As filed with the U.S. Securities and Exchange Commission on December 16, 2016

Registration No. 333- [_____]

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

FORM S-3

REGISTRATION STATEMENT UNDER THE SECURITIES ACT OF 1933

ASTERIAS BIOTHERAPEUTICS, INC.

(Exact Name of Registrant as Specified in its Charter)

Delaware	**46-1047971**
(State or Other Jurisdiction of Incorporation or Organization)	(I.R.S. Employer Identification Number)

6300 Dumbarton Circle
Fremont, CA 94555
(510) 456-3800

(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

Stephen L. Cartt
President and Chief Executive Officer
Asterias Biotherapeutics, Inc.
6300 Dumbarton Circle
Fremont, CA 94555
(510) 456-3800
(Name, address, including zip code, and telephone number, including area code, of agent for service)

Copies to:
Jeffrey A. Baumel, Esq.
Dentons US LLP
1221 Avenue of the Americas
New York, New York 10020
(212) 768-6700

Approximate date of commencement of proposed sale to public: From time to time or at one time after this registration statement becomes effective in light of market conditions and other factors.

If the only securities being registered on this Form are being offered pursuant to dividend or interest reinvestment plans, please check the following box. ☐

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, as amended (the "Securities Act"), other than securities offered only in connection with dividend or interest reinvestment plans, check the following box. ☒

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, please check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this Form is a registration statement pursuant to General Instruction I.D. or a post-effective amendment thereto that shall become effective upon filing with the U.S. Securities and Exchange Commission pursuant to Rule 462(e) under the Securities Act, check the following box. ☐

If this Form is a post-effective amendment to a registration statement filed pursuant to General Instruction I.D. filed to register additional securities or additional classes of securities pursuant to Rule 413(b) under the Securities Act, check the following box. ☐

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

Large accelerated filer ☐ Accelerated filer ☐
Non-accelerated filer ☒ (Do not check if a smaller reporting company) Smaller reporting company ☐

CALCULATION OF REGISTRATION FEE

Title of Each Class of Securities to be Registered [1]	Amount to be Registered[1][2]	Proposed Maximum Offering Price Per Unit[2][3]	Proposed Maximum Aggregate Offering Price[1][3]	Amount of Registration Fee[3]
Preferred Stock, par value $.0001 per share	-	-	-[2]	
Series A Common Stock, par value $.0001 per share	-	-	-[2]	
Warrants	-	-	-[2]	
Total	-	-	$ 75,000,000.00[4]	$ 8,692.50[4]

(1) There are being registered under this registration statement such indeterminate number of shares of Preferred Stock, Series A Common Stock, warrants to purchase shares of Preferred Stock or Series A Common Stock and a combination of such securities, separately or as units, as may be sold by the registrant from time to time, which collectively shall have an aggregate initial offering price not to exceed $75,000,000.00. The securities registered hereunder also include such indeterminate number of each class of identified securities as may be issued upon conversion, exercise or exchange of any other securities that provide for such conversion into, exercise for or exchange into such securities. Separate consideration may or may not be received for securities that are issuable on exercise, conversion or exchange of other securities. In addition, pursuant to Rule 416 under the Securities Act of 1933, as amended, or the Securities Act, the shares of Preferred Stock and Series A Common Stock being registered hereunder include such indeterminate number of shares of Preferred Stock and Series A Common Stock as may be issuable with respect to the shares being registered hereunder as a result of stock splits, stock dividends, or similar transactions.

(2) Not required to be included in accordance with General Instruction II.D. of Form S-3 and Rule 457(o) under the Securities Act.

(3) The proposed maximum offering price per class of security will be determined from time to time by the registrant in connection with the issuance by the registrant of the securities registered hereunder.

(4) Estimated solely to calculate the registration fee in accordance with Rule 457(o) under the Securities Act. The aggregate maximum offering price of all securities issued pursuant to this registration statement will not exceed $75,000,000.00.

The registrant hereby amends this registration statement on such date or dates as may be necessary to delay its effective date until the registrant shall file a further amendment which specifically states that this registration statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933, as amended, or until the registration statement shall become effective on such date as the Commission, acting pursuant to said Section 8(a), may determine.

The information in this prospectus is not complete and may be changed. We may not sell these securities until the registration statement filed with the U.S. Securities and Exchange Commission is effective. This prospectus is not an offer to sell these securities and it is not soliciting an offer to buy these securities in any state where the offer or sale is not permitted.

SUBJECT TO COMPLETION, DATED DECEMBER 16, 2016

PROSPECTUS

$75,000,000.00

Asterias Biotherapeutics, Inc.

Preferred Stock
Series A Common Stock
Warrants

From time to time, we may offer and sell preferred stock, common stock or warrants or any combination of those securities, either individually or in units, in one or more offerings. The aggregate public offering price of the securities offered by us pursuant to this prospectus will not exceed $75,000,000.00.

This prospectus provides you with a general description of the securities that we may offer. Each time we offer securities, we will provide a prospectus supplement that will contain more specific information about the terms of that offering, including the prices at which those securities will be sold. We may also add, update or change in the prospectus supplement any of the information contained in this prospectus. You should carefully read this prospectus, together with any prospectus supplements and information incorporated by reference in this prospectus and any prospectus supplements, before you decide to invest. **This prospectus may not be used to offer or sell any securities unless accompanied by a prospectus supplement.**

The securities offered by us pursuant to this prospectus may be sold directly to investors, through agents, underwriters or dealers as designated from time to time, through a combination of these methods or in any other manner as described under the heading "Plan of Distribution" and in the corresponding section in the applicable prospectus supplement. Each time we offer securities, the relevant prospectus supplement will provide the specific terms of the plan of distribution for such offering and the net proceeds that we expect to receive from such offering.

Shares of our Series A Common Stock (the "Common Stock") are listed on the NYSE MKT LLC under the trading symbol "AST." Any securities sold pursuant to this prospectus and any prospectus supplement may be listed on that exchange, subject to official notice of issuance. Each prospectus supplement to this prospectus will contain information, where applicable, as to any other listing of the securities covered by the prospectus supplement on any national securities exchange.

Investing in our securities involves significant risks. See "Risk Factors" beginning on page 6.

Neither the U.S. Securities and Exchange Commission (the "Commission") nor any state securities commission has approved or disapproved of these securities or determined if this prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

The date of this prospectus is , 2016.

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ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement that we filed with the Commission utilizing a "shelf" registration process or continuous offering process, which allows us to offer and sell any combination of the securities described in this prospectus in one or more offerings. You should rely only on the information we have provided or incorporated by reference in this prospectus or any prospectus supplement. We have not authorized anyone to provide you with additional or different information. We are not making an offer of these securities in any state or other jurisdiction where the offer is not permitted. You should not assume that the information in this prospectus is accurate as of any date other than the date on the front of the prospectus. Using this prospectus, we may offer up to a total dollar amount of $75,000,000.00 of these securities.

This prospectus provides you with a general description of the securities we may offer. Each time we sell securities pursuant to the registration statement of which this prospectus is a part, we will provide a prospectus supplement that will contain specific information about the terms of that offering. That prospectus supplement may include additional risk factors about us and the terms of that particular offering. Prospectus supplements may also add to, update or change the information contained in this prospectus. To the extent that any statement that we make in a prospectus supplement is inconsistent with statements made in this prospectus, the statements made in this prospectus will be deemed modified or superseded by those made in such prospectus supplement. In addition, as we describe in the section entitled "Where You Can Find More Information," we have filed and plan to continue to file other documents with the Commission that contain information about us and the business conducted by us. Before you decide whether to invest in a particular offering of any securities registered hereby, you should read this prospectus, the prospectus supplement relating to that particular offering and the information we file with the Commission.

In this prospectus and any prospectus supplement, unless otherwise indicated, the terms "Asterias," the "Company," "we," "us" and "our" refer and relate to Asterias Biotherapeutics, Inc.

SPECIAL NOTE REGARDING FORWARD-LOOKING INFORMATION

This prospectus and the documents incorporated by reference herein contains "forward-looking statements" within the meaning of Section 27A of the Securities Act and Section 21E of the Securities Exchange Act of 1934. The forward-looking statements are only predictions and provide our current expectations or forecasts of future events and financial performance and may be identified by the use of forward-looking terminology, including such terms as "believes," "estimates," "anticipates," "expects," "plans," "intends," "may," "will" or "should" or, in each case, their negative, or other variations or comparable terminology, though the absence of these words does not necessarily mean that a statement is not forward-looking. Forward-looking statements include all matters that are not historical facts and include, without limitation, statements concerning: our business strategy, outlook, objectives, future milestones, plans, intentions, goals, and future financial condition, including the period of time during which our existing resources will enable us to fund our operations. Forward-looking statements also include our financial, clinical, development and potential regulatory plans to secure marketing authorization for our products under development, starting with AST-OPC1, AST-VAC1 and AST-VAC2, if approved and our expectations, timing and anticipated outcomes of submitting regulatory filings for our products under development.

We intend that all forward-looking statements be subject to the safe-harbor provisions of the Private Securities Litigation Reform Act of 1995. Forward-looking statements are subject to many risks and uncertainties that could cause actual results to differ materially from any future results expressed or implied by the forward-looking statements. We caution you therefore against relying on any of these forward-looking statements. They are neither statements of historical fact nor guarantees or assurances of future performance. Examples of the risks and uncertainties include, but are not limited to:

- We will require in the near term, but may be unable to secure, significant additional capital to continue our operations, and support our research and development activities;
- We will need to issue additional equity or debt securities in order to raise additional capital needed to pay our operating expenses;
- We will spend a substantial amount of our capital on research and development but we might not succeed in developing products and technologies that are useful in medicine;
- Risks relating to the progress of our clinical trials, including our ability to obtain FDA approval;
- We are subject to government regulation;
- Risks relating to intellectual property rights, such as our ability to obtain or enforce patents, the possibility that we may be subject to patent infringement claims, or the possibility that we may lose our rights to key technologies on which our business depends;
- We have no experience in manufacturing, marketing, selling or distributing products and may depend on third parties to develop and commercialize many of our product candidates and to provide the manufacturing, regulatory compliance, sales, marketing and distribution capabilities required for the success of our business;
- Failure of our internal control over financial reporting could harm our business and financial results; and
- BioTime is our largest shareholder and BioTime has substantial influence on our business and operations.

Pharmaceutical, biotechnology and medical technology companies have suffered significant setbacks conducting clinical trials, even after obtaining promising earlier preclinical and clinical data. Moreover, data obtained from clinical trials are susceptible to varying interpretations, which could delay, limit or prevent regulatory approval. After gaining approval of a drug product, pharmaceutical and biotechnology companies face considerable challenges in marketing and distributing their products, and may never become profitable.

The forward-looking statements contained in this prospectus or the documents incorporated by reference herein speak only as of their respective dates. Factors or events that could cause our actual results to differ may emerge from time to time and it is not possible for us to predict them all. Except to the extent required by applicable laws, rules or regulations, we do not undertake any obligation to publicly update any forward-looking statements or to publicly announce revisions to any of the forward-looking statements, whether as a result of new information, future events or otherwise.

PROSPECTUS SUMMARY

This summary highlights certain information about us and information appearing elsewhere in this prospectus and in the documents we incorporate by reference. This summary is not complete and does not contain all of the information that you should consider before investing in our securities. The following summary is qualified in its entirety by, and should be read in conjunction with, the more detailed information appearing elsewhere in this prospectus and the financial statements and notes thereto appearing in our Annual and Quarterly Reports, which are incorporated herein by reference. Before you decide to invest in our securities, to fully understand this offering and its consequences to you, you should carefully read this entire prospectus carefully, including the matters set forth under the caption "Risk Factors," any accompanying prospectus supplement and the other documents incorporated by reference herein and therein.

Business Overview

We are a clinical-stage biotechnology company focused on developing and commercializing novel therapies in the emerging fields of cell therapy and regenerative medicine. We have two core technology platforms. The first is our pluripotent stem cell platform. Pluripotent cells are a type of stem cell capable of becoming all of the cell types in the human body. The second is an immunotherapy platform to teach cancer patients' immune systems to attack their tumors. We are focused on developing therapies to treat conditions with high unmet medical needs and inadequate available therapies, with an initial focus on the therapeutic areas of neurology and oncology.

Products Under Development

Product Candidates

AST-OPC1 Oligodendrocyte Progenitor Cells

Our AST-OPC1 product candidate for treatment of spinal cord injuries is comprised of oligodendrocyte progenitor cells, which are cells that become oligodendrocytes after injection, derived from a cGMP master cell bank of undifferentiated hES cells that has been fully qualified for human use. These cells, which are stored frozen until ready for use, are produced under cGMP conditions and screened for adventitious agents.

Phase I Safety Trial

As of December 2016, all five patients in our phase I safety trial of our AST-OPC1 in thoracic spinal cord injury ("SCI") have completed five years of follow up under the protocol. No surgical complications during or post-surgery have been observed, and there have been no significant adverse events to date in any patient attributable to the AST-OPC1 product, the surgery to deliver the cells, or the immunosuppressive regimen. There have been no unexpected neurological changes to date, nor has there been evidence of adverse changes or cavitation on multiple MRIs. MRI results in four of the five subjects are consistent with prevention of lesion cavity formation. Immune monitoring, conducted in some of the patients, has not detected any evidence of immune responses to AST-OPC1 at time periods of up to one year post-transplant.

Phase 1/2a Dose Escalation Study: Subjects with Neurologically Complete Cervical Spinal Cord Injuries

We initiated enrollment of the SCi-Star Phase 1/2a dose escalation trial of AST-OPC1 in patients with neurologically complete (American Spinal Injury Association Impairment Scale A; AIS-A) cervical injuries in March 2015. In May 2016, we announced that the FDA had approved expansion of the study to include up to 35 patients, including the addition of two cohorts of 5-8 patients with motor complete, sensory incomplete AIS-B injuries. The trial is designed to assess safety and activity of three escalating doses of AST-OPC1 in motor complete cervical SCI, the first targeted indication for AST-OPC1. The trial is an open-label, single-arm study in patients with sub-acute, C-5 to C-7, motor complete (AIS-A and AIS-B) cervical SCI. AST-OPC1 is administered 14 to 30 days post-injury. Patients are followed by neurological exams and imaging methods to assess the safety and activity of the product. We completed enrollment in the first (AIS-A; two million cells) dose cohort in August 2015, and of the second (AIS-A; ten million cells) dose cohort in July 2016. We are currently open for concurrent enrollment in the third (AIS-A; 20 million cells) and fourth (AIS-B; 10 million cells) cohorts. No serious adverse events related to AST-OPC1, the administration procedure, or the immunosuppressive regimen have been observed to date. . In September 2016, we announced early but promising interim efficacy data from the study and we intend to provide our next interim update in January 2017.

We received a Strategic Partnerships Award grant from the California Institute for Regenerative Medicine, which provides for up to $14.3 million of non-dilutive funding for the Phase 1/2a clinical trial and other product development activities for AST-OPC1, subject to achieving certain milestones. As of December 1, 2016, $10.3 million of payments have been received by Asterias, $2.5 million is payable to Asterias based on recent milestone achievement, and $1.5 million remains payable upon achievement of future milestones. Additionally, in February 2016, we announced that the FDA had granted our application for Orphan Drug Designation of AST-OPC1 for the treatment of acute spinal cord injury.

AST-VAC1 and AST-VAC2, Cancer Vaccine Candidates Targeting Telomerase

We are developing two experimental immunotherapeutic programs, AST-VAC1 and AST-VAC2, each designed to attack cancer cells by targeting the cancer cell's expression of telomerase. Both product candidates use an immune cell type known as dendritic cells to stimulate immune responses to telomerase. Dendritic cells are antigen processing and presenting cells which are potent initiators of a cellular and antibody-mediated immune response Telomerase is a ubiquitous cancer antigen, expressed at high levels in nearly all human cancers, but at very low levels or not at all in normal human cells. The premise underlying these vaccines is to "teach" the patient's own immune system to attack cancer cells while sparing other normal healthy cells.

AST-VAC1: Autologous Telomerase-loaded, Dendritic Cells

AST-VAC1 is an autologous product candidate, or a product that is derived from cells that come from the treated patient. AST-VAC1 consists of mature antigen-presenting dendritic cells pulsed with RNA for the protein component of human telomerase ("hTERT") and a portion of a lysosomal targeting signal ("LAMP"). LAMP directs the telomerase RNA to the lysosome, the subcellular organelle that directs the RNA to a particular part of the cell membrane. AST-VAC1 is injected into the patient's skin, with the objective of the dendritic cells traveling to the lymph nodes and instructing cytotoxic T-cells to kill tumor cells that express telomerase on their surface.

AST-VAC2: hES Cell-Derived Allogeneic Dendritic Cells

AST-VAC2 is an allogeneic, or non-patient specific, cancer vaccine candidate designed to stimulate patient immune responses to telomerase. AST-VAC2 is produced from hES cells and can be modified with any antigen. We believe that the use of hES, as opposed to collecting and using the patient's own blood, as the starting material for AST-VAC2 provides a scalable system for the production of a large number of vaccine doses in a single lot. Allogeneic vaccine production has the potential to lower manufacturing costs, "off-the-shelf" availability and broader patient availability, and ensure product consistency. In addition, we believe that this approach has the potential to stimulate a more robust immune response through an adjuvant effect of the immune mismatch between the genetic makeup of AST-VAC2 and patients. Further, we believe AST-VAC2 may be synergistic with immune checkpoint inhibitors currently in development for many cancer indications because immune checkpoint inhibitors function by relieving suppressive mechanisms exerted on T-cells by the tumor, whereas AST-VAC2 is designed to specifically target the T-cells to attack the telomerase expressing tumor cells.

Product Development Strategy for AST-VAC2

During September 2014, we entered into a Clinical Trial and Option Agreement with Cancer Research UK ("CRUK") and Cancer Research Technology Limited, ("CRT"), a wholly-owned subsidiary of CRUK (the "CRUK Agreement"). In January 2016 we announced that we had completed the technology transfer of the AST-VAC2 manufacturing process to CRUK. CRUK is now producing AST-VAC2 in its facility under current good manufacturing practice ("cGMP"). Cancer Research UK's Centre for Drug Development ("CDD") intends to submit a Clinical Trial Authorization application to the UK regulatory authorities for the Phase 1/2 clinical trial in non-small cell lung cancer in Q1 2017. This trial will be sponsored, managed and funded by CDD. The clinical trial will examine the safety, immunogenicity and activity of AST-VAC2 and position the immunotherapy to be tested for numerous clinical indications. We will continue to serve in a collaborative and advisory role with CRUK throughout this process.

Upon completion of the Phase 1/2 study, we will have an exclusive first option to acquire the data generated in the trial. If we exercise that option we will be obligated to make payments upon the execution of the license agreement, upon the achievement of various milestones, and then royalties on sales of products. In connection with the CRUK Agreement, we sublicensed to CRUK certain patents that have been licensed or sublicensed to us by third parties for use in the clinical trials and product manufacturing process. We would also be obligated to make payments to those patent licensors and sublicensors upon the achievement of various milestones, and then royalties on sales of products if AST-VAC2 is successfully developed and commercialized.

Corporate Information

We are a Delaware corporation. Our corporate headquarters are located at 6300 Dumbarton Circle Fremont, California 94555 and our telephone number is (510) 456-3800. We maintain a website at http://www.asteriasbiotherapeutics.com. Information contained on or linked to our website is not a part of this prospectus supplement summary. Our Series A Common Stock is listed on The NYSE MKT, under the symbol "AST."

Trademark Notice

Asterias Biotherapeutics, the Asterias Biotherapeutics logo and other trademarks of Asterias Biotherapeutics appearing in this prospectus are the property of Asterias Biotherapeutics. All other trademarks, service marks and trade names in this prospectus are the property of their respective owners. We have omitted the ® and ™ designations, as applicable, for the trademarks used in this prospectus.

Ratio of Earnings to Combined Fixed Charges and Preferred Stock Dividends

If we offer preference equity securities under this prospectus, then we will, if required at that time, provide a ratio of combined fixed charges and preference dividends to earnings in the applicable prospectus supplement for such offering.

RISK FACTORS

An investment in our securities involves significant risks. You should carefully consider the risks described below or in any applicable prospectus supplement and other information, including our financial statements and related notes previously included in our periodic reports, filed with the Commission, and in the documents incorporated therein by reference before deciding to invest in our securities. However, those risks are not the only ones that we face. Additional risks not presently known to us or that we currently deem immaterial may also impair our business operations. The following risks, among others, could cause our actual results, performance, achievements or industry results to differ materially from those expressed in our forward-looking statements contained herein and presented elsewhere by management from time to time. If any of the following risks actually occurs, our business prospects, financial condition or results of operations could be materially harmed. In such case, the market price of our securities would likely decline and you could lose all or part of your investment.

Risks Related to Our Business

We have a history of operating losses and negative cash flows.

Since our inception in September 2012, we have incurred operating losses and negative cash flow, and we expect to continue to incur losses and negative cash flow in the future. Our net losses for the fiscal years ended December 31, 2015, 2014, and 2013 were $15.0 million, $10.1 million, and $22.4 million respectively, and we had an accumulated deficit of $48.2 million and $33.2 million as of December 31, 2015 and 2014, respectively. For the nine months ended September 30, 2016, we had net losses of $26.1 million and an accumulated deficit of $74.4 million. Our net loss for the year ended December 31, 2013 and our accumulated deficit as of that date include $17.5 million charged as in-process research and development expenses ("IPR&D") in accordance with Accounting Standards Codification ("ASC") 805-50 on account of our acquisition of certain assets from Geron. See Notes 2 and 3 to the Financial Statements. BioTime previously funded our formation and operating costs but we do not expect BioTime to continue to do so in the future. We have limited cash resources and will depend upon future equity financings, research grants, financings through collaborations with third parties, and sales of BioTime common shares that we have as a source of funding for our operations. There is no assurance that we will be able to obtain the financing we need from any of those sources, or that any such financing that may become available will be on terms that are favorable to us and our shareholders.

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

Under Section 382 of the Internal Revenue Code of 1986, as amended, if a corporation undergoes an "ownership change," generally defined as a greater than 50% change (by value) in its equity ownership over a three year period, the corporation's ability to use its pre-change net operating loss carryforwards and other pre-change tax attributes (such as research tax credits) to offset its post-change income may be limited. Since the Company's formation, the Company has raised capital through the issuance of capital stock on several occasions which, combined with disposition of shares by shareholders, may have resulted in one or more changes of control, as defined by Section 382. If the Company has experienced such a change of control, its NOL carryforwards and tax credits may not be available, or their utilization could be subject to an annual limitation under Section 382. In addition, since we will need to raise substantial additional funding to finance our operations, we may undergo further ownership changes in the future. If we have net taxable income, our ability to use our pre-change net operating loss carryforwards to offset United States federal taxable income may be subject to limitations, which could potentially result in increased future tax liability to us. Similar rules and limitations may apply for state income tax purposes.

Failure to attract and retain skilled personnel and key relationships could impair our research and development efforts.

Some of our operations are still in the start-up stage and we had only 55 employees as of December 1, 2016. We will need to recruit and hire additional qualified research scientists, laboratory technicians, clinical development, and management personnel. Competition for these types of personnel is intense and we may experience delays in hiring the qualified people that we need. The inability to attract and retain sufficient qualified management, scientific, or technical personnel may significantly delay or prevent the achievement of our product development and other business objectives and could have a material adverse effect on our business, operating results and financial condition. We partially rely on BioTime to provide certain services related to financial accounting management and reporting. We will also rely on consultants and advisors who are either self-employed or employed by other organizations, and they may have conflicts of interest or other commitments, such as consulting or advisory contracts with other organizations, that may affect their ability to perform services for us.

We will spend a substantial amount of our capital on research and development but we might not succeed in developing products and technologies that are useful in medicine.

The product development work we plan to do is costly, time consuming and uncertain as to its results. We will attempt to develop new medical products and technologies that might not prove to be safe and efficacious in human medical applications. Many of the products and technologies that we will seek to develop have not been applied in human medicine and have only been used in laboratory studies in vitro or in animals. Only two of the product candidates that we have acquired have been used in clinical trials, and those were early stage trials involving only a small number of patients. If we are successful in developing a new technology or product, refinement of the new technology or product and definition of the practical applications and limitations of the technology or product may take years and require the expenditure of large sums of money.

The amount and pace of research and development work that we can do or sponsor, and our ability to commence and complete clinical trials required to obtain FDA and foreign regulatory approval of our products, depends upon the amount of money available to us.

We may have to limit our laboratory research and development work based on the amount of our cash resources. We plan to continue to seek research and development grants from government agencies and to enter into collaborative product development agreements through which third parties will provide funding or otherwise bear the cost of research and development or clinical trials of our product candidates. There is no assurance that the amount of any grants that we may receive will be adequate for our needs. The agreements we entered into to date with CIRM and CRUK are subject to termination if certain milestones are not achieved. Hence, there is no assurance that we will receive the full value of the agreement with either entity. Unless we are able to generate sufficient revenue or raise additional funds when needed, it is likely that we will be unable to continue our planned activities, even if we make progress in our research and development projects.

We will need to issue additional equity or debt securities in order to raise additional capital needed to pay our operating expenses.

We plan to incur substantial research and product development expenses, and we will need to raise additional capital to pay operating expenses until we are able to generate sufficient revenues from product sales, royalties, and license fees. It is likely that additional sales of equity or debt securities will be required in the near future to meet our short-term capital needs, unless we receive substantial research grants and revenues from the sale of any products that receive regulatory approval or we are successful in licensing or sublicensing our technology and we receive substantial licensing fees and royalties. Sales of additional equity securities could result in the dilution of the interests of present shareholders.

The condition of certain cells, cell lines and other biological materials that we acquired from Geron could impact the time and cost of commencing our research and product development programs.

The cells, cell lines and other biological materials that we acquired are being stored under cryopreservation protocols intended to preserve their functionality. We have successfully completed the verification of the viability of three lots of AST-OPC1 cells that we intend to use in clinical trials. However, the functional condition of the other materials cannot be certified until they are tested in an appropriate laboratory setting by qualified scientific personnel using validated equipment. We intend to perform that testing on the cells that we intend to use in our research and development programs as the need arises.

To the extent that the cells we plan to use are not sufficiently functional for our purposes, we would need to incur the time and expense of regenerating cell lines from cell banks, or regenerating cell banks from cell stocks, which could delay and increase the cost of our research and development work using those cells.

Sales of any products we may develop may be adversely impacted by the availability of competing products.

In order to compete with other products, particularly those that sell at lower prices, our products will have to provide medically significant advantages. Physicians and hospitals may be reluctant to try a new product due to the high degree of risk associated with the application of new technologies and products in the field of human medicine. There also is a risk that our competitors may succeed at developing safer or more effective products that could render our products and technologies obsolete or noncompetitive.

Any products that receive regulatory approval may be difficult and expensive to manufacture on a commercial scale.

hES derived therapeutic cells have only been produced on a small scale and not in quantities and at levels of purity and viability that will be needed for wide scale commercialization. If we are successful in developing products that consist of hES cells or other cells or products derived from hES or other cells, we will need to develop, alone or in collaboration with one or more pharmaceutical companies or contract manufacturers, technology for the commercial production of those products. Our hES cell or other cell-based products are likely to be more expensive to manufacture on a commercial scale than most other drugs on the market today. The high cost of manufacturing a product will require that we charge our customers a high price for the product in order to cover our costs and earn a profit. If the price of our products is too high, hospitals and physicians may be reluctant to purchase our products, especially if lower priced alternative products are available, and we may not be able to sell our products in sufficient volumes to recover our costs of development and manufacture or to earn a profit.

We do not have our own marketing, distribution, and sales resources for the commercialization of any products that we might successfully develop.

If we are successful in developing marketable products, we will need to build our own marketing, distribution, and sales capability for our products, which would require the investment of significant financial and management resources, or we will need to find collaborative marketing partners, independent sales representatives, or wholesale distributors for the commercial sale of our products. If we market products through arrangements with third parties, we may pay sales commissions to sales representatives or we may sell or consign products to distributors at wholesale prices. As a result, our gross profit from product sales may be lower than it would be if we were to sell our products directly to end users at retail prices through our own sales force. There can be no assurance that we will able to negotiate distribution or sales agreements with third parties on favorable terms to justify our investment in our products or achieve sufficient revenues to support our operations.

We do not have the ability to independently conduct clinical trials required to obtain regulatory approvals for our therapeutic product candidates.

We will need to rely on third parties, such as CRUK, contract research organizations, data management companies, contract clinical research associates, medical institutions, clinical investigators and contract laboratories to conduct any clinical trials that we may undertake for our products. We may also rely on third parties to assist with our preclinical development of therapeutic product candidates. If we outsource clinical trials, we may be unable to directly control the timing, conduct and expense of our clinical trials. If we enlist third parties to conduct clinical trials and they fail to successfully carry out their contractual duties or regulatory obligations or fail to meet expected deadlines, if the third parties need to be replaced or if the quality or accuracy of the data they obtain is compromised due to the failure to adhere to clinical protocols or regulatory requirements or for other reasons, our preclinical development activities or clinical trials may be extended, delayed, suspended or terminated, and we may not be able to obtain regulatory approval for or successfully commercialize our therapeutic product candidates.

We will have certain obligations and may incur liabilities arising from clinical trials, and we do not yet know the scope of any resulting expenses that might arise.

We face the risk of incurring liabilities to patients who participate in clinical trials of our product candidates if they incur any injuries as a result of their participation. We will also be obligated to obtain information and prepare reports about the health of the clinical trial patients. In addition, we have assumed Geron's obligations to obtain information and prepare reports about the health of patients, and we have assumed any liabilities to those patients that might arise from any injuries they may have incurred, as a result of their participation in the clinical trials of Geron's GRN-OPC1 cell replacement therapy for spinal cord damage and its GRN-VAC1 immunological therapy for certain cancers. We are not aware of any claims by patients alleging injuries suffered as a result of any of those clinical trials, but if any claims are made and if liability can be established, the amount of any liability that we may incur, depending upon the nature and extent of any provable injuries, could exceed our insurance coverage, and the amount of the liability could be material to our financial condition.

Our business could be adversely affected if we lose the services of the key personnel upon whom we depend.

Our research programs are directed primarily by our President of Research and Development, Dr. Jane S. Lebkowski, our Chief Operating Officer, Dr. Katharine E. Spink, and our Chief Medical Officer, Dr. Edward D. Wirth. In addition, our success depends to a large extent on our President and CEO, Stephen L. Cartt, and our Chief Financial Officer and General Counsel, Ryan D. Chavez. If any of these key personnel should leave our employ we may be unable to locate and recruit sufficient replacement personnel without undue delay or additional cost or we may be unable to replace them at all. Any such delay or inability could delay or terminate some or all of our research programs, the commercialization of our products, or our ability to raise capital to fund our business. Even if we are able to attract suitable replacement personnel, we may incur delays during a transition period. Therefore, the loss of these key employees could have a material adverse effect on us.

Our business and operations could suffer in the event of system failures

Despite the implementation of security measures, our internal computer systems and those of our contractors and consultants are vulnerable to damage from computer viruses, unauthorized access, natural disasters, terrorism, war and telecommunication and electrical failures. Such events could cause interruption of our operations. For example, the loss of data for our product candidates could result in delays in our regulatory filings and development efforts and significantly increase our costs. To the extent that any disruption or security breach was to result in a loss of or damage to our data, or inappropriate disclosure of confidential or proprietary information, we could incur liability and the development of our product candidates could be delayed.

Failure of our internal control over financial reporting could harm our business and financial results.

Our management is responsible for establishing and maintaining adequate internal control over financial reporting. Internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting for external purposes in accordance with accounting principles generally accepted in the U.S. Internal control over financial reporting includes maintaining records that in reasonable detail accurately and fairly reflect our transactions; providing reasonable assurance that transactions are recorded as necessary for preparation of our financial statements; providing reasonable assurance that receipts and expenditures of our assets are made in accordance with management authorization; and providing reasonable assurance that unauthorized acquisition, use or disposition of our assets that could have a material effect on the financial statements would be prevented or detected on a timely basis. Because of its inherent limitations, internal control over financial reporting is not intended to provide absolute assurance that a misstatement of our financial statements would be prevented or detected. Our growth and entry into new products, technologies and markets will place significant additional pressure on our system of internal control over financial reporting. Any failure to maintain an effective system of internal control over financial reporting could limit our ability to report our financial results accurately and timely or to detect and prevent fraud.

We continue to rely in part on financial systems maintained by BioTime and upon services provided by BioTime personnel. BioTime allocates certain expenses among itself, us, and BioTime's other subsidiaries, which creates a risk that the allocations may not accurately reflect the benefit of an expenditure or use of financial or other resources by us, BioTime as our parent company, and the BioTime subsidiaries among which the allocations are made.

Risks Related to Our Industry

We will face certain risks arising from regulatory, legal, and economic factors that affect our business and the business of other pharmaceutical and biological product development companies. Because we are a small company with limited revenues and limited capital resources, we may be less able to bear the financial impact of these risks than larger companies that have substantial income and available capital.

If we do not receive FDA and other regulatory approvals we will not be permitted to sell our products.

The cell-based products that we are developing cannot be sold until the FDA and corresponding foreign regulatory authorities approve the products for medical use. To date, long-term safety and efficacy has not been demonstrated in clinical trials for any of our therapeutic product candidates. The need to obtain regulatory approval to market a new product means that:

- we will have to conduct expensive and time consuming clinical trials of new products. The full cost of conducting and completing clinical trials necessary to obtain FDA and foreign regulatory approval of a new product cannot be presently determined, but could exceed our current financial resources;
- clinical trials and the regulatory approval process for a cell-based product can take several years to complete. As a result, we will incur the expense and delay inherent in seeking FDA and foreign regulatory approval of new products, even if the results of clinical trials are favorable;
- data obtained from preclinical and clinical studies is susceptible to varying interpretations that could delay, limit, or prevent regulatory agency approvals. Delays in the regulatory approval process or rejections of an application for approval of a new drug or cell-based product may be encountered as a result of changes in regulatory agency policy;
- because the therapeutic products we plan to develop with hES technology involve the application of new technologies and approaches to medicine, the FDA or foreign regulatory agencies may subject those products to additional or more stringent review than drugs or biologics derived from other technologies. No therapeutic product based on hES technology has been approved by the FDA to date.
- a product that is approved may be subject to restrictions on use;
- the FDA can limit or withdraw approval of a product if problems arise; and
- we will face similar regulatory issues in foreign countries.

Clinical trial failures can occur at any stage of the testing and we may experience numerous unforeseen events during, or as a result of, the clinical trial process that could delay or prevent commercialization of our current or future therapeutic product candidates.

All of our product candidates are either at early stages of clinical development or at the preclinical or research stages of development. Clinical trial failures or delays can occur at any stage of the trials, and may be directly or indirectly caused by a variety of factors, including but not limited to:

- delays in securing clinical investigators or trial sites for our clinical trials;
- delays in obtaining Institutional Review Board ("IRB") and other regulatory approvals to commence a clinical trial;
- slower than anticipated rates of patient recruitment and enrollment, or failing to reach the targeted number of patients due to competition for patients from other trials;
- limited or no availability of coverage, reimbursement and adequate payment from health maintenance organizations and other third party payors for the use of agents used in our clinical trials;
- negative or inconclusive results from clinical trials;
- unforeseen side effects interrupting, delaying, or halting clinical trials of our therapeutic product candidates, and possibly resulting in the FDA or other regulatory authorities denying approval of our therapeutic product candidates;
- unforeseen safety issues;
- uncertain dosing issues;
- approval and introduction of new therapies or changes in standards of practice or regulatory guidance that render our clinical trial endpoints or the targeting of our proposed indications obsolete;
- inability to monitor patients adequately during or after treatment or problems with investigator or patient compliance with the trial protocols;
- inability to replicate in large controlled studies safety and efficacy data obtained from a limited number of patients in uncontrolled trials;
- inability or unwillingness of medical investigators to follow our clinical protocols; and
- unavailability of clinical trial supplies.

Government imposed bans or restrictions, and religious, moral and ethical concerns on the use of hES cells could prevent us from developing and successfully marketing stem cell products.

Government imposed bans or restrictions on the use of embryos or hES cells research and development in the United States and abroad could generally constrain stem cell research, thereby limiting the market and demand for any of our products that receive regulatory approval. In March 2009, President Barack Obama lifted certain restrictions on federal funding of research involving the use of hES cells, and in accordance with President Obama's executive order, the National Institutes of Health has adopted new guidelines for determining the eligibility of hES cell lines for use in federally funded research. The central focus of the proposed guidelines is to assure that hES cells used in federally funded research were derived from human embryos that were created for reproductive purposes, were no longer needed for this purpose, and were voluntarily donated for research purposes with the informed written consent of the donors. hES cells that were derived from embryos created for research purposes rather than reproductive purposes, and other hES cells that were not derived in compliance with the guidelines, are not eligible for use in federally funded research.

In May 2016, the Select Investigative Panel on Infant Lives of the United States House of Representatives Committee on Energy and Commerce (the "Panel") submitted a formal request that we provide certain information relating to, among other things, whether we have used fetal tissue in our research. We fully complied with this request and have provided evidence, to the Panel's full satisfaction, that we have never used fetal tissue in our research, as we only use specific hES cell lines that were deemed eligible for federal funding based on their original derivation by third parties according to ethical principles. Then President George W. Bush in August 2001 signed an executive order approving, for research purposes, the use of these specific cell lines, among certain others, and approval for their use was subsequently reconfirmed under President Obama's March 2009 executive order.

California law requires that stem cell research be conducted under the oversight of a stem cell research oversight ("SCRO") committee. Many kinds of stem cell research, including the derivation of new hES cell lines, may only be conducted in California with the prior written approval of the SCRO. A SCRO could prohibit or impose restrictions on the research we plan to do.

The use of hES cells gives rise to religious, moral and ethical issues regarding the appropriate means of obtaining the cells and the appropriate use and disposal of the cells. These considerations could lead to more restrictive government regulations or could generally constrain stem cell research thereby limiting the market and demand for any of our products that receive regulatory approval. From time to time, social views on religious, moral and ethical issues could change that could affect political viewpoints and government regulations. Therefore, it is difficult to forecast with certainty whether there will be additional government imposed bans or restrictions, and religious, moral and ethical concerns on our use of hES cells that could potentially give rise to proceedings, litigation or disputes that could cause us to incur substantial expense, require significant time and attention from our management and result in civil penalties against us. The results of any such proceedings, litigation or disputes could have a material adverse effect on our business and results of operations. Furthermore, it is possible that such proceedings, litigation or disputes could negatively impact the ability of our vendors, suppliers or collaborators to conduct their operations, which could also have a material adverse effect on our business and results of operations.

Risks Related to Our Intellectual Property

If our efforts to protect our proprietary technologies are not adequate, we may not be able to compete effectively in our market.

We rely upon a combination of patents, trade secret protection and contractual arrangements to protect the intellectual property related to our technologies. We will only be able to protect our products and proprietary information and technology by preventing unauthorized use by third parties to the extent that our patents, trade secrets, and contractual position allow us to do so. Any disclosure to or misappropriation by third parties of our trade secrets or confidential information could compromise our competitive position. Moreover, we have in the past been involved in, and may in the future be involved in legal or administrative proceedings involving our intellectual property and initiated by third parties, which proceedings can result in significant costs and commitment of management time and attention. As our product candidates continue in development, third parties may attempt to challenge the validity and enforceability of our patents and proprietary information and technologies.

We also have in the past been involved in, and may in the future be involved in initiating legal or administrative proceedings involving the product candidates and intellectual property of our competitors. These proceedings can result in significant costs and commitment of management time and attention, and there can be no assurance that our efforts would be successful in preventing or limiting the ability of our competitors to market competing products. Composition-of-matter patents relating to the active pharmaceutical ingredient are generally considered to be the strongest form of intellectual property protection for pharmaceutical products, as such patents provide protection not limited to any one method of use or manufacture. Method-of-use and method-of-manufacture patents protect the use or manufacture of a product for the specified method(s), and do not prevent a competitor from making and marketing a product that is identical to our product for an indication that is outside the scope of the patented method. We rely on a combination of these and other types of patents to protect our product candidates, and there can be no assurance that our intellectual property will create and sustain the competitive position of our product candidates.

Biotechnology and pharmaceutical product patents involve highly complex legal and scientific questions and can be uncertain. Any patent applications that we own or license may fail to result in issued patents. Even if patents do successfully issue from our applications, third parties may challenge their validity or enforceability, which may result in such patents being narrowed, invalidated, or held unenforceable. Even if our patents and patent applications are not challenged by third parties, those patents and patent applications may not prevent others from designing around our claims and may not otherwise adequately protect our product candidates. If the breadth or strength of protection provided by the patents and patent applications we hold with respect to our product candidates is threatened, competitors with significantly greater resources could threaten our ability to commercialize our product candidates.

Subject to meeting other requirements for patentability, for United States patent applications filed prior to March 16, 2013, the first to invent the claimed invention is entitled to receive patent protection for that invention while, outside the United States, the first to file a patent application encompassing the invention is entitled to patent protection for the invention. The United States moved to a "first to file" system under the Leahy-Smith America Invents Act, or AIA, effective March 16, 2013. Discoveries are generally published in the scientific literature well after their actual development, and patent applications in the United States and other countries are typically not published until 18 months after filing, and in some cases are never published. Accordingly, we cannot be certain that we or our licensors were the first to make the inventions claimed in our owned and licensed United States patents or patent applications filed prior to March 16, 2013, or that we or our licensors were the first to file for patent protection for inventions claimed in foreign patents or foreign patent applications and United States patents or patent applications filed on or after March 16, 2013. The AIA also includes new procedures for challenging issued patents and pending patent applications, which creates additional uncertainty. We may become involved in opposition or interference proceedings challenging our patents and patent applications or the patents and patent applications of others, and the outcome of any such proceedings are highly uncertain. An unfavorable outcome in any such proceedings could reduce the scope of, or invalidate, our patent rights, allow third parties to commercialize our technology and compete directly with us, or result in our inability to manufacture, develop or commercialize our product candidates without infringing the patent rights of others.

In addition to the protection afforded by patents, we seek to rely on trade secret protection and confidentiality agreements to protect proprietary know-how, information, or technology that is not covered by our patents. Although our agreements require all of our employees to assign their inventions to us, and we require all of our employees, consultants, advisors and any third parties who have access to our trade secrets, proprietary know-how and other confidential information and technology to enter into appropriate confidentiality agreements, we cannot be certain that our trade secrets, proprietary know-how and other confidential information and technology will not be subject to unauthorized disclosure or that our competitors will not otherwise gain access to or independently develop substantially equivalent trade secrets, proprietary know-how and other information and technology. Furthermore, the laws of some foreign countries do not protect proprietary rights to the same extent or in the same manner as the laws of the United States. As a result, we may encounter significant problems in protecting and defending our intellectual property globally. If we are unable to prevent unauthorized disclosure of our intellectual property related to our product candidates and technology to third parties, we may not be able to establish or maintain a competitive advantage in our market, which could materially adversely affect our business and operations.

Intellectual property disputes with third parties and competitors may be costly and time consuming, and may negatively affect our competitive position.

Our commercial success may depend on our avoiding infringement of the patents and other proprietary rights of third parties as well as on enforcing our patents and other proprietary rights against third parties. Pharmaceutical and biotechnology intellectual property disputes are characterized by complex, lengthy and expensive litigation over patents and other intellectual property rights. We may initiate or become a party to, or be threatened with, future litigation or other proceedings regarding intellectual property rights with respect to our product candidates and competing products.

As our product candidates progress toward commercialization, we or our collaboration partners may be subject to patent infringement claims from third parties. We attempt to ensure that our product candidates do not infringe third party patents and other proprietary rights. However, the patent landscape in competitive product areas is highly complex, and there may be patents of third parties of which we are unaware that may result in claims of infringement. Accordingly, there can be no assurance that our product candidates do not infringe proprietary rights of third parties, and parties making claims against us may seek and obtain injunctive or other equitable relief, which could potentially block further efforts to develop and commercialize our product candidates. Any litigation involving defense against claims of infringement, regardless of the merit of such claims, would involve substantial litigation expense and would be a substantial diversion of management time.

We intend, if necessary, to vigorously enforce our intellectual property in order to protect the proprietary position of our product candidates. Active efforts to enforce our patents may include litigation, administrative proceedings, or both, depending on the potential benefits that might be available from those actions and the costs associated with undertaking those efforts against third parties. We carefully review and monitor publicly available information regarding products that may be competitive with our product candidates and assert our intellectual property rights where appropriate.

We may consider administrative proceedings and other means for challenging third party patents and patent applications. Third parties may also challenge our patents and patent applications, through interference, reexamination, ***inter partes*** review, and post-grant review proceedings before the USPTO or through other comparable proceedings, such as oppositions or invalidation proceedings, before foreign patent offices. An unfavorable outcome in any such challenge could require us to cease using the related technology and to attempt to license rights to it from the prevailing third party, which may not be available on commercially reasonable terms, if at all, in which case our business could be harmed. Even if we are successful, participation in administrative proceedings before the USPTO or a foreign patent office may result in substantial costs and time on the part of our management and other employees.

Furthermore, there is a risk that any public announcements concerning the status or outcomes of intellectual property litigation or administrative proceedings may adversely affect the price of our stock. If securities analysts or our investors interpret such status or outcomes as negative or otherwise creating uncertainty, our common stock price may be adversely affected.

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

Our reliance on third party contractors to develop and manufacture our product candidates is based upon agreements that limit the rights of the third parties to use or disclose our confidential information, including our trade secrets and know-how. Despite the contractual provisions, the need to share trade secrets and other confidential information increases the risk that such trade secrets and information are disclosed or used, even if unintentionally, in violation of these agreements. In the highly competitive markets in which our product candidates are expected to compete, protecting our trade secrets, including our strategies for addressing competing products, is imperative, and any unauthorized use or disclosure could impair our competitive position and may have a material adverse effect on our business and operations.

In addition, our collaboration partners are larger, more complex organizations than ours, and the risk of inadvertent disclosure of our proprietary information may be increased despite their internal procedures and contractual obligations in place with our collaboration partners. Despite our efforts to protect our trade secrets and other confidential information, a competitor's discovery of such trade secrets and information could impair our competitive position and have an adverse impact on our business.

We have an extensive worldwide patent portfolio. The cost of maintaining our patent protection is high and maintaining our patent protection requires continuous review and compliance in order to maintain worldwide patent protection. We may not be able to effectively maintain our intellectual property position throughout the major markets of the world.

The USPTO and foreign patent authorities require maintenance fees and payments as well as continued compliance with a number of procedural and documentary requirements. Noncompliance may result in abandonment or lapse of the subject patent or patent application, resulting in partial or complete loss of patent rights in the relevant jurisdiction. Non-compliance may result in reduced royalty payments for lack of patent coverage in a particular jurisdiction from our collaboration partners or may result in competition, either of which could have a material adverse effect on our business.

We have made, and will continue to make, certain strategic decisions in balancing costs and the potential protection afforded by the patent laws of certain countries. As a result, we may not be able to prevent third parties from practicing our inventions in all countries throughout the world, or from selling or importing products made using our inventions in and into the United States or other countries. Third parties may use our technologies in territories in which we have not obtained patent protection to develop their own products and, further, may infringe our patents in territories which provide inadequate enforcement mechanisms, even if we have patent protection. Such third party products may compete with our product candidates, and our patents or other intellectual property rights may not be effective or sufficient to prevent them from competing.

The laws of some foreign countries do not protect proprietary rights to the same extent as do the laws of the United States, and we may encounter significant problems in securing and defending our intellectual property rights outside the United States.

Many companies have encountered significant problems in protecting and defending intellectual property rights in certain countries. The legal systems of certain countries do not always favor the enforcement of patents, trade secrets, and other intellectual property rights, particularly those relating to pharmaceutical and biotechnology products, which could make it difficult for us to stop infringement of our patents, misappropriation of our trade secrets, or marketing of competing products in violation of our proprietary rights. Proceedings to enforce our intellectual property rights in foreign countries could result in substantial costs and divert our efforts and attention from other aspects of our business, and could put our patents in these territories at risk of being invalidated or interpreted narrowly, or our patent applications at risk of not granting, and could provoke third parties to assert claims against us. We may not prevail in all legal or other proceedings that we may initiate and, if we were to prevail, 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.

Intellectual property rights do not address all potential threats to any competitive advantage we may have.

The degree of future protection afforded by our intellectual property rights is uncertain because intellectual property rights have limitations, and intellectual property rights may not adequately protect our business or permit us to maintain our competitive advantage. The following examples are illustrative:

- Others may be able to make cellular treatments that are the same as or similar to our current or future product candidates but that are not covered by the claims of the patents that we own or have exclusively licensed.
- We or any of our licensors or strategic partners might not have been the first to make the inventions covered by the issued patent or pending patent application that we own or have exclusively licensed.
- We or any of our licensors or strategic partners might not have been the first to file patent applications covering certain of our inventions.

- Others may independently develop similar or alternative technologies or duplicate any of our technologies without infringing our intellectual property rights.
- The prosecution of our pending patent applications may not result in granted patents.
- Granted patents that we own or have exclusively licensed may not provide us with any competitive advantages, or may be held invalid or unenforceable, as a result of legal challenges by our competitors.
- Patent protection on our product candidates may expire before we are able to develop and commercialize the product, or before we are able to recover our investment in the product.
- Our competitors might conduct research and development activities in the United States and other countries that provide a safe harbor from patent infringement claims for such activities, as well as in countries in which we do not have patent rights, and may then use the information learned from such activities to develop competitive products for sale in markets where we intend to market our product candidates.

If we fail to meet our obligations under license agreements, we may lose our rights to key technologies on which our business depends.

Our business will depend in part on several technologies that are based in part on technology licensed from third parties, including the University of California, and the Wisconsin Alumni Research Foundation. Those third-party license agreements impose obligations on us, including payment obligations and obligations to pursue development of commercial products under the licensed patents or technology. If a licensor believes that we have failed to meet our obligations under a license agreement, the licensor could seek to limit or terminate our license rights, which could lead to costly and time-consuming litigation and, potentially, a loss of the licensed rights. During the period of any such litigation our ability to carry out the development and commercialization of potential products, and our ability to raise capital, could be significantly and negatively affected. If our license rights were restricted or ultimately lost, we would not be able to continue to use the licensed technology in our business.

The price and sale of any of our products that receive regulatory approval may be limited by health insurance coverage and government regulation.

Success in selling any of our products that receive regulatory approval may depend in part on the extent to which health insurance companies, HMOs, and government health administration authorities such as Medicare and Medicaid will pay for the cost of the products and related treatment. Until we actually introduce a new product into the medical market place we will not know with certainty whether adequate health insurance, HMO, and government coverage will be available to permit the product to be sold at a price high enough for us to generate a profit. In some foreign countries, pricing or profitability of health care products is subject to government control which may result in low prices for our products. In the United States, there have been a number of federal and state proposals to implement similar government controls, and new proposals are likely to be made in the future.

The implementation of the ACA in the United States may adversely affect our business.

As a result of the March 2010 adoption of the ACA in the United States, substantial changes are being made to the current system for paying for healthcare in the United States, including programs to extend medical benefits to millions of individuals who currently lack insurance coverage. The changes contemplated by the ACA are subject to rule-making and implementation timelines that extend for several years, as well as initiatives in Congress to amend or repeal the law, and this uncertainty limits our ability to forecast changes that may occur in the future. However, implementation of the ACA has already begun with respect to certain significant cost-saving measures, including changes to several government healthcare programs that may cover the cost of our future products, including Medicaid, Medicare Parts B and D, and these efforts could have a materially adverse impact on our future financial prospects and performance. For example, with respect to Medicaid, in order for a manufacturer's products to be reimbursed by federal funding under Medicaid, the manufacturer must enter into a Medicaid rebate agreement with the Secretary of the United States Department of Health and Human Services, and must pay certain rebates to the states based on utilization data provided by each state to the manufacturer and to CMS, and based on pricing data provided by the manufacturer to the federal government. The states share this savings with the federal government, and sometimes implement their own additional supplemental rebate programs. Under the Medicaid drug rebate program, the rebate amount for most branded drug products was previously equal to a minimum of 15.1% of the Average Manufacturer Price, or AMP, or the AMP less Best Price, whichever is greater. Effective January 1, 2010, the ACA generally increases the size of the Medicaid rebates paid by manufacturers for single source and innovator multiple source (brand name) drug product from a minimum of 15.1% to a minimum of 23.1% of the AMP, subject to certain exceptions, for example, for certain clotting factors, the increase is limited to a minimum of 17.1% of the AMP. For non-innovator multiple source (generic) products, the rebate percentage is increased from a minimum of 11.0% to a minimum of 13.0% of AMP. In 2010, the ACA also newly extended this rebate obligation to prescription drugs covered by Medicaid managed care organizations. These increases in required rebates may adversely affect our future financial prospects and performance. The ACA also creates new rebate obligations for products under Medicare Part D, a partial, voluntary prescription drug benefit created by the United States federal government primarily for persons 65 years old and over. The Part D drug program is administered through private insurers that contract with CMS. Beginning in 2011, the healthcare reform law generally requires that in order for a drug manufacturer's products to be reimbursed under Medicare Part D, the manufacturer must enter into a Medicare Coverage Gap Discount Program agreement with the Secretary of the United States Department of Health and Human Services, and reimburse each Medicare Part D plan sponsor an amount equal to 50% savings for the manufacturer's brand name drugs and biologics which the Part D plan sponsor has provided to its Medicare Part D beneficiaries who are in the "donut hole" (or a gap in Medicare Part D coverage for beneficiaries who have expended certain amounts for drugs). The Part D plan sponsor is responsible for calculating and providing the discount directly to its beneficiaries and for reporting these amounts paid to CMS's contractor, which notifies drug manufacturers of the rebate amounts it must pay to each Part D plan sponsor. The rebate requirement could adversely affect our future financial performance, particularly if contracts with Part D plans cannot be favorably renegotiated or the Part D plan sponsors fail to accurately calculate payments due in a manner that overstates our rebate obligation. The ACA also introduced a biosimilar pathway that will permit companies to obtain FDA approval of generic versions of existing biologics based upon reduced documentation and data requirements deemed sufficient to demonstrate safety and efficacy than are required for the pioneer biologics. The new law provides that a biosimilar application may be submitted as soon as four years after the reference product is first licensed, and that the FDA may not make approval of an application effective until 12 years after the reference product was first licensed. With the likely introduction of biosimilars in the United States, we expect in the future to face greater competition from biosimilar products, including a possible increase in patent challenges. The FDA has reported meeting with sponsors who are interested in developing biosimilar products, and is developing regulations to implement the abbreviated regulatory review pathway. Regarding access to our products, the ACA established and provided significant funding for a Patient-Centered Outcomes Research Institute to coordinate and fund Comparative Effectiveness Research, or CER. While the stated intent of CER is to develop information to guide providers to the most efficacious therapies, outcomes of CER could influence the reimbursement or coverage for therapies that are determined to be less cost-effective than others. Should any of our products be determined to be less cost

effective than alternative therapies, the levels of reimbursement for these products, or the willingness to reimburse at all, could be impacted, which could materially impact our future financial prospects and results.

Risks Related to Our Relationship With BioTime

BioTime has a significant influence on our business operations.

As of December 1, 2016, BioTime owns approximately 47% of our issued and outstanding Common Stock. Because BioTime is by far our largest shareholder and owns close to a majority of the outstanding Common Stock, it has the voting power to significantly impact any matter that requires shareholder approval. Furthermore, three of the nine members of our Board of Directors are also directors of BioTime, and another director is an employee of Broadwood Capital, Inc., which is the general partner of Broadwood Partners, L.P., the partnership that is the largest shareholder of BioTime. Some of our directors also serve on the Boards of Directors of one or more of BioTime's other subsidiaries. As a result of the relationships described above, BioTime has significant influence over our business operations, and therefore, BioTime could cause corporate actions to be taken even if the interests of BioTime conflict with the interests of our other shareholders. This concentration of voting power could have the effect of deterring or preventing a change in control that might be beneficial to our other shareholders.

We partially rely upon BioTime for certain services and resources

Although we have our own research facilities, scientific personnel, and some management and administrative personnel, we partially rely on BioTime to provide certain management and administrative services, including financial services related to financial accounting and reporting. We have entered into a Shared Facilities and Services Agreement with BioTime under which we have agreed to bear costs allocated to us by BioTime for the use of BioTime human resources and for services and materials provided for our benefit by BioTime. We pay BioTime 105% of its costs of providing personnel and services to us, and for any use of its facilities by us, including an allocation of general overhead based on that use. We may also share the services of some research personnel with BioTime.

If BioTime's personnel that we rely upon to provide these services are not sufficient to serve both BioTime's needs and ours, we will have to hire additional personnel of our own, either on a full-time or part-time basis, as employees or as consultants, and the cost of doing so could be greater than the costs that would be allocated to us by BioTime. Also, any new personnel that we may need to hire may not be as familiar with our business or operations as BioTime's personnel, which means that we would incur the expense and inefficiencies related to training new employees or consultants.

Conflicts of interest may arise from our relationship with BioTime

Our relationship with BioTime could give rise to certain conflicts of interest that could have an impact on our research and development programs, business opportunities, and operations generally.

- We and BioTime or any of its other subsidiaries may determine to engage in research and development of the same or similar products or technologies, or products that would otherwise compete in the market place. Even if we utilize different technologies than BioTime or its other subsidiaries, we could find ourselves in competition with them for research scientists, financing and other resources, licensing, manufacturing, and distribution

- Because of our relationship with BioTime as described in the prior risk factor, BioTime could prevent us from engaging in research and development programs, investments, business ventures, or agreements to develop, license, or acquire products or technologies that would or might compete with those owned, licensed, or under development by BioTime or any of its other subsidiaries.

- In February 2016, we entered into a certain Cross-License Agreement (the "Cross License") with BioTime a subsidiary of BioTime, ES Cell International Pte Ltd. Under this Cross-License Agreement, we received a fully-paid, non-royalty-bearing, world-wide, non-exclusive, sub-licensable license under certain patents and related patent rights owned by BioTime and ES Cell International, and in exchange, we granted BioTime and ES Cell International a fully-paid, non-royalty-bearing, world-wide, non-exclusive, sub-licensable license certain patents and related patent rights we own. In the future, we may enter into additional license or sublicense agreements with BioTime or another BioTime subsidiary. Conflicts of interest could arise in determining the scope and financial terms of any such licenses or sublicenses, including the fields of use permitted, licensing fees, and royalties, if any, and other matters.

- BioTime and its other subsidiaries will engage for their own accounts in research and product development programs, investments, and business ventures, and we will not be entitled to participate or to receive an interest in those programs, investments, or business ventures. BioTime and its other subsidiaries will not be obligated to present any particular research and development, investment, or business opportunity to us, even if the opportunity would be within the scope of our research and development plans or programs, business objectives, or investment policies. These opportunities may include, for example, opportunities to acquire businesses or assets, including but not limited to patents and other intellectual property that could be used by us or by BioTime or by any of BioTime's other subsidiaries. Our respective boards of directors will have to determine which company should pursue those opportunities, taking into account relevant facts and circumstances at the time, such as the financial and other resources of the companies available to acquire and utilize the opportunity, and the best "fit" between the opportunity and the business and research and development programs of the companies. However, by virtue of their significant voting power, BioTime has significant influence in decision making with respect to the allocation of opportunities.

- Under the Cross License, Bio and ES Cell International may have a conflict of interest in determining how and when they should enforce their rights under the Cross License if they were to default or otherwise fail to perform any of their obligations under the Cross License.

- One of our significant assets is 3,852,880 BioTime common shares that we held as of December 1, 2016. We may sell the BioTime common shares from time to time, or to pledge those shares as collateral for loans, to raise capital to finance our operations. Because a sale of those shares could have a depressing effect on the market value of BioTime common shares, BioTime will have a continuing interest in the number of shares we sell, the prices at which we sell the shares, and time and manner in which the shares are sold. Further, we may need or find it desirable to sell BioTime common shares at the same time as BioTime, or other BioTime subsidiaries that hold BioTime common shares, also desire to sell some of their BioTime common shares. Concurrent sales of BioTime common shares by us, BioTime, or other BioTime subsidiaries could have a depressing effect on the market price of the BioTime common shares, lowering the price at which we and they are able to sell BioTime common shares and resulting in lower net proceeds from the sales. We may coordinate any future sales of our BioTime common shares with BioTime and its other subsidiaries in order to provide an orderly and controlled process for raising capital through the sale of BioTime shares. This may include an agreement as to the number of shares to be sold, the time period or "market window" for selling shares, the use of a common securities broker-dealer, and a fair allocation of net sales based on average sales prices during any trading day on which we and they sell BioTime shares.

- Each conflict of interest will be resolved by our respective boards of directors in keeping with their fiduciary duties and such policies as they may implement from time to time. However, the terms and conditions of patent and technology licenses and other agreements between us and BioTime or other BioTime subsidiaries will not be negotiated on an arm's-length basis due to BioTime's ownership of a controlling interest in us and due to the commonality of directors serving on our respective boards of directors.

Risks Related to Our Dependence on Third Parties

We could lose our CIRM grant if we fail to meet the clinical trial milestones that are a condition to CIRM's obligation to provide funding.

We are depending upon our grant from CIRM as a source of financing for the costs of conducting our Phase 1/2a clinical trial and process development of AST-OPC1. Under the terms of the CIRM grant, as amended effective March 2, 2016, we must meet certain progress milestones pertaining to the clinical trial in order to receive additional payments. If we fail to meet the milestones, payments will be delayed. Additionally, under the agreement CIRM has the right to suspend payment upon the occurrence of certain Suspension Events, which could force us to postpone, delay, or discontinue the clinical trial and development work for the product.

Establishing and maintaining strategic alliances is a key component of our business strategy. If we are unable to establish and maintain strategic alliances for our therapeutic product candidates, we may have to reduce or delay our product development or increase our expenditures.

A key component of our current strategy for developing, manufacturing and commercializing our therapeutic product candidates will be entering into strategic alliances with pharmaceutical companies or other industry participants to advance our programs and enable us to maintain our financial and operational capacity. We will face significant competition in seeking appropriate alliances. We may not be able to negotiate alliances on acceptable terms, if at all. If our strategic alliances do not result in the successful development and commercialization of our product candidates or if one or more of our collaborators terminates its agreement with us, we may not receive any future research and development funding or milestone or royalty payments under the collaboration. If we do not receive the funding we expect under these agreements, our continued development of our product candidates could be delayed and we may need to obtain additional funding, which may be unavailable or available only on unfavorable terms.

If we are able to enter into product development and marketing arrangements with pharmaceutical companies, we may license product development, manufacturing, and marketing rights to the pharmaceutical company or to a joint venture company formed with the pharmaceutical company. Under such arrangements we might receive only a royalty on sales of the products developed or an equity interest in a joint venture company that develops the product. As a result, our revenues from the sale of those products may be substantially less than the amount of revenues and gross profits that we might receive if we were to develop, manufacture, and market the products ourselves.

We may become dependent on possible future collaborations to develop and commercialize many of our product candidates and to provide the manufacturing, regulatory compliance, sales, marketing and distribution capabilities required for the success of our business.

We may enter into various kinds of collaborative research and development, manufacturing, and product marketing agreements to develop and commercialize our products. Any future milestone payments and cost reimbursements from collaboration agreements could provide an important source of financing for our research and development programs, thereby facilitating the application of our technology to the development and commercialization of our products, but there are risks associated with entering into collaboration arrangements.

There is a risk that we could become dependent upon one or more collaborative arrangements for product development or manufacturing or as a source of revenues from the sale of any products that may be developed by us alone or through one of the collaborative arrangements. A collaborative arrangement upon which we might depend might be terminated by our collaboration partner or they might determine not to actively pursue the development or commercialization of our products. A collaboration partner also may not be precluded from independently pursuing competing products and drug delivery approaches or technologies.

There is a risk that a collaboration partner might fail to perform its obligations under the collaborative arrangements or may be slow in performing its obligations. In addition, a collaboration partner may experience financial difficulties at any time that could prevent it from having available funds to contribute to the collaboration. If a collaboration partner fails to conduct its product development, manufacturing, commercialization, regulatory compliance, sales and marketing or distribution activities successfully and in a timely manner, or if it terminates or materially modifies its agreements with us, the development and commercialization of one or more product candidates could be delayed, curtailed or terminated because we may not have sufficient financial resources or capabilities to continue product development, manufacturing, and commercialization on our own.

Industry and other market data used in this Prospectus, including those undertaken by us or our engaged consultants, may prove to be unrepresentative of current and future market conditions or future results.

This Prospectus includes statistical and other industry and market data that we obtained from industry publications and research, surveys and studies conducted by third parties, and surveys and studies we commissioned, regarding the market potential for our product candidates. Although we believe that such information has been obtained from sources believed to be reliable, neither the sources of such data, nor we, can guarantee the accuracy or completeness of such information. While we believe these industry publications and third party research, surveys and studies are reliable, we have not independently verified such data. With respect to the information from third party consultants, the results of that study represent the independent consultants' own methodologies, assumptions, research, analysis, projections, estimations, composition of respondent pool, presentation of data, and adjustments, each of which may ultimately prove to be incorrect, and cause actual results and market viability to differ materially from those presented in such report. Readers should not place undue reliance on this information.

Risks Pertaining to Our Common Stock

Ownership of our common stock will entail certain risks associated with the volatility of prices for our shares and the fact that we do not pay dividends on our common stock.

The price of our common stock may rise and fall rapidly.

The market price of our common stock like that of the shares of many biotechnology companies, is highly volatile. The price of our common stock may rise or fall rapidly as a result of a number of factors, including:

- sales or potential sales of substantial amounts of our common stock;
- results of preclinical testing or clinical trials of our product candidates or those of our competitors;
- announcements about us or about our competitors, including clinical trial results, regulatory approvals, new product introductions and commercial results;
- the cost of our development programs;
- the success of competitive products or technologies;
- litigation and other developments relating to our issued patents or patent applications or other proprietary rights or those of our competitors;
- conditions in the pharmaceutical or biotechnology industries;
- actual or anticipated changes in estimates as to financial results, development timelines or recommendations by securities analysts;
- variations in our financial results or those of companies that are perceived to be similar to us, including the failure of our earnings to meet analysts' expectations; and
- general economic, industry and market conditions.

Many of these factors are beyond our control. The stock markets in general, and the market for pharmaceutical and biotechnological companies in particular, have been experiencing extreme price and volume fluctuations which have affected the market price of the equity securities without regard to the operating performance of the issuing companies. Broad market fluctuations, as well as industry factors and general economic and political conditions, may adversely affect the market price of our common stock.

The JOBS Act allows us to postpone the date by which we must comply with certain laws and regulations intended to protect investors and to reduce the amount of information we provide in our reports filed with the Commission, which could undermine investor confidence in our company and adversely affect the market price of our securities.

The JOBS Act is intended to reduce the regulatory burden on "emerging growth companies." As defined in the JOBS Act, a public company whose initial public offering of common equity securities occurred after December 8, 2011 and whose annual gross revenues are less than $1.0 billion will, in general, qualify as an emerging growth company until the earliest of:

- the last day of its fiscal year following the fifth anniversary of the date of its initial public offering of common equity securities;
- the last day of its fiscal year in which it has annual gross revenue of $1.0 billion or more;

- the date on which it has, during the previous three-year period, issued more than $1.0 billion in non-convertible debt; and

- the date on which it is deemed to be a "large accelerated filer," which will occur at such time as we (a) have an aggregate worldwide market value of common equity securities held by non-affiliates of $700 million or more as of the last business day of its most recently completed second fiscal quarter, (b) have been required to file annual and quarterly reports under the Securities Exchange Act of 1934 for a period of at least 12 months, and (c) have filed at least one annual report pursuant to the Securities Exchange Act of 1934.

Under this definition, we are an emerging growth company and could remain an emerging growth company until as late as December 31, 2019.

The JOBS Act provides that, so long as we qualify as an emerging growth company, we will, among other things:

- be exempt from the provisions of Section 404(b) of the Sarbanes-Oxley Act requiring that our independent registered public accounting firm provide an attestation report on the effectiveness of our internal control over financial reporting;

- be exempt from the "say on pay" provisions (requiring a non-binding stockholder vote to approve compensation of certain executive officers) and the "say on golden parachute" provisions (requiring a non-binding stockholder vote to approve golden parachute arrangements for certain executive officers in connection with mergers and certain other business combinations) of the Dodd-Frank Act and certain disclosure requirements of the Dodd-Frank Act relating to compensation of our chief executive officer;

- be permitted to omit the detailed compensation discussion and analysis from proxy statements and reports filed under the Securities Exchange Act of 1934 and instead provide a reduced level of disclosure concerning executive compensation; and

- be exempt from any rules that may be adopted by the Public Company Accounting Oversight Board requiring mandatory audit firm rotation or a supplement to the auditor's report on the financial statements.

Although we are still evaluating the JOBS Act, we currently take advantage of the reduced regulatory and reporting requirements that are available to us so long as we qualify as an "emerging growth company," except that we have irrevocably elected not to take advantage of the extension of time to comply with new or revised financial accounting standards available under Section 102(b) of the JOBS Act. Among other things, this means that our independent registered public accounting firm will not be required to provide an attestation report on the effectiveness of our internal control over financial reporting so long as we qualify as an emerging growth company, which may increase the risk that weaknesses or deficiencies in our internal control over financial reporting go undetected. Likewise, so long as we qualify as an emerging growth company, we may elect not to provide you with certain information, including certain financial information and certain information regarding compensation of our executive officers, that we would otherwise have been required to provide in filings we make with the Commission, which may make it more difficult for investors and securities analysts to evaluate our company. As a result, investor confidence in our company and the market price of our securities may be materially and adversely affected.

Our stock price could decline due to the large number of outstanding shares of our common stock eligible for future sale.

Sales of substantial amounts of our common stock in the public market, or the perception that those sales could occur, could cause the market price of our common stock to decline. Sales of substantial amounts of common stock could also make it more difficult for us to sell equity or equity-related securities in the future at a time and price that we deem appropriate.

We do not currently intend to pay dividends on any of our classes of securities and, consequently, your ability to achieve a return on your investment will depend on the appreciation in the price of our securities.

We have never declared or paid any cash dividends on any class of our securities. We currently intend to retain any future earnings to fund our future growth and do not expect to declare or pay any dividend on any class of our securities in the foreseeable future. As a result, you may only realize a gain on your investment in our securities if the market price of our securities appreciates and you sell your securities at a price above your cost after accounting for any taxes. The price of our securities may not appreciate in value or ever exceed the price that you paid for our securities.

The price of our common stock, and the value of our assets, will be affected by changes in the value of the BioTime common shares that we own.

As of December 1, 2016, we held 3,852,880 BioTime common shares. The value of our common stock will reflect, in part, the value of the BioTime common shares that we hold. The value of the BioTime common shares we hold will vary with the price at which BioTime common shares trade in the public market. The market price of BioTime common shares will be impacted by a number of factors, including the results of BioTime's operations.

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

The current trading market for our common stock relies in part on the research and reports that industry or financial analysts publish about us, our business, our markets and our competitors. We do not control these analysts. If securities analysts do not cover us, the lack of research coverage may adversely affect the market price of our common stock. Furthermore, if one or more of the analysts who do cover us downgrade our stock or if those analysts issue other unfavorable commentary about us or our business, our stock price would likely decline. If one or more of these analysts cease coverage of us or fails to regularly publish reports on us, we could lose visibility in the market and interest in our stock could decrease, which in turn could cause our stock price or trading volume to decline.

You may experience dilution of your ownership interests because of the future issuance of additional shares of our common stock and our preferred stock.

In the future, we may issue our authorized but previously unissued equity securities, resulting in the dilution of the ownership interests of our present shareholders. We are currently authorized to issue an aggregate of 150,000,000 shares of common stock, consisting of 75,000,000 Series A Shares, which we refer to as the "Common Stock" here in this prospectus, and 75,000,000 of our Series B Common Stock, of which none are currently outstanding. We are also authorized to issue 5,000,000 shares of "blank check" preferred stock. As of December 1, 2016, we had issued and outstanding 46,686,410 shares of Common Stock. We have also reserved 6,697,870 shares of Common Stock for issuance upon the exercise of outstanding warrants. We have also reserved 11,000,000 shares of Common Stock for issuance under a stock option and stock purchase plan, of which, 2,222,254 shares were available for issuance.

We may issue additional shares of Common Stock or other securities in order to raise additional capital, or in connection with hiring or retaining employees or consultants, or in connection with future acquisitions of licenses to technology or rights to acquire products, in connection with future business acquisitions, or for other business purposes. The future issuance of any such additional shares of common stock or other securities may create downward pressure on the trading price of our Common Stock.

We may also issue 5,000,000 shares of preferred stock having rights, preferences, and privileges senior to the rights of our common stock with respect to dividends, rights to share in distributions of our assets if we liquidate our company, or voting rights. Any preferred stock may also be convertible into Series A Shares on terms that would be dilutive to holders of common stock.

USE OF PROCEEDS

We will retain broad discretion over the use of net proceeds to us from the sale of our securities offered hereby. Except as may be otherwise described in a prospectus supplement, we currently anticipate using any net proceeds to us for general corporate purposes. The amounts and timing of our actual expenditures may vary significantly depending upon numerous factors.

Pending the application of such proceeds, we may invest the proceeds in short-term, interest bearing, investment-grade marketable securities or money market obligations.

DESCRIPTION OF CAPITAL STOCK

General

Our Amended and Restated Certificate of Incorporation currently authorizes us to issue an aggregate of 155,000,000 shares of capital stock, of which (i) 150,000,000 are shares of common stock comprised of 75,000,000 shares of Series A Common Stock, par value $0.0001 per share (which we refer to as the "Common Stock" in this prospectus), and 75,000,000 shares of Series B Common Stock, par value $0.0001 per share (the "Series B Common Stock"), and (ii) 5,000,000 are shares of "blank check" preferred stock (the "Preferred Stock"), par value $0.0001 per share.

As of December 1, 2016, we had 46,686,410 shares of Common Stock issued and outstanding and an additional 8,920,124 shares of Common Stock issuable upon exercise of outstanding options and warrants. No Series B Common Stock or shares of Preferred Stock are issued and outstanding.

The following summary description of our capital stock is based on the provisions of our certificate of incorporation and bylaws and the applicable provisions of the Delaware General Corporation Law. This information is qualified entirely by reference to the applicable provisions of our certificate of incorporation, bylaws and the Delaware General Corporation Law. For information on how to obtain copies of our certificate of incorporation and bylaws, which are exhibits to the registration statement of which this prospectus is a part, see "Where You Can Find Additional Information."

Preferred Stock

Our certificate of incorporation currently authorizes the issuance of up to 5,000,000 shares of Preferred Stock. We may issue Preferred Stock in one or more series, at any time, with such powers, preferences, and rights, and qualifications, limitations and restrictions as our Board of Directors may determine, all without further action of our shareholders. Our Board of Directors may, by resolution, increase or decrease (but not below the number of shares of such series then outstanding) the number of shares of any series of Preferred Stock subsequent to the issue of shares of that series. Any series of Preferred Stock which may be authorized by the Board of Directors in the future may be senior to and have greater rights and preferences than the Common Stock. There are no shares of Preferred Stock presently outstanding and we have no present plan, arrangement or commitment to issue any Preferred Stock.

Common Stock

Rights and Preferences

Holders of Common Stock have no preemptive, conversion or subscription rights and there are no redemption or sinking fund provisions applicable to the Common Stock. The rights, preferences and privileges of the holders of Common Stock are subject to, and may be adversely affected by, the rights of the holders of shares of any series of Preferred Stock that we may designate in the future.

Voting Rights

Each holder of record of Common Stock or Series B Common Stock is entitled to one vote for each outstanding share of Common Stock or Series B Common Stock owned on every matter properly submitted to the shareholders for their vote. The Common Stock and Series B Common Stock will vote together as a single class, without distinction as to series on all matters except as may otherwise be required by Delaware law.

Subject to any voting rights that might be afforded to holders of any Preferred Stock that might be outstanding, matters submitted to our shareholders for a vote will generally require for approval the affirmative vote of a majority of the shares of stock entitled to vote on the matter, without distinction as to class or series, present and voting at a meeting of shareholders at which a quorum is present, unless Delaware law requires a different vote. Delaware law requires the following vote for approval of the following matters:

- A merger or consolidation for which a vote of our shareholders is required, or a sale of all or substantially all of our assets, or a corporate dissolution, will require the affirmative vote of a majority of the outstanding shares of stock entitled to vote on the matter, without distinction as to class or series.

- An amendment of our certificate of incorporation will require the affirmative vote of a majority of the outstanding stock entitled to vote on the amendment, and a majority of the outstanding stock of each class entitled to vote on the amendment as a class. Under Delaware law, the holders of the outstanding shares of a class shall be entitled to vote as a class upon a proposed amendment, whether or not entitled to vote on the amendment by our certificate of incorporation, if the amendment would increase or decrease the aggregate number of authorized shares of the class, increase or decrease the par value of the shares of the class, or alter or change the powers, preferences, or special rights of the shares of the class so as to affect them adversely. If any proposed amendment would alter or change the powers, preferences, or special rights of one or more series of any class so as to affect them adversely, but shall not so affect the entire class, then only the shares of the series so affected by the amendment shall be considered a separate class for the purposes of the vote required to approve the amendment.

- Directors may be elected by a plurality of the shares of stock entitled to vote, voted at a meeting at which a quorum is present.

- Any director or the entire Board of Directors may be removed, with or without cause, by the holders of a majority of the shares then entitled to vote at an election of directors.

A majority of the shares entitled to vote, present in person or represented by proxy, shall constitute a quorum at a meeting of shareholders. Any action required or that may be taken at any annual or special meeting of our shareholders may be taken without a meeting, without prior notice and without a vote, if a consent or consents in writing, setting forth the action so taken, shall be signed by the holders of outstanding stock having not less than the minimum number of votes that would be necessary to authorize or take the action at a meeting at which all shares entitled to vote on the matter were present and voted.

Dividend Rights

Subject to the dividend rights of holders of any shares of the Preferred Stock that may be issued from time to time, holders of our Common Stock are entitled to any dividend declared by the Board of Directors out of funds legally available for that purpose. We have not paid any cash dividends on either the Common Stock or Series B Common Stock, and it is unlikely that any cash dividends will be declared or paid on any series of our Common Stock in the foreseeable future. Instead, we plan to retain our cash for use in financing our future operations and growth. We may declare and pay dividends or other distributions on Common Stock without paying a corresponding dividend or distribution on the Series B Common Stock.

Liquidation Rights

Subject to the prior payment of the liquidation preference to holders of any shares of Preferred Stock that may be issued, holders of Common Stock are entitled to receive on a pro rata basis, without a distinction between Common Stock and Series B Common Stock, all of our remaining assets available for distribution to the holders of Common Stock in the event of the liquidation, dissolution, or winding up of our operations.

Preemptive Rights

Holders of our Common Stock or Series B Common Stock do not have any preemptive rights to become subscribers or purchasers of additional shares of any series of our capital stock.

Delaware Law

Delaware Statutory Business Combinations Provision

We are subject to the anti-takeover provisions of Section 203 of the Delaware General Corporation Law. In general, Section 203 prohibits a publicly-held Delaware corporation from engaging in a "business combination" with an "interested stockholder" for a period of three years after the date of the transaction in which the person became an interested stockholder, unless the business combination is, or the transaction in which the person became an interested stockholder was, approved in a prescribed manner or another prescribed exception applies. For purposes of Section 203, a "business combination" is defined broadly to include a merger, asset sale or other transaction resulting in a financial benefit to the interested stockholder, and, subject to certain exceptions, an "interested stockholder" is a person who, together with his or her affiliates and associates, owns (or within three years prior, did own) 15% or more of the corporation's voting stock. Section 203 could discourage or make it more difficult to effect a change in our management or the acquisition of control by a holder of a substantial amount of our voting stock, even if our stockholders might consider such a change to be in their best interest. These provisions are intended to enhance the likelihood of continuity and stability in the composition of our board of directors and in the policies formulated by the board of directors and to discourage certain types of transactions that may involve an actual or threatened change of control of us. These provisions are designed to reduce our vulnerability to an unsolicited acquisition proposal. The provisions also are intended to discourage certain tactics that may be used in proxy fights. Such provisions also may have the effect of preventing changes in our management.

Transfer Agent and Registrar

The Transfer Agent and Registrar for our Common Stock is American Stock Transfer and Trust Company LLC, 6201 15th Avenue, Brooklyn, New York 11219.

Stock Exchange Listing

Our Common Stock is listed on the NYSE MKT LLC under the trading symbol "AST."

DESCRIPTION OF WARRANTS

As of December 1, 2016, there are 6,697,870 shares of Common Stock issuable upon the exercise of outstanding warrants, at a weighted average exercise price of $4.68.

Number of Warrants	Shares Issuable(1)	Exercise Price(1)	Expiration Date
409,152	409,152	$4.28	February 15, 2017
3,329,159	3,329,159	$5.00	February 15, 2017
2,959,559	2,959,559	$4.37	May 13, 2021

(1) The number of common shares and exercise price will be proportionally adjusted in the event of a stock split, stock dividend, combination, or similar recapitalization of the common shares, and upon the occurrence of certain other transactions.

General

Pursuant to this prospectus, we may issue, in one or more series, warrants to purchase Preferred Stock or Common Stock. The warrants may be issued independently or together with any securities and may be attached to or separate from the securities. If the warrants are issued pursuant to warrant agreements, we will so specify in the prospectus supplement relating to the warrants being offered pursuant to the prospectus supplement. While the following terms described below will apply generally to any warrants we may offer, we will describe the particular terms of any series of warrants in the applicable prospectus supplement. The terms of any warrants offered under a prospectus supplement for a particular series of warrants may specify different or additional terms than those specified below.

The prospectus supplement relating to any warrants that we may offer will contain the specific terms of the warrants. These terms may include the following:

- the title of the warrants;
- the securities (i.e., Preferred Stock or Common Stock) for which the warrants are exercisable;
- the price or prices at which the warrants will be issued;
- if applicable, the designation and terms of the Preferred Stock or Common Stock with which the warrants are issued, and the number of warrants issued with each share of Preferred Stock or Common Stock;
- the aggregate number of warrants;
- the date on which the right to exercise the warrants will commence, and the date on which the right will expire;
- any other terms of the warrants, including terms, procedures and limitations relating to the exchange and exercise of warrants.

Holders of warrants will not be entitled, by virtue of being such holders, to vote, consent, receive dividends, receive notice as stockholders with respect to any meeting of stockholders for the election of our directors or any other matter, or to exercise any rights whatsoever as our stockholders.

Exercise of Warrants

Each warrant will entitle the holder to purchase for cash such principal amount of securities or shares of stock at such exercise price as shall in each case be set forth in, or be determinable as set forth in, the prospectus supplement relating to the warrants offered thereby. Warrants may be exercised at any time up to the close of business on the expiration date set forth in the prospectus supplement relating to the warrants offered thereby. After the close of business on the expiration date, unexercised warrants will become void.

The warrants may be exercised as set forth in the prospectus supplement relating to the warrants offered thereby. Upon receipt of payment and the taking of other action specified in the applicable prospectus supplement, we will, as soon as practicable, forward the securities purchasable upon exercise. If less than all of the warrants represented by such warrant certificate are exercised, a new warrant certificate will be issued for the remaining warrants.

Each warrant agent will act solely as our agent under the applicable warrant agreement and will not assume any obligation or relationship of agency or trust with any holder of any warrant. A single bank or trust company may act as warrant agent for more than one issue of warrants. A warrant agent will have no duty or responsibility in case of any default by us under the applicable warrant agreement or warrant, including any duty or responsibility to initiate any proceedings at law or otherwise, or to make any demand upon us. Any holder of a warrant may, without the consent of the related warrant agent or the holder of any other warrant, enforce by appropriate legal action its right to exercise, and receive the securities purchasable upon exercise of, its warrants.

PLAN OF DISTRIBUTION

We may sell the securities being offered by us in this prospectus pursuant to underwritten public offerings, negotiated transactions, block trades or any combination of such methods. We may sell the securities to or through underwriters, dealers, agents or directly to one or more purchasers. We and our agents reserve the right to accept and to reject in whole or in part any proposed purchase of securities. A prospectus supplement or post-effective amendment, which we will file each time we effect an offering of any securities, will provide the names of any underwriters, dealers or agents, if any, involved in the sale of such securities, and any applicable fees, commissions, or discounts to which such persons shall be entitled to in connection with such offering.

We and our agents, dealers and underwriters, as applicable, may sell the securities being offered by us in this prospectus from time to time in one or more transactions at:

- a fixed price or prices, which may be changed;
- market prices prevailing at the time of sale;
- prices related to such prevailing market prices;
- varying prices determined at the time of sale; or
- negotiated prices.

We may determine the price or other terms of the securities offered under this prospectus by use of an electronic auction. We will describe how any auction will determine the price or any other terms, how potential investors may participate in the auction and the nature of the underwriters' obligations in the applicable prospectus supplement or amendment.

We may solicit directly offers to purchase securities. We may also designate agents from time to time to solicit offers to purchase securities. Any agent that we designate, who may be deemed to be an underwriter as that term is defined in the Securities Act, may then resell such securities to the public at varying prices to be determined by such agent at the time of resale.

We may engage in at the market offerings of our securities. An at the market offering is an offering of our securities at a fixed price through a market maker. We shall name any underwriter that we engage for an at the market offering in a post-effective amendment to the registration statement containing this prospectus. We shall also describe any additional details of our arrangement with such underwriter, including commissions or fees paid, or discounts offered, by us and whether such underwriter is acting as principal or agent, in the related prospectus supplement.

If we use underwriters to sell securities, we will enter into an underwriting agreement with the underwriters at the time of the sale to them, which agreement shall be filed with the Commission. Underwriters may also receive commissions from purchasers of the securities. Underwriters may also use dealers to sell securities. In such an event, the dealers may receive compensation in the form of discounts, concessions or commissions from the underwriters and/or commissions from the purchasers for whom they may act as agents.

Underwriters, dealers, agents and other persons may be entitled, under agreements that may be entered into with us, to indemnification by us against certain civil liabilities, including liabilities under the Securities Act or to contribution with respect to payments which they may be required to make in respect of such liabilities. Underwriters and agents may engage in transactions with, or perform services for, us in the ordinary course of business.

If so indicated in the applicable prospectus supplement, we may authorize underwriters, dealers or other persons to solicit offers by certain institutions to purchase the securities offered by us under this prospectus pursuant to contracts providing for payment and delivery on a future date or dates. The obligations of any purchaser under these contracts will be subject only to those conditions described in the applicable prospectus supplement, and the prospectus supplement will set forth the price to be paid for securities pursuant to those contracts and the commissions payable for solicitation of the contracts.

Any underwriter may engage in over-allotment, stabilizing and syndicate short covering transactions and penalty bids in accordance with Regulation M of the Exchange Act. Over-allotment involves sales in excess of the offering size, which create a short position. Stabilizing transactions involve bids to purchase the underlying security so long as the stabilizing bids do not exceed a specified maximum. Syndicate short covering transactions involve purchases of securities in the open market after the distribution has been completed in order to cover syndicate short positions. Penalty bids permit the underwriters to reclaim selling concessions from dealers when the securities originally sold by such dealers are purchased in covering transactions to cover syndicate short positions. These transactions may cause the price of the securities sold in an offering to be higher than it would otherwