discourage others from initiating changes of control. In such cases, the perception of our prospects in the market may be adversely affected and the market price of our common stock may decline.

Certain provisions in our organizational documents could enable our board of directors to prevent or delay a change of control.

Our organizational documents contain provisions that may have the effect of discouraging, delaying or preventing a change of control of, or unsolicited acquisition proposals, that a stockholder might consider favorable. These include provisions:

- requiring a majority vote of the outstanding shares of common stock to amend the bylaws;
- providing that the authorized number of directors may be changed only by resolution of the board of directors;
- providing that the board of directors or any individual director may only be removed with cause and the affirmative vote of the holders of at least 66-2/3% of the voting power of all of our then outstanding common stock;
- providing that all vacancies, including newly created directorships, may, except as otherwise required by law, be filled by the affirmative vote of a majority of directors then in office, even if less than a quorum;
- dividing our board of directors into three classes;
- requiring that any action to be taken by our stockholders must be effected at a duly called annual or special meeting of stockholders and not be taken by written consent;
- providing that stockholders seeking to present proposals before a meeting of stockholders or to nominate candidates for election as directors at a meeting of stockholders must provide notice in writing in a timely manner and also specify requirements as to the form and content of a stockholder's notice;
- that do not provide for cumulative voting rights (therefore allowing the holders of a majority of the shares of common stock entitled to vote in any election of directors to elect all of the directors standing for election, if they should so choose);
- providing that special meetings of our stockholders may be called only by the chairman of the board, our Chief Executive Officer or by the board of directors pursuant to a resolution adopted by a majority of the total number of authorized directors; and
- providing that the Court of Chancery of the State of Delaware will be the sole and exclusive forum for (i) any derivative action or proceeding brought on our behalf, (ii) any action asserting a claim of breach of a fiduciary duty owed by any of our directors or officers to us or our stockholders, (iii) any action asserting a claim against us arising pursuant to any provision of the Delaware General Corporation Law or our certificate of incorporation or bylaws, or (iv) any action asserting a claim against us governed by the internal affairs doctrine. This exclusive forum provision may limit a stockholder's ability to bring such an action in a judicial forum that it finds favorable for such actions and may discourage such actions.

Furthermore, our board of directors has the authority to issue shares of preferred stock in one or more series and to fix the rights and preferences of these shares without stockholder approval. Any series of preferred stock is likely to be senior to our common stock with respect to dividends, liquidation rights and, possibly, voting rights. The ability of our board of directors to issue preferred stock also could have the effect of discouraging unsolicited acquisition proposals, thus adversely affecting the market price of our common stock.

In addition, Delaware law makes it difficult for stockholders that recently have acquired a large interest in a corporation to cause the merger or acquisition of the corporation against the directors' wishes. Under Section 203 of the Delaware General Corporation

Law, a Delaware corporation may not engage in any merger or other business combination with an interested stockholder for a period of three years following the date that the stockholder became an interested stockholder except in limited circumstances, including by approval of the corporation's board of directors.

Item 1B. Unresolved Staff Comments.

None.

Item 2. Properties.

Our corporate and executive offices are in located in leased facilities in Austin, Texas and Cambridge, Massachusetts. The Austin lease expires on April 30, 2019. We are currently negotiating a renewal of the lease. The Cambridge lease is month-to-month. We believe our current facilities and those that we believe are available to us are sufficient to meet our current needs and that suitable space will be available as and when needed. We do not own any real property.

Item 3. Legal Proceedings.

We are not subject to any litigation.

In October 2017, we received an informal demand from a former financial advisor, claiming that it is entitled to a warrant to purchase shares of common stock equal to three percent of our outstanding shares as of December 1, 2015, with "piggyback" registration rights. We believe this asserted claim lacks merit, and we intend to defend the claim vigorously. We have not reflected any expense or any effect on our capitalization or otherwise related to this demand because it is not yet possible to determine whether any effect is probable or reasonably estimable.

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 began trading on the NASDAQ Capital Market under the symbol "GNPX" on March 29, 2018. Prior to that date, there was no public trading market for our common stock.

Holders of Record

As of March 25, 2019, there were approximately 249 stockholders of record of our common stock. 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 or by other entities.

Dividend Policy

We have never declared or paid cash dividends on our capital stock. We currently intend to retain all available funds and any future earnings for use in the operation of our business and do not anticipate paying any dividends on our common stock in the foreseeable future. Any future determination to declare dividends will be made at the discretion of our board of directors and will depend on, among other factors, our financial condition, operating results, capital requirements, contractual restrictions, general business conditions and other factors that our board of directors may deem relevant. In addition, the terms of our loan and security agreement prohibit us from paying cash dividends.

Securities Authorized for Issuance Under Our Equity Compensation Plans

Information regarding securities authorized for issuance under our equity compensation plans is incorporated herein by reference to Item 12, "Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters" of Part III of this Annual Report on Form 10-K.

Recent Sales of Unregistered Securities

During the 12 months ended December 31, 2018, we issued and sold the following unregistered securities (excluding those previously disclosed in a Quarterly Report on Form 10-Q or in a Current Report on Form 8-K) :

(1) On November 19, December 21 and December 31, 2018, we issued an aggregate of 133,167 shares of our common stock to consultants in consideration of services provided by the consultants.

(2) On November 2, 2018, we granted options to purchase an aggregate of 955,908 shares of our common stock under our 2018 Equity Incentive Plan to two of our directors and one of our employees.

The offers, sales and issuances of the securities described in paragraph (1) were deemed to be exempt from registration under the Securities Act in reliance on Section 4(2) (or Regulation D promulgated thereunder) in that the issuance of securities to the accredited investors did not involve a public offering. The recipients of securities in each of these transactions acquired the securities for investment only and not with a view to or for sale in connection with any distribution thereof and appropriate legends were affixed to the securities issued in these transactions. Each of the recipients of securities in these transactions was an accredited investor under Rule 501 of Regulation D.

The offer, sale and issuance of the securities described in paragraph (2) were deemed to be exempt from registration under the Securities Act in reliance on either Rule 701 thereunder in that the transactions were under compensatory benefit plans and contracts relating to compensation as provided under Rule 701 or Section 4(2) in that the issuance of securities to the accredited investors did not involve a public offering. The recipient of such securities was our employee and received the securities under our 2009 Plan.

Each of the recipients of securities in these transactions had adequate access, through employment, business or other relationships, to information about us.

Use of Proceeds

On December 29, 2017, our Registration Statement on Form S-1, as amended (file No. 333-219386) was declared effective by the SEC for our initial public offering of common stock. We issued 1,280,000 shares of common stock at an offering price of $5.00 per share for gross proceeds of $6.4 million. After deducting underwriting discounts, commissions and offering costs incurred by us of $1.375 million, the net proceeds from the offering were $5.025 million. The offering was completed on April 3, 2018. The lead underwriter for the offering was Network 1 Financial Securities, Inc. No offering costs were paid or are payable, directly or indirectly, to our directors or officers, to persons owning 10% or more of any class of our equity securities, or to any of our affiliates.

As of December 31, 2018, we had used all of the net proceeds received from our initial public offering, primarily in advancing Oncoprex through Phase I/II clinical trials, manufacturing pre-commercial clinical trial and preclinical study materials, conducting IND-enabling activities for Oncoprex and for working capital and general corporate purposes. There was no material change in the use of proceeds from our initial public offering from the planned use as described in our final prospectus filed with the Securities and Exchange Commission on March 29, 2018.

Purchases of Equity Securities by the Issuer and Affiliated Purchasers

None.

Item 6. Selected Financial Data.

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

The statements of operations data for the years ended December 31, 2018 and 2017 and the balance sheet data as of December 31, 2018 and 2017 are derived from our audited financial statements included elsewhere in this Annual Report on Form 10-K. Our historical results are not necessarily indicative of the results that may be expected in any future period.

	Year Ended December 31,	
	2018	2017
Statement of Operations Data:		
Revenues	$ —	$ —
Depreciation	5,885	3,242
Research and development expense	971,427	289,934
General and administrative expense	11,386,229	3,019,171
Net loss	$ (12,372,339)	$ (3,314,157)
Net loss per share—basic and diluted	$ (0.90)	$ (0.29)
Weighted average number of common shares—basic and diluted	13,771,020	11,500,032

	As of December 31,	
	2018	2017
Balance Sheet Data:		
Cash and cash equivalents	$ 8,600,918	$ 161,251
Working capital (deficit)	8,459,245	(637,390)
Total assets	9,268,956	1,259,538
Accumulated deficit	(29,824,691)	(17,452,352)
Total stockholders' equity	8,881,135	428,574

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations.

This Management's Discussion and Analysis of Financial Condition and Results of Operations ("MD&A") contains certain forward-looking statements. Historical results may not indicate future performance. Our forward-looking statements reflect our current views about future events, are based on assumptions and are subject to known and unknown risks and uncertainties that could cause actual results to differ materially from those contemplated by these statements. Factors that may cause differences between actual results and those contemplated by forward- looking statements include, but are not limited to, those discussed in "Risk Factors." We undertake no obligation to publicly update or revise any forward-looking statements, including any changes that might result from any facts, events, or circumstances after the date hereof that may bear upon forward-looking statements. Furthermore, we cannot guarantee future results, events, levels of activity, performance, or achievements.

Overview

Genprex™ is a clinical stage gene therapy company developing a new approach to treating cancer, based upon our novel proprietary technology platform, including our initial product candidate, Oncoprex™ immunogene therapy, or Oncoprex. Our platform technologies are designed to encapsulate cancer fighting genes into nanoscale hollow spheres called nanovesicles, which are then administered intravenously and taken up by tumor cells where they express proteins that are missing or found in low quantities and modulate the immune environment to restore defective cancer fighting functions. We hold an exclusive worldwide license from The University of Texas MD Anderson Cancer Center, or MD Anderson, to patents covering the therapeutic use of a series of genes that have been shown in preclinical and clinical research to have cancer fighting properties. Researchers at MD Anderson have conducted a Phase I clinical trial and the Phase I portion of a Phase I/II clinical trial and are conducting the Phase II portion of that Phase I/II clinical trial in non-small cell lung cancer, or NSCLC. MD Anderson researchers have collaborated with other researchers to identify other genes, such as those in the 3p21.3 chromosomal region, that may act as tumor suppressors or have other cancer fighting functions. Data from preclinical studies performed by others suggest that product candidates that could be derived from our technology platform could be effective against other types of cancer, including breast, head and neck, renal cell (kidney), and soft tissue cancer, as well as NSCLC. Therefore, our platform technologies may allow delivery of a number of cancer fighting genes, alone or in combination with other cancer therapies, to combat multiple types of cancer.

On April 3, 2018, we completed our initial public offering, in which we sold an aggregate of 1,280,000 shares of our common stock at $5.00 per share, resulting in net proceeds of $5.025 million after underwriting discounts, commissions, and offering expenses. On May 9, 2018, we completed a private placement, in which we sold an aggregate of 828,500 shares of our common stock at $12.07 per share, resulting in net proceeds of $9.250 million after underwriting discounts, commissions, and offering expenses.

JOBS Act and Recent Accounting Pronouncements

The JOBS Act, enacted in 2012, provides that an "emerging growth company" can take advantage of the extended transition period provided in Section 7(a)(2)(B) of the Securities Act of 1933, as amended, for complying with new or revised accounting standards. In other words, an "emerging growth company" can delay the adoption of certain accounting standards until those standards would otherwise apply to private companies. We have irrevocably elected not to avail ourselves of this extended transition period and, as a result, we will adopt new or revised accounting standards on the relevant dates on which adoption of such standards is required for other public companies.

We have implemented all new accounting pronouncements that are in effect and may affect our financial statements and we do not believe that there are any other new accounting pronouncements that have been issued that would have a material impact on our financial position or results of operations.

Critical Accounting Policies and Significant Judgments and Estimates

Our financial statements have been prepared in accordance with generally accepted accounting principles in the United States, or GAAP. The preparation of these financial statements requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements, as well as the reported expenses incurred during the reporting periods. Our estimates are based on our historical experience and on various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions.

We believe that the following accounting policies are the most critical to aid in fully understanding and evaluating our reported financial results, and they require our most difficult, subjective or complex judgments, resulting from the need to make estimates about the effect of matters that are inherently uncertain**.**

Research and Development Costs

We record accrued expenses for costs invoiced from research and development activities conducted, on our behalf, by third-party service providers, which include the conduct of pre-clinical studies and clinical trials and use of contract research and manufacturing activities. We record the costs of research and development activities based upon the amount of services provided, and we include these costs in accrued liabilities in the balance sheets and within research and development expense in the statement of operations. These costs are a significant component of our research and development expenses.

We estimate the amount of work completed through discussions with internal personnel and external service providers as to the progress or stage of completion of the services and the agreed-upon fee to be paid for such services. We make significant judgments and estimates in determining the accrued balance in each reporting period. As actual costs become known, we adjust our accrued estimates. Although we do not expect our estimates to be materially different from amounts actually incurred, our understanding of the status and timing of services performed, the number of patients enrolled and the rate of patient enrollment may vary from our estimates and could result in us reporting amounts that are too high or too low in any particular period. Our accrued expenses are dependent, in part, upon the receipt of timely and accurate reporting from clinical research organizations and other third-party service providers. To date, there have been no material differences from our accrued expenses to actual expenses.

Income Taxes

Deferred tax assets or liabilities are recorded for temporary differences between financial statement and tax basis of assets and liabilities, using enacted rates in effect for the year in which the differences are expected to reverse. A valuation allowance is recorded if it is more likely than not that a deferred tax asset will not be realized. We have provided a full valuation allowance on our deferred tax assets, which primarily consist of cumulative net operating losses from April 1, 2009 (inception) to December 31, 2018. Due to our history of operating losses since inception and losses expected to be incurred in the foreseeable future, a full valuation allowance was considered necessary.

Impairment of Long-Lived Assets

Management reviews long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying amount may not be realizable or at a minimum annually during the fourth quarter of the year. If an evaluation is required, the estimated future undiscounted cash flows associated with the asset are compared to the asset's carrying value to determine if an impairment of such asset is necessary. The effect of any impairment would be to expense the difference between the fair value of such asset and its carrying value.

Components of our Results of Operations and Financial Condition

Operating expenses

We classify our operating expenses into three categories: research and development, general and administrative, and depreciation.

Research and development. Research and development expenses consist primarily of:

- costs incurred to conduct research, such as the discovery and development of our current and potential product candidates;
- costs related to production and storage of clinical supplies, including fees paid to contract manufacturers, manufacturing consultants, and cold-storage facilities;
- fees paid to clinical consultants, clinical trial sites and vendors, including clinical research organizations in conjunction with implementing and monitoring our clinical trials and acquiring and evaluating clinical trial data, including all related fees, such as patient screening fees, laboratory work, and statistical compilation and analysis; and
- costs related to compliance with drug development regulatory requirements.

We recognize all research and development costs as they are incurred. Clinical trial costs, contract manufacturing and other development costs incurred by third parties are expensed as the contracted work is performed.

We expect our research and development expenses to increase in the future as we advance our current and potential product candidates into and through clinical trials and pursue regulatory approval of our current and potential product candidates in the United States and Europe. The process of conducting the necessary clinical research to obtain regulatory approval is costly and time-consuming. The actual probability of success for our current and potential product candidates may be affected by a variety of factors

including the quality of our current and potential product candidates, early clinical data, investment in our clinical program, competition, manufacturing capability and commercial viability. We may never succeed in achieving regulatory approval for any of our current and potential product candidates. As a result of the uncertainties discussed above, we are unable to determine the duration and completion costs of our research and development projects or when and to what extent we will generate revenue from the commercialization and sale of our current and potential product candidates.

General and administrative. General and administrative expense consists of personnel related costs, which include salaries, as well as the costs of professional services, such as accounting and legal, travel, facilities, information technology and other administrative expenses. We expect our general and administrative expense to increase in future periods due to the anticipated growth of our business and related infrastructure as well as accounting, insurance, investor relations, and other costs associated with being a public company.

Depreciation. Depreciation expense consists of depreciation on our property and equipment. We depreciate our assets over their estimated useful life. We estimate computer and office equipment to have a 5-year life.

Results of Operations

Comparison of the Years Ended December 31, 2018 and 2017

The following summarizes our results of operations for the years ended December 31, 2018 and 2017.

Research and Development Expense. Research and development expense consists primarily of the discovery and development of our current and potential product candidates; costs related to production of clinical supplies, including fees paid to contract manufacturers, fees paid to clinical consultants, clinical trial sites and vendors, including clinical research organizations in conjunction with implementing and monitoring our clinical trials and acquiring and evaluating clinical trial data; and costs related to compliance with drug development regulatory requirements.

Research and development expense was $971,427 for the year ended December 31, 2018 as compared to $289,934 for the year ended December 31, 2017. This increase of $681,493 was due to the Company's focus on improving clinical strategies, expanding research activities, refining existing manufacturing processes, and developing new manufacturing and logistics processes to support future research and development activities.

We expect research and development expense to increase in future periods as we expand our clinical programs to a greater number of sites and our research programs to include new therapy combinations.

General and Administrative Expense. General and administrative expense primarily consists of personnel costs, travel, information technology, facilities, and professional service fees. Professional services fees primarily consist of legal, accounting and consulting costs.

General and administrative expense for the year ended December 31, 2018 was $11,386,229 as compared to $3,019,171 for the year ended December 31, 2017. The $8,367,058 increase in general and administrative expense is related primarily to a larger than normal equity-based compensation amount issued in 2018 to recruit and retain executive leadership, board members, and technical experts to our team. Excluding this expense, an increase of $4,225,568 for the year ended December 31, 2018 versus December 31, 2017 was primarily due to increased headcount, associated office space and employee-related expenses, and expenses related to the Company's initial public offering and private placement.

Interest Income. Interest income was $29,184 and $80 for the years ended December 31, 2018 and 2017, respectively. This increase of $29,104 was entirely due to utilization of money market instruments in the year ended December 31, 2018.

Interest Expense. Interest expense was $37,982 and $1,890 for the years ended December 31, 2018 and 2017, respectively. This increase of $36,092 was entirely due to increase in utilization of debt in 2018 as we prepared for our initial public offering.

Depreciation Expense. Depreciation expense was $5,885 and $3,242 for the years ended December 31, 2018 and 2017, respectively. Depreciation is generated from our fixed assets, which consist only of computer equipment at this time. The increase of $2,643 in depreciation is due to additional equipment purchased and utilized by new employees during the year ended in December 31, 2018.

Liquidity and Capital Resources

From our inception through December 31, 2018, we have never generated revenue from product sales and have incurred net losses in each year since inception. As of December 31, 2018, we had an accumulated deficit of $29,824,691. Prior to our initial public offering, we funded our operations primarily through the sale and issuance of preferred stock. In connection with our initial public offering, we converted all preferred stock to common stock and forward-split the common stock on a 6.6841954-to-1 basis. During 2017, we sold 22,473 shares of Series G preferred stock at $35.33 per share or 150,211 shares of common stock at $5.29 per share taking into account the conversion and forward-split, for a total of $793,971.

On April 3, 2018, we completed our initial public offering, whereby we sold 1,280,000 shares of common stock for net proceeds of $5,025,000. On May 9, 2018, we completed a private placement whereby we sold 828,500 shares of common stock for net proceeds of $9,250,000 and issued warrants to purchase shares of common stock. On August 1, 2018, pursuit to the terms of the private placement purchase agreement, we issued to the original investors of the private placement an aggregate of 1,174,440 additional shares of our common stock.

As of December 31, 2018, we had $8,600,918 in cash.

We believe the net proceeds of our recent public offering, together with the cash at December 31, 2018, will be sufficient to meet our cash, operational and liquidity requirements for at least 15 months.

We do not expect to generate revenue from product sales unless and until we successfully complete development of, obtain regulatory approval for and begin to commercialize one or more of our current and potential product candidates, which we expect will take a number of years and which is subject to significant uncertainty. Accordingly, we anticipate that we will need to raise additional capital to fund our future operations. Until such time as we can generate substantial revenue from product sales, if ever, we expect to finance our operating activities through a combination of equity offerings and debt financings and we may seek to raise additional capital through strategic collaborations. However, we may be unable to raise additional funds or enter into such arrangements when needed on favorable terms, or at all, which would have a negative impact on our financial condition and could force us to delay, limit, reduce or terminate our development programs or commercialization efforts or grant to others rights to develop or market product candidates that we would otherwise prefer to develop and market ourselves. Failure to receive additional funding could cause us to cease operations, in part or in full. Furthermore, even if we believe we have sufficient funds for our current or future operating plans, we may seek additional capital due to favorable market conditions or strategic considerations.

The following table sets forth the primary sources and uses of cash for the years ended December 31, 2018 and 2017:

	Years Ended December 31,	
	2018	2017
Net cash used in operating activities	$ (6,846,534)	$ (2,171,594)
Net cashed used in investing activities	(103,317)	(63,421)
Net cash provided by financing activities	15,389,518	793,971
Net increase (decrease) in cash	8,439,667	(1,441,044)

Cash used in operating activities

Net cash used in operating activities was $6,846,534 and $2,171,594 for the years ended December 31, 2018 and 2017, respectively. The $4,674,940 increase in net cash used in operating activities was primarily due to increased general and administrative and research and development expenses in 2018 to support increased operations during the year..

Cash used in investing activities

Net cash used in investing activities was $103,317 and $63,421 for the years ended December 31, 2018 and 2017, respectively. The increase in net cash used in investing activities of $39,896 was due to increased patent prosecution expenses necessary to protect our intellectual property and greater spending on computer equipment used by employees during the year ended December 31, 2018.

Cash provided by financing activities

Net cash provided by financing activities was $15,389,518 and $793,971 for the years ended December 31, 2018 and 2017, respectively. The increase of $14,595,547 in net cash provided by financing activities was due to the Company’s initial public offering and private placement.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk.

The primary objective of our investment activities is to preserve our capital to fund our operations. We also seek to maximize income from our investments without assuming significant risk. To achieve our objectives, we maintain a portfolio of cash equivalents and investments in securities of high credit quality. As of December 31, 2018, we had cash of $8,600,918 consisting of cash and investments in money market funds. A significant portion of our investments may be subject to interest rate risk and could fall in value if market interest rates increase. However, because our investments are primarily short-term in duration, we believe that our exposure to interest rate risk is not significant and a 1% movement in market interest rates would not have a significant impact on the total value of our portfolio. We actively monitor changes in interest rates.

Item 8. Financial Statements and Supplementary Data.

The financial statements and supplementary data required by this item are included after Part IV of this Annual Report on Form 10-K beginning on page F-1.

Item 9. Changes in and Disagreements With Accountants on Accounting and Financial Disclosure.

None.

Item 9A. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures

As required by Rules 13a-15(b) and 15d-15(b) of the Exchange Act, our management with the participation of our Chief Executive Officer and our Chief Financial Officer, evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2018. The term "disclosure controls and procedures" as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act, means controls and other procedures of a company that are designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC's rules and forms. Disclosure controls and procedures include, without limitation, controls and procedures designed to ensure that information required to be disclosed by a company in the reports that it files or submits under the Exchange Act is accumulated and communicated to the company's management, including its principal executive and principal financial officer, as appropriate to allow timely decisions regarding required disclosure. Management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives, and management necessarily applies its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on the evaluation of our disclosure controls and procedures as of December 31, 2018, our Chief Executive Officer and our Chief Financial Officer concluded that, as of such date, our disclosure controls and procedures were effective at the reasonable assurance level.

Management's Report on Internal Control over Financial Reporting

Our principal executive officer and our principal accounting and financial officer are responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Exchange Act Rules 13a-15(f). Management conducted an assessment of the effectiveness of our internal control over financial reporting as of December 31, 2018. In making this assessment, management used the criteria described in Internal Control-Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Our management concluded that our internal controls over financial reporting were, and continue to be, ineffective as of December 31, 2018 due to a material weakness in our internal controls due to the lack of segregation of duties.

It should be noted that any system of controls, however well designed and operated, can provide only reasonable and not absolute assurance that the objectives of the system are met. In addition, the design of any control system is based in part upon certain assumptions about the likelihood of certain events. Because of these and other inherent limitations of control systems, there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions, regardless of how remote.

In light of the material weakness described below, we performed additional analysis and other post-closing procedures to ensure our financial statements were prepared in accordance with generally accepted accounting principles. Accordingly, we believe that the financial statements included in this report fairly present, in all material respects, our financial condition, results of operations and cash flows for the periods presented.

During the last quarter of fiscal 2018 and as our operational activities increased, management determined and continues to determine that it does not have sufficient segregation of duties within its accounting functions, which is a basic internal control. Due to our size and nature, segregation of all conflicting duties may not always be possible and may not be economically feasible. However, to the extent possible, the initiation of transactions, the custody of assets and the recording of transactions should be performed by separate individuals. Management evaluated the impact of our failure to maintain effective segregation of duties on our assessment of our internal control over financial reporting and has concluded that the control deficiency represents a material weakness. Management intends to further increase its accounting staff and enhance its system of financial accounting and reporting, as soon as economically feasible and sustainable, to remediate this material weakness.

Changes in Internal Control over Financial Reporting

There were no changes in our internal control over financial reporting that occurred during the year ended December 31, 2018 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Inherent Limitations of Disclosure Controls and Internal Control over Financial Reporting

Because of their inherent limitations, our disclosure controls and procedures and our internal control over financial reporting may not prevent material errors or fraud. A control system, no matter how well conceived and operated, can provide only reasonable, not absolute, assurance that the objectives of the control system are met. The effectiveness of our disclosure controls and procedures and our internal control over financial reporting is subject to risks, including that the controls may become inadequate because of changes in conditions or that the degree of compliance with our policies or procedures may deteriorate.

Item 9B. Other Information.

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

The information required by this item and not set forth below will be contained in our definitive proxy statement to be filed with the Securities and Exchange Commission in connection with our 2019 Annual Meeting of Stockholders, or the Proxy Statement, which is expected to be filed not later than 120 days after the end of our fiscal year ended December 31, 2018, and is incorporated herein by reference.

We have adopted a written Code of Business Conduct and Ethics, or Ethics Code, that applies to all officers, directors and employees, including our principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions. The Ethics Code is available on our website at www.genprex.com. If we make any substantive amendments to the Ethics Code or grant any waiver from a provision of the Ethics Code to any executive officer or director, we will promptly disclose the nature of the amendment or waiver on our website or in a current report on Form 8-K.

Item 11. Executive Compensation.

The information required by this item will be set forth in the Proxy Statement and is incorporated herein by reference.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.

The information required by this item will be set forth in the Proxy Statement and is incorporated herein by reference.

Item 13. Certain Relationships and Related Transactions, and Director Independence.

The information required by this item will be set forth in the Proxy Statement and is incorporated herein by reference.

Item 14. Principal Accounting Fees and Services.

The information required by this item will be set forth in the Proxy Statement and is incorporated herein by reference.

PART IV

Item 15. Exhibits, Financial Statement Schedules.

(a)(1) Financial statements.

The financial statements and supplementary data required by this item begin on page F-1.

(a)(2) Financial Statement Schedules.

All schedules are omitted because the required information is inapplicable or the information is presented in the financial statements and the related notes.

(a)(3) Exhibits.

EXHIBIT INDEX

Exhibit Number	Description of Exhibit
3.1	Amended and Restated Certificate of Incorporation of the Registrant, incorporated by reference to Exhibit 3.1 of the Registrant's Current Report on Form 8-K filed on April 10, 2018.
3.2	Amended and Restated Bylaws of the Registrant, incorporated by reference to Exhibit 3.2 of the Registrant's Current Report on Form 8-K filed on April 10, 2018.
4.1	Form of Common Stock Certificate of the Registrant, incorporated by reference to Exhibit 4.1 of the Registrant's Registration Statement on Form S-1 (File No. 333-219386), as amended, originally filed on July 21, 2017.
4.2	Texas Emerging Technology Fund Award and Security Agreement dated August 13, 2010 by and between the Registrant and The State of Texas, incorporated by reference to Exhibit 4.2 of the Registrant's Registration Statement on Form S-1 (File No. 333-219386, as amended, originally filed on July 21, 2017.
4.3	Investment Unit, dated August 13, 2010, issued to the State of Texas, incorporated by reference to Exhibit 4.3 of the Registrant's Registration Statement on Form S-1 (File No. 333-219386), as amended, originally filed on July 21, 2017.
4.4	Warrant Agreement, dated December 17, 2015, issued to DABS Advanced Biotech Solutions, LLC, incorporated by reference to Exhibit 4.4 of the Registrant's Registration Statement on Form S-1 (File No. 333-219386), as amended, originally filed on July 21, 2017.
4.5	Warrant Agreement, dated December 17, 2015, issued to DABS Advanced Biotech Solutions, LLC, incorporated by reference to Exhibit 4.5 of the Registrant's Registration Statement on Form S-1 (File No. 333-219386), as amended, originally filed on July 21, 2017.
4.6	Warrant Agreement, dated November 3, 2016, issued to Viet Ly, incorporated by reference to Exhibit 4.6 of the Registrant's Registration Statement on Form S-1 (File No. 333-219386), as amended, originally filed on July 21, 2017.
4.7	Form of Underwriter's Warrant Agreement, incorporated by reference to Exhibit 4.7 of the Registrant's Registration Statement on Form S-1 (File No. 333-219386), as amended, originally filed on July 21, 2017.
4.8	Form of Warrant, incorporated by reference to Exhibit 4.1 of the Registrant's Current Report on Form 8-K filed on May 10, 2018.
4.9	Warrant Agreement, dated July 27, 2018, issued to Cancer Revolution, LLC, incorporated by reference to Exhibit 4.1 of the Registrant's Current Report on Form 8-K filed on August 6, 2018.
4.10	Warrant Agreement, dated July 27, 2018, issued to Inception Capital Management, LLC, incorporated by reference to Exhibit 4.1 of the Registrant's Current Report on Form 8-K filed on August 6, 2018.
4.11	Warrant Agreement, dated July 27, 2018, issued to Cancer Biotech, LLC, incorporated by reference to Exhibit 4.1 of the Registrant's Current Report on Form 8-K filed on August 6, 2018.
10.1+	Form of Indemnity Agreement by and between the Registrant and its directors and officers, incorporated by reference to Exhibit 10.1 of the Registrant's Registration Statement on Form S-1 (File No. 333-219386), as amended, originally filed on July 21, 2017.
10.2+	Registrant's 2009 Equity Incentive Plan and Forms of Grant Notices and Agreements thereunder, incorporated by reference to Exhibit 10.2 of the Registrant's Registration Statement on Form S-1 (File No. 333-219386), as amended, originally filed on July 21, 2017.
10.3+	Genprex, Inc. 2018 Equity Incentive Plan and Forms of Stock Option Grant Notice, Option Agreement and Notice of Exercise thereunder, incorporated by reference to Exhibit 10.3 of the Registrant's Annual Report on Form 10-K filed April 17, 2018.
10.4+	Genprex, Inc. 2018 Employee Stock Purchase Plan, incorporated by reference to Exhibit 10.4 of the Registrant's Annual Report on Form 10-K filed April 17, 2018.
10.5+	Genprex, Inc. Non-Employee Director Compensation Policy, incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed on November 8, 2018.

Exhibit Number	Description of Exhibit
10.6	Patent and Technology License Agreement dated effective July 20, 1994, by and between the Board of Regents of the University of Texas System, The University of Texas M.D. Anderson Cancer Center and Intron Therapeutics, Inc., incorporated by reference to Exhibit 10.6 of the Registrant's Registration Statement on Form S-1 (File No. 333-219386), as amended, originally filed on July 21, 2017.
10.7	Amendment No. 3 to Patent and Technology License Agreement dated October 4, 2001, incorporated by reference to Exhibit 10.7 of the Registrant's Registration Statement on Form S-1 (File No. 333-219386), as amended, originally filed on July 21, 2017.
10.8	Technology Sublicense Agreement effective March 7, 2007, by and between Introgen Therapeutics, Inc., and Introgen Research Institute, Inc., incorporated by reference to Exhibit 10.8 of the Registrant's Registration Statement on Form S-1 (File No. 333-219386), as amended, originally filed on July 21, 2017.
10.9	Assignment and Collaboration Agreement effective April 13, 2009, by and between Gensolve, Inc. and the Registrant, incorporated by reference to Exhibit 10.9 of the Registrant's Registration Statement on Form S-1 (File No. 333-219386), as amended, originally filed on July 21, 2017.
10.10	Technology License Agreement dated as of February 26, 2010, by and between Introgen Research Institute, Inc. and P53, Inc., incorporated by reference to Exhibit 10.10 of the Registrant's Registration Statement on Form S-1 (File No. 333-219386), as amended, originally filed on July 21, 2017.
10.11	Technology Sublicense Agreement effective June 1, 2011, by and between the Registrant and Introgen Research Institute, Inc., incorporated by reference to Exhibit 10.12 of the Registrant's Registration Statement on Form S-1 (File No. 333-219386), as amended, originally filed on July 21, 2017.
10.12	Amended Collaboration and Assignment Agreement effective July 1, 2011, by and between Introgen Research Institute, Inc. and the Registrant, incorporated by reference to Exhibit 10.13 of the Registrant's Registration Statement on Form S-1 (File No. 333-219386), as amended, originally filed on July 21, 2017.
10.13	Clinical Study Agreement dated February 10, 2014, by and between The University of Texas M.D. Anderson Cancer Center and the Registrant, incorporated by reference to Exhibit 10.14 of the Registrant's Registration Statement on Form S-1 (File No. 333-219386), as amended, originally filed on July 21, 2017.
10.14	Amendment No. 1 to Clinical Study Agreement dated June 25, 2015, incorporated by reference to Exhibit 10.15 of the Registrant's Registration Statement on Form S-1 (File No. 333-219386), as amended, originally filed on July 21, 2017.
10.15+	Amended and Restated Executive Employment Agreement, dated May 23, 2018, by and between the Registrant and Julien L. Pham, M.D., M.P.H., incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed on May 30, 2018.
10.16+	Executive Employment Agreement dated April 13, 2018, by and between the Registrant and Rodney Varner, incorporated by reference to Exhibit 10.16 of the Registrant's Annual Report on Form 10-K filed on April 17, 2018.
10.17+	Executive Employment Agreement dated April 13, 2018, by and between the Registrant and Ryan Confer, incorporated by reference to Exhibit 10.17 of the Registrant's Annual Report on Form 10-K filed on April 17, 2018.
10.18	Master Service Agreement dated March 9, 2018, by and between the Registrant and World Wide Holdings, LLC d/b/a Invictus Resources, incorporated by reference to Exhibit 10.22 of the Registrant's Registration Statement on Form S-1 (File No. 333-219386), as amended, originally filed on July 21, 2017.
10.19	Securities Purchase Agreement dated as of May 6, 2018, by and between the Registrant and the persons named on the signature pages thereto, incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed on May 10, 2018.
10.20	Form of Registration Rights Agreement, incorporated by reference to Exhibit 10.1 of the Registrant's Current Report on Form 8-K filed on May 10, 2018.
10.21+	Consulting Agreement, dated August 13, 2018, by and between the Registrant and Viet Ly, incorporated by reference to Exhibit 10.1 of the Registrant's Quarterly Report on Form 10-Q filed on August 14, 2018.
23.1*	Consent of Independent Registered Public Accounting Firm.
31.1*	Certification of Principal Executive Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.

Exhibit Number	Description of Exhibit
31.2*	Certification of Principal Financial Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.
32.1*	Certification of Principal Executive Officer and Principal Financial Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101.INS*	XBRL Instance document.
101.SCH*	XBRL Taxonomy Extension Schema Document.
101.CAL*	XBRL Taxonomy Extension Calculation Linkbase Document.
101.DEF*	XBRL Taxonomy Extension Definition Linkbase Document
101.LAB*	XBRL Taxonomy Extension Label Linkbase Document
101.PRE*	XBRL Taxonomy Extension Presentation Document

* Filed herewith.
\+ Indicates management contract or compensatory plan.

Item 16. Form 10–K Summary.

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, as amended, the registrant has duly caused this annual report on Form 10-K to be signed on its behalf by the undersigned, thereunto duly authorized**.**

GENPREX, INC.

Date: March 29, 2019

By: /s/ J. Rodney Varner
J. Rodney Varner
Chief Executive Officer
(Principal Executive Officer)

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below constitutes and appoints J. Rodney Varner and Ryan M. Confer as his or her true and lawful attorneys-in-fact, each with full power of substitution, for him or her in any and all capacities, to sign any amendments to this Annual Report on Form 10-K and to file the same, with exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, hereby ratifying and confirming all that each of said attorneys-in-fact or their substitute or substitutes may do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Exchange Act of 1934, as amended, this report has been signed below by the following persons on behalf of the registrant in the capacities and on the dates indicated.

Signature	Title	Date
/s/ J. Rodney Varner **J. Rodney Varner**	Chief Executive Officer and Member of the Board of Directors *(Principal Executive Officer)*	March 29, 2019
/s/ Ryan M. Confer **Ryan M. Confer**	Chief Financial Officer *(Principal Financial and Accounting Officer)*	March 29, 2019
/s/ John N. Bonfiglio, PhD **John N. Bonfiglio, PhD**	Member of the Board of Directors	March 29, 2019
/s/ David E. Friedman **David E. Friedman**	Member of the Board of Directors	March 29, 2019
/s/ Robert W. Pearson **Robert W. Pearson**	Member of the Board of Directors	March 29, 2019

INDEX TO FINANCIAL STATEMENTS

Report of Independent Registered Public Accounting Firm

To the Board of Directors and
Stockholders of Genprex, Inc.
Austin, Texas

Opinion on the Financial Statements
We have audited the accompanying balance sheets of Genprex, Inc. (the "Company") at December 31, 2018 and 2017, and the related statements of operations, changes in stockholders' equity, and cash flows for each of the years in the two-year period ended December 31, 2018, and the related notes (collectively referred to as the financial statements). In our opinion, the financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the years in the two-year period ended December 31, 2018, in conformity with accounting principles generally accepted in the United States of America.

Basis for Opinion
These financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits, we are required to obtain an understanding of internal control over financial reporting, but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Daszkal Bolton LLP

We have served as the Company's auditor since 2014.

Boca Raton, FL
March 29, 2019

Genprex, Inc.

Balance Sheets

	2018	2017
Assets		
Current assets:		
Cash	$ 8,600,918	$ 161,251
Accounts receivable	9,297	8,844
Prepaid expenses and other	236,851	23,479
Total current assets	8,847,066	193,574
Property and equipment, net	24,354	7,804
Other assets:		
Deferred offering costs	-	759,591
Security deposits	18,085	-
Intellectual property, net	379,451	298,569
Total other assets	397,536	1,058,160
Total assets	$ 9,268,956	$ 1,259,538
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable and accrued expenses	$ 295,069	$ 629,074
Other current liabilities	92,752	201,890
Total current liabilities	387,821	830,964
Investment unit	—	—
Commitments and contingencies		
Stockholders' equity:		
Common stock $0.001 par value: 200,000,000 shares authorized; 15,239,148 and 11,721,584 shares issued and outstanding, respectively	15,240	11,721
Additional paid-in capital	38,690,586	17,869,205
Accumulated deficit	(29,824,691)	(17,452,352)
Total stockholders' equity	8,881,135	428,574
Total liabilities and stockholders' equity	$ 9,268,956	$ 1,259,538

See accompanying notes to the financial statements

Genprex, Inc.

Statements of Operations

	Year Ended December 31,	
	2018	2017
Revenues	$ —	$ —
Cost and expenses:		
Depreciation	5,885	3,242
Research and development	971,427	289,934
General and administrative	11,386,229	3,019,171
Total costs and expenses	12,363,541	3,312,347
Operating loss	(12,363,541)	(3,312,347)
Other income (expense):		
Interest income	29,184	80
Interest expense	(37,982)	(1,890)
Other expense	(8,798)	(1,810)
Net loss	$ (12,372,339)	$ (3,314,157)
Net loss per share	(0.90)	(0.29)
Weighted average number of shares		
Weighted average number of common shares (basic and diluted)	13,771,020	11,500,032

See accompanying notes to the financial statements

Genprex, Inc.

Statements of Changes in Stockholders' Equity

	Common Stock		Preferred Stock				
	Shares	Amount	Shares	Amount	Additional Paid-In Capital	Accumulated Deficit	Total
Balance at December 31, 2016	11,364,167	$ 11,364	—	$ —	$15,751,699	$(14,138,195)	$ 1,624,868
Issuance of stock for cash	150,211	150	—	—	793,821	—	793,971
Issuance of stock for services	207,206	207	—	—	1,095,023	—	1,095,230
Share based compensation	—	—	—	—	228,662	—	228,662
Net loss	—	—	—	—	—	(3,314,157)	(3,314,157)
Balance at December 31, 2017	11,721,584	$ 11,721	—	$ —	$17,869,205	$(17,452,352)	$ 428,574
Issuance of stock for cash	3,282,940	3,284	—	—	15,386,234	—	15,389,518
Issuance of stock for services	234,624	235	—	—	553,068	—	553,303
Share based compensation	—	—	—	—	4,882,079	—	4,882,079
Net loss	—	—	—	—	—	(12,372,339)	(12,372,339)
Balance at December 31, 2018	15,239,148	$ 15,240	—	$ —	$38,690,586	$(29,824,691)	$ 8,881,135

See accompanying notes to the financial statements

Genprex, Inc.

Statements of Cash Flows

	2018	2017
Cash flows from operating activities:		
Net loss	$ (12,372,339)	$ (3,314,157)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation	5,885	3,242
Share based compensation	5,435,382	1,323,892
Changes in operating assets and liabilities:		
Accounts receivable	(453)	(663)
Prepaid expenses and other	(213,372)	4,873
Deposits	(18,085)	—
Deferred offering costs	759,591	(734,084)
Accounts payable and accrued expenses	(443,143)	545,303
Net cash used in operating activities	(6,846,534)	(2,171,594)
Cash flows from investing activities:		
Additions to property and equipment	(22,435)	(5,889)
Additions to intellectual property	(80,882)	(57,532)
Net cash used in investing activities	(103,317)	(63,421)
Cash flows from financing activities:		
Proceeds from issuances of common stock	15,389,518	793,971
Net cash provided by financing activities	15,389,518	793,971
Net increase (decrease) in cash	8,439,667	(1,441,044)
Cash, beginning of year	161,251	1,602,295
Cash, end of year	$ 8,600,918	$ 161,251

See accompanying notes to the financial statements

Note 1 – Description of Business and Basis of Presentation

Genprex, Inc. ("we" or "the Company"), is a clinical stage gene therapy company developing a new approach to treating cancer, based upon a novel proprietary technology platform, including our initial product candidate, Oncoprex immunogene therapy for non-small cell lung cancer (NSCLC). Our platform technologies are designed to administer cancer fighting genes by encapsulating them into nanoscale hollow spheres called nanovesicles, which are then administered intravenously and taken up by tumor cells where they express proteins that are missing or found in low quantities. Oncoprex has a multimodal mechanism of action whereby it interrupts cell signaling pathways that cause replication and proliferation of cancer cells, re-establishes pathways for apoptosis, or programmed cell death, in cancer cells, and modulates the immune response against cancer cells. Oncoprex has also been shown to block mechanisms that create drug resistance.

We are subject to all the risks inherent in a start-up company in the biopharmaceutical industry. The biopharmaceutical industry is subject to rapid and technological change. We have numerous competitors, including major pharmaceutical and chemical companies, specialized biotechnology firms, universities and other research institutions. These competitors may succeed in developing technologies and products that are more effective than any that are being developed by us or that would render our technology and products obsolete and noncompetitive. Many of these competitors have substantially greater financial and technical resources than us. In addition, many of our competitors have significantly greater experience than us in pre-clinical testing and human clinical trials of new or improved pharmaceutical products and in obtaining Food and Drug Administration (“FDA”) and other regulatory approvals on products for use in health care.

Capital Requirements, Liquidity and Going Concern Considerations

Our financial statements are prepared using the generally accepted accounting principles applicable to a going concern, which contemplates the realization of assets and liquidation of liabilities in the normal course of business. However, as shown in the accompanying financial statements, we have sustained substantial losses from operations since inception and have no current source of revenue. In addition, we have used, rather than provided, cash in our operations. We expect to continue to incur significant expenditures to further clinical trials for the commercial development of our patents.

Management recognizes that we must obtain additional resources to successfully commercialize our intellectual property. To date, we have received funding in the form of equity and debt, and we plan to seek additional funding in the future. However, no assurances can be given that we will be successful in raising additional capital. If we are not able to timely and successfully raise additional capital, the timing of our clinical trials, financial condition and results of operations will continue to be materially affected. These financial statements do not include any adjustments relating to the recoverability and classification of recorded asset amounts and classification of liabilities.

Note 2 – Summary of Significant Accounting Policies

The accompanying audited financial statements have been prepared in accordance with U.S. generally accepted accounting principles (“GAAP”) and reflect all adjustments, which are of a normal and recurring nature, that are, in the opinion of management, necessary for a fair presentation of our financial position and results of operations for the related periods. The results of operations for any interim periods are not necessarily indicative of results to be expected for the full year. A summary of our significant accounting policies consistently applied in the preparation of the accompanying financial statements follows.

Capital Stock

In connection with the Company’s completed IPO (see Subsequent Events Note) in April 2018, all of the Company’s Preferred Stock and Non-Voting Common Stock were converted into shares of the Company’s Common Stock. The Company’s Common Stock was then forward-split at a ratio of 6.6841954-to-1. Furthermore, prior to the closing of the IPO, the Company’s Certificate of Incorporation was amended and restated to provide the Company with the authority to issue up to 210,000,000 shares of stock consisting of 200,000,000 shares of Common Stock at a par value of $0.001 per share and 10,000,000 shares of Preferred Stock at a par value of $0.001 per share.

Use of Estimates

The preparation of our financial statements in conformity with GAAP requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of expenses during the reporting period. Actual results could differ from those estimates.

Cash

We consider all highly liquid short-term investments with an initial maturity of three months or less to be cash equivalents. Any amounts of cash in financial institutions which exceed FDIC insured limits expose us to cash concentration risk. We have no cash equivalents, and had $8,465,768 and $0 in excess of FDIC insured limits of $250,000 at December 31, 2018 and December 31, 2017 respectively.

Fair Value of Financial Instruments

The carrying amounts reported in the balance sheet for cash, accounts payable and accrued expenses approximate fair value because of the immediate or short-term maturity of these financial instruments.

ASC 820 defines fair value, provides a consistent framework for measuring fair value under GAAP and expands fair value financial statement disclosure requirements. ASC 820's valuation techniques are based on observable and unobservable inputs. Observable inputs reflect readily obtainable data from independent sources, while unobservable inputs reflect our market assumptions. ASC 820 classifies these inputs into the following hierarchy:

Level 1: Quoted prices for identical instruments in active markets.

Level 2: Quoted prices for similar instruments in active markets; quoted prices for identical or similar instruments in markets that are not active; and model-derived valuations whose inputs are observable or whose significant value drivers are observable.

Level 3: Instruments with primarily unobservable value drivers.

Property and Equipment

Furniture and equipment are stated at cost. Depreciation is calculated using the straight-line method over the estimated useful lives of the assets, which range from three to five years. Routine maintenance and repairs are charged to expense as incurred and major renovations or improvements are capitalized.

Research and Development Materials Costs

Research and development expenditures are comprised of costs incurred to conduct research and development activities. These include payments to collaborative research partners, including wages and associated employee benefits, facilities and overhead costs. These expenditures relate to Phase 1 and 2 clinical trials and are expensed as incurred. Purchased materials to be used in future research are capitalized and included in prepaid expenses.

Awards

In 2010, we were awarded $4.5 million from the State of Texas Emerging Technology Fund ("TETF"). The award was received in two tranches of $2.25 million during 2010 and 2011. The award proceeds were used for the development and future commercialization of our nanomolecular therapy product for the treatment of cancer. In consideration for the award, we provided the TETF with an "Investment Unit", consisting of (i) a Promissory Note ("Note") and (ii) a right to purchase our equity shares ("Warrant"). The funds received for this award were assigned to the Investment Unit, and classified separately from equity as "mezzanine" in the balance sheet.

In 2010, we also were awarded approximately $244,500 from the U.S. Treasury Department for our QTDP Program Nanoparticle Therapy for Lung Cancer. The award was received during 2011 for our historical activities, and required no prospective expenditures. We accounted for these funds received as revenue at that time.

Intellectual Property

Intellectual property consists of external legal and related costs associated with patents and other proprietary technology acquired, licensed by, or maintained by us that we believe contribute to a probable economic benefit toward such patents and activities. These

legal costs incurred in connection with the patent applications and patent maintenance are capitalized. Intellectual property is stated at cost, to be amortized on a straight-line basis over the estimated useful lives of the assets.

Accounting for Stock-Based Compensation

We use the fair value-based method of accounting for stock-based compensation for options granted to employees, independent consultants and contractors. We measure options granted at fair value determined as of the grant date, and recognize the expense over the periods in which the related services are rendered based on the terms and conditions of the award. Generally, where the award only has a service condition, the requisite service period is the same as the vesting period.

Financial Instruments

We have elected the Fair Value Option to account for the Investment Unit at fair value as a combined hybrid financial instrument containing a Warrant and a Note (see Investment Unit Note). Prior to its exercise, the Warrant component was not classified within equity, as the exercise price of the warrants was affected by the market price of our stock in a future qualifying financing transaction and was not considered to be indexed to our own stock. The Note is not classified within liabilities, as our management can determine the timing of the repayment obligation, if any. As a result, the Warrant and Note that comprised the Investment Unit were aggregated and classified within the mezzanine section of the balance sheet.

Due to the contingent terms of the financial instruments, changes in the fair value of the Investment Unit were calculated and realized in earnings. There were no changes in the fair value of the Investment Unit at December 31, 2018.

Long-Lived Assets

We review long-lived assets and certain identifiable intangibles held and used for possible impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. In evaluating the fair value and future benefits of its intangible assets, management performs an analysis of the anticipated undiscounted future net cash flow of the individual assets over the remaining amortization period. We recognize an impairment loss if the carrying value of the asset exceeds the expected future cash flows. During the years ended December 31, 2018 and December 31, 2017, there were no deemed impairments of our long-lived assets.

Recent Accounting Developments

Accounting pronouncements issued but not effective until after December 31, 2018 are not expected to have a significant effect on our financial condition, results of operations, or cash flows.

Note 3 – Intellectual Property

We have exclusive license agreements on thirty two (32) issued and one (1) allowed patent for technologies developed by researchers at the National Cancer Institute, The University of Texas MD Anderson Cancer Center, and The University of Texas Southwestern Medical Center. These patents comprise various therapeutic, diagnostic, technical and processing claims. These license rights will be amortized on a straight-line basis over the estimated period of useful lives of the underlying patents or the license agreements.

Note 4 – Investment Unit

The Texas Emerging Technology Fund ("TETF") was created as an incentive for economic development to the Texas economy by providing financial support that leverage private investment for the creation of high-quality technology jobs in Texas. The award received required us to comply with certain performance conditions to ensure the monies the Company received were used for development activities in the state of Texas, and that we maintained our corporate nexus in Texas. Further, in connection with the award, the Company issued an Investment Unit to the TETF. As further described below, the Investment Unit consists of a Promissory Note and a Right to Purchase:

Promissory Note

The Promissory Note is an obligation to repay the $4.5 million principal amount, with interest accrued at 8% per annum, but only if an event of default occurs prior to August 13, 2020. If no event of default occurs prior to August 13, 2020, the Promissory Note and all related interest will be cancelled.

Consistent with the stated objectives of the TETF, an event of default that would trigger the repayment obligation under the Promissory Note is our failure to maintain our principal place of business or our principal executive offices headquartered in the State of Texas (referred to as the "Residency Requirement") until August 13, 2020.

Warrant

The Warrant is an obligation to issue (a Right to purchase by the TETF) shares of the same class of stock to be issued in a "First Qualifying Financing Transaction," at 80% of the per share transaction value (effectively a 20% discount). Alternatively, the TETF could exercise its right to purchase at any time prior to the occurrence of a First Qualifying Financial Transaction for $0.001 per share.

The Warrant included a provision that required changes in the strike price, driven by the pricing of the "First Qualifying Financing Transaction." As a result, the Warrants embedded in the Investment Unit were accounted for as a derivative financial instrument and classified outside from equity under ASC 815-40-15 as the settlement adjustment from the future transaction did not permit for the strike price to be considered fixed.

On March 12, 2014, the TETF exercised its Right to Purchase for $0.001 per share, and we issued to the TETF an aggregate of 184,797 shares of our Series B preferred stock. Upon completion of the Company's IPO, the TETF's shares were converted to Common Stock and forward-split resulting in 1,235,219 shares of Common Stock.

Accounting for the Investment Unit

We accounted for the Investment Unit as a hybrid financial instrument under FASB Statement 155, and measured the Investment Unit at the amount of proceeds received from the TETF award. The First Qualifying Financial Transaction occurred during December 2013, resulting in an adjustment to the fair value of the Investment Unit in the amount of approximately $2.5 million. The TETF exercised the Warrant for $0.001 per share. We received notice of purchase from the TETF during March 2014, and issued 184,797 shares of series B Preferred Stock, which has since been converted to 1,235,219 shares of Common Stock upon completion of the Company's IPO. Upon exercise by the TETF of the Warrant, the remaining component within the Investment Unit was the Promissory Note. The Investment Unit was valued at zero, because our obligation to repay the Promissory Note arises from an event of default (a failure to maintain the Texas Residency Requirement), which is an event which rests entirely within our control.

Note 5 – Equity

Initial Public Offering

On April 3, 2018, the Company completed its IPO, whereby the Company sold an aggregate of 1,280,000 shares of its common stock, at $5.00 per share, resulting in estimated net proceeds of $5,025,000 after underwriting discounts, commissions and estimated offering expenses of $895,000. Additionally, the underwriters have been issued warrants to purchase common stock equal to 3% of the securities sold in the IPO, or 38,400 shares of Common Stock.

Private Investment

On May 9, 2018, the Company completed a private placement, whereby the Company sold to investors an aggregate of 828,500 shares of its common stock at $12.07 per share and warrants to purchase up to 621,376 shares of the Company's common stock with an initial exercise price equal to $15.62 per share. The per share price and warrant exercise price were subject to automatic adjustment, if applicable, based on the volume weighted average daily prices on the three days after the registration statement registering the resale of the shares of common stock sold to the investors and the shares of the common stock issuable upon exercise of the warrant was declared effective and the Company's shareholders approved the transaction. In no event would the purchase price or warrant exercise price be less than $4.25 per share. The Company received net proceeds of $9,250,000 after commissions and expenses.

On August 1, 2018, following the effectiveness of our Registration Statement on Form S-1 (File No. 333-225090) and pursuant to the terms of the Purchase Agreement and Warrants, we issued to the original investors of the private placement an aggregate of 1,174,440 shares of our common stock and the Warrants became exercisable for a total of 2,283,740 shares of our common stock with an exercise price equal to $4.25 per share.

Stock Issuances

During the year ended December 31, 2018, we issued (i) 200,009 shares of Common Stock, taking into account the forward-split ratio from the Company's IPO, for service provided to us, valued at $553,303, and we issued (ii) 3,282,940 shares of Common Stock in the Company's IPO and Private Investment for cash of $16,400,000.

During the year ended December 31, 2017, we issued (i) 207,206 shares of Common Stock, taking into account the forward-split ratio from the Company's IPO, for service provided to us, valued at $1,095,230 and we issued (ii) 22,473 shares of Series G Preferred Stock, which has since been converted to Common Stock and forward-split representing 150,211 shares of Common Stock, for cash of $793,971.

Preferred Stock

In connection with the Company's IPO, all Preferred Stock included in Series A through Series G, totaling 1,394,953 shares at December 31, 2017, were converted to 9,324,177 shares of Common Stock in associated with the forward-split (See Capital Stock Note). Upon the completion of the IPO, the Company is authorized to issue 10,000,000 shares of Preferred Stock at a par value of $0.001 per share, none of which are outstanding as of December 31, 2018.

Common Stock

Upon the completion of the IPO, all of the Company's non-voting Common Stock automatically converted to into Voting Common Stock on a one-to-one basis. Immediately following the completion of the IPO, the Company is authorized to issue 200,000,000 shares of Common Stock at a par value of $0.001 per share, all of which is Voting Common Stock. There are 15,239,148 shares of Common Stock outstanding at December 31, 2018.

Common Stock Purchase Warrants

Common Stock purchase warrant activity for years ended December 31, 2018 and 2017 respectively are as follows:

	Number of Warrants	Weighted Avg. Exercise Price
Outstanding at January 1, 2017	748,060	$ 5.17
Issued	—	—
Cancelled or expired	—	—
Exercised	—	—
Outstanding at December 31, 2017	748,060	$ 5.17
Issued	3,166,492	4.47
Cancelled or expired	(15,385)	—
Exercised	(34,615)	—
Outstanding at December 31, 2018	3,864,552	$ 4.60

In the year ending December 31, 2018, we granted (i) warrants to purchase 38,400 shares of our Common Stock at $6.25 per share to the underwriter of the Company's IPO and (ii) warrants to purchase 2,283,740 shares of our Common Stock at $4.25 per share to the investors in the Company's private placement. We also granted warrants to purchase up to 844,352 shares of Common Stock in consideration of services valued at $2,203,506 including (i) 425,000 shares of common stock to Cancer Revolution, LLC, (ii) 225,000 shares of common stock to Cancer Biotech, LLC, (iii) 144,352 shares of common stock to Inception Capital Management, LLC, and (iv) up to 50,000 shares of Common Stock to World Wide Holdings, LLC at $5.00 per share.

On January 29, 2018, the Company entered into an agreement with FundAthena, Inc. whereby the Company agreed to grant warrants to purchase 6,000 shares of our Common Stock at $5.00 per share in consideration of services valued at $30,000 provided to the company. As of December 31, 2018, the Company has not issued these warrant shares.

On September 20, 2018, World Wide Holdings, LLC exercised their warrant to purchase 50,000 shares via a cashless exercise option. As a result, the Company issued 34,615 shares of Common Stock to World Wide Holdings in exchange for the cashless exercise of the warrant and the remaining 15,385 shares of Common Stock were cancelled.

2018 Equity Incentive Plan

The Company's board of directors and stockholders has approved and adopted the Company's 2018 Equity Incentive Plan ("2018 Plan"), which became effective on the completion of the IPO on April 3, 2018. The 2018 Plan provides for the grant of incentive stock options ("ISOs"), nonstatutory stock options, stock appreciation rights, restricted stock awards, restricted stock unit awards, performance-based stock awards, other forms of equity compensation and performance cash awards. ISOs may be granted only to employees. All other awards may be granted to employees, including officers, and to the Company's non-employee directors and consultants, and affiliates.

A total of 4,160,000 shares of Common Stock are available under the 2018 Plan, which includes 554,963 shares of Common Stock reserved for issuance under our 2009 Equity Incentive Plan that were added to 2018 Plan. No further grants will be made under the 2009 Plan and any shares subject to outstanding stock options under the 2009 Plan that would otherwise be returned to the 2009 Plan will instead be added to the shares initially reserved under the 2018 Plan.

In addition, the number of shares of common stock reserved for issuance under the 2018 Plan will automatically increase on January 1 of each year, beginning on January 1, 2019 by 5% of the total number of shares of the Company's Common Stock outstanding on December 31 of the preceding calendar year, or a lesser number of shares determined by the administrator of the 2018 Plan.

2018 Employee Stock Purchase Plan

The Company's board of directors and stockholders has approved and adopted the Company's 2018 Employee Stock Purchase Plan ("ESPP"), which became effective on the completion of the IPO on April 3, 2018. The ESPP authorizes the issuance of 208,500 shares of the Company's common stock pursuant to purchase rights granted to our eligible employees. The number of shares of common stock reserved for issuance will automatically increase on January 1 of each calendar year, from January 1, 2019 by the lesser of 2% of the total number of shares of our common stock outstanding on December 31 of the preceding calendar year or a number determined by the administrator of the ESPP.

Stock Options

At December 31, 2017, the Company had outstanding stock options to purchase 2,628,749 shares of Common Stock, taking into account the forward-split ratio from the Company's IPO. In the year ending December 31, 2018, the Company granted stock options to employees to purchase 2,034,525 shares of Common Stock at a weighted average share price of $6.21.

As of December 31, 2018, the Company has outstanding stock options to purchase 4,535,681 shares of Common Stock that have been granted to various employees, vendors and independent contractors. Some of these options vest immediately while others vest over periods ranging from twelve (12) to forty-eight (48) months, are exercisable for a period of ten years, and enable the holders to purchase shares of our Common Stock at exercise prices ranging from $0.001 - $9.80. The per-share fair values of these options range from $0.001 to $7.93, based on Black-Scholes-Merton pricing models with the following assumptions. The weighted average remaining contractual term for the outstanding options at December 31, 2018 and 2017 is 7.73 and 7.34, years, respectively.

Stock option activity for the years ended December 31, 2018 and 2017, respectively, is as follows:

	Number of Shares	Weighted Avg. Exercise Price
Outstanding at January 1, 2017	2,628,749	$ 1.31
Options granted	—	—
Options exercised	—	—
Options expired	—	—
Outstanding at December 31, 2017	2,628,749	$ 1.31
Options granted	2,034,525	6.21
Options exercised	—	—
Options expired	(127,593)	—
Outstanding at December 31, 2018	4,535,681	$ 3.31

Note 6 - Related Party Transactions

Domecq Sebastian, LLC

Domecq-Sebastian LLC ("Domecq") is an entity affiliated with David Nance, a former director and officer who is now deceased. During December 2017, we entered into a promissory note with Domecq for a total amount of $200,000 that carried a 15% interest rate and is due and payable on or before March 31, 2018. The note carried a 18% default interest on amounts paid after the maturity date. This note was subsequently repaid in full in April 2018.

Introgen Research Institute

Introgen Research Institute ("IRI") is a Texas-based technology company, currently affiliated with Rodney Varner, our CEO. In April 2009, prior to Mr. Varner becoming an officer and director of our Company in August 2012, we entered into an Assignment and Collaboration Agreement with IRI, providing us with the exclusive right to commercialize a portfolio of intellectual property. This agreement was amended in 2011 to include additional sublicensing of additional intellectual property made available to IRI from the University of Texas MD Anderson Cancer Center ("UTMDACC").

Rodney Varner

Rodney Varner is the Company's Chief Executive Officer. On March 28, 2018, we entered into a promissory note with Rodney Varner, Trustee, for a total amount of $45,000 that carried a 0% interest rate and is due and payable on or the earlier of (i) five days after funding of the Company's initial public offering, or (ii) April 30, 2018, the maturity date. If paid after the maturity date, the note carried a 10% interest rate. This note was paid in full prior to the maturity date in April 2018.

Viet Ly

Viet Ly manages several investment funds that have provided the Company with investment funds since 2013. On March 9, 2018, we entered into a promissory note with Viet Ly for a total amount of $25,000 that carried a 0% interest rate and is due and payable on or before June 9, 2018, the maturity date. If paid after the maturity date, the note carried a 10% interest rate. This note was paid in full prior to the maturity date in April 2018.

The Company entered into a consulting agreement with Viet Ly on April 19, 2018. The Company agreed to pay Mr. Ly an initial rate of $175,000 per year, with compensation variable from time-to-time as determined by the Company, for strategic consulting services.

Note 7 - Commitments and Contingencies

Leases

On April 16, 2018, the Company executed a service agreement with CIC Innovation Communities, LLC, to establish and lease offices at the Cambridge Innovation Center at 1 Broadway, Floor 14, Cambridge, MA 02142. The Company does not have a long-term agreement in place to occupy this location, but rather occupies on a month-to-month basis.

On April 16, 2018, the Company also executed a space utilization agreement with the Board of Regents of the University of Texas System to establish and lease offices at the Dell Medical School located 1601 Trinity Street, Bldg B, Suite 3.322, Austin, Texas 78712. The Company paid $4,000 per month to occupy this location and the lease was effective until October 31, 2018. In November 2018, the Company amended and renewed the lease at a rate of $2,050 per month effective until April 30, 2019.

Commitments

We have entered into a clinical trial agreement with the University of Texas MD Anderson Cancer Center to administer a phase I/II clinical trial, combining FUS1-nanoparticles and Erlotinib in Stage IV lung cancer patients. The trial is expected to run through the end of 2018 with a projected total cost of approximately $2 million. Payments are due and payable when invoiced throughout the clinical trial period. The agreement may be terminated at any time.

In July 2018, the Company entered into a two-year sponsored research agreement with MD Anderson Cancer Center in Houston, Texas, to sponsor pre-clinical studies focused on the combination of TUSC2 with an immunotherapy with a projected total cost of approximately $2 million. Payments are due and payable when invoiced throughout the clinical trial period. The agreement may be terminated at any time.

In 2009, we agreed to assume certain contractual and other obligations of IRI in consideration for the sublicense rights, expertise, and assistance associated with the assignment of certain technologies and intellectual property. We also agreed to pay royalties of one percent (1%) on sales of resulting Licensed Products, for a period of 21 years following the termination of the last of the MD Anderson License Agreement and Sublicense Agreement, to IRI and we assumed patent prosecution costs and an annual minimum royalty of $20,000 payable to the National Institutes of Health ("NIH").

Our $191,393 payment obligation to the National Institutes of Health ("NIH") represented a current obligation, of which $15,393 of 2016 patent prosecution costs were paid in the fourth quarter of 2016 and $176,000 was included in Accounts Payable at December 31, 2016 (consisting of accrued annual royalties of $140,000 and patent costs of $36,000). During the first quarter of 2017, we modified the terms of our accrued royalty obligation to NIH. Under the modified agreement, NIH agreed to extinguish $120,000 of the accrued royalties payable to them in consideration for payment by us of (i) accrued patent costs of $36,000, (ii) a royalty payment of $20,000, and (iii) a contingent payment of $240,000, increasing at $20,000 per year starting in 2018, to be paid upon our receipt of FDA approval. The payments for the patent costs of $36,000 and royalties of $20,000 were paid during the second quarter of 2017.

As a result of our modified agreement with the NIH, we have recognized the exchange of the $120,000 fixed obligation for the $240,000 contingent obligation as a $120,000 reduction to intellectual property expense (classified within General and Administrative Expense) during the first quarter of 2017. The $240,000 contingent obligation (and related expense) will be recognized when we obtain regulatory approval (the event that triggers the payment obligation).

Contingencies

From time to time we may become subject to threatened and/or asserted claims arising in the ordinary course of our business. Management is not aware of any matters, either individually or in the aggregate, that are reasonably likely to have a material impact on our Company's financial condition, results of operations or liquidity.

During October 2017, we received an informal demand from a former financial advisor, claiming that it is entitled to a warrant to purchase shares of common stock equal to three (3) percent of our outstanding shares at December 1, 2015. We believe this asserted claim lacks merit, and we intend to defend the claim vigorously.

Note 8 – Income Taxes

The provision for income taxes differs from the amount computed by applying the statutory federal income tax rate to income before provision for income taxes. The sources and tax effects of the differences are as follows:

Income tax provision at the federal statutory rate	21%
Effect of operating losses	-21%
	0%

At December 31, 2018, the Company has a net operating loss carryforward of approximately $9.6 million for Federal and state purposes. This loss will be available to offset future taxable income. If not used, this carryforward will begin to expire in 2029. The deferred tax asset relating to the operating loss carryforward has been fully reserved at December 31, 2018 and December 31, 2017. The principal differences between the operating loss for income tax purposes and reporting purposes are shares issued for services and share-based compensation and a temporary difference in depreciation expense.

Note 9 – Subsequent Events

Option Grants

On January 27, 2019, the Company's Board of Directors approved the issuance of stock option grants to purchase a total of 40,000 shares of Common Stock to key service providers and 1,362,703 shares of Common Stock to Company executives. On February 12, 2019, the Company's Board of Directors approved the issuance of stock option grants to purchase a total of 96,894 shares of Common Stock to employees and 45,976 shares of Common Stock to an independent director.

Share Issuances to Consultants

The Company issued 97,617 shares of common stock to consultants during the first three months of 2019 including (i) 5,000 shares of common stock to Jack A. Roth on January 1, 2019, (ii) 24,000 shares of common stock to OpenWater Capital on January 26, 2019, (iii) 35,000 shares of common stock to Caro Partners on January 31, 2019, and (iv) 33,617 shares of common stock to Acorn Management Partners on March 1, 2019.

Appointment of Independent Director

On February 12, 2019, the Company's Board of Directors appointed John N. Bonfiglio, PhD, MBA, as a Class III director to the Board.

Additional Issuance of Private Placement Securities

On March 15, 2019, pursuant to the terms of the Securities Purchase Agreement entered into in connection with the Company's May 2018 private placement, the Company issued to one of the purchasers in the private placement an aggregate of 200,000 additional shares of the Company's common stock.

Exhibit 23.1

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

Genprex, Inc.
Austin, Texas

We hereby consent to the use of our report dated March 29, 2019, on the financial statements of Genprex, Inc. for the years ended December 31, 2018 and 2017, included herein on this Annual Report on Form 10-K of Genprex, Inc.

/s/ Daszkal Bolton LLP

Fort Lauderdale, Florida
March 29, 2019

{01368/0005/00217770.1}

Exhibit 31.1

CERTIFICATION PURSUANT TO
RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, J. Rodney Varner, certify that:

1. I have reviewed this annual report on Form 10-K of Genprex, Inc., a Delaware corporation (the "registrant");

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 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 15d-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 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 29, 2019

By: /s/ J. Rodney Varner
J. Rodney Varner
Chief Executive Officer
(Principal Executive Officer)

Exhibit 31.2

CERTIFICATION PURSUANT TO
RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Ryan M. Confer, certify that:

1. I have reviewed this annual report on Form 10-K of Genprex, Inc., a Delaware corporation (the "registrant");

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 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 15d-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 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 29, 2019

By: /s/ Ryan M. Confer
Ryan M. Confer
Chief Financial Officer
(Principal 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 on Form 10-K of Genprex, Inc. (the "Company") for the period ended December 31, 2018 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), each of the undersigned, J. Rodney Varner, Chief Executive Officer of the Company, and Ryan M. Confer, Chief Financial Officer of the Company, hereby certifies, pursuant to Rule 13a-14(b) of the Securities Exchange Act of 1934, as amended and 18 U.S.C. § 1350, as adopted pursuant to § 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 29, 2019

By: /s/ J. Rodney Varner
J. Rodney Varner
Chief Executive Officer
(Principal Executive Officer)

By: /s/ Ryan M. Confer
Ryan M. Confer
Chief Financial Officer
(Principal Financial Officer)

This certification accompanies the Report, is not deemed filed with the Securities and Exchange Commission and is not to be incorporated by reference into any filing of the Company under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended (whether made before or after the date of the Report), irrespective of any general incorporation language contained in such filing.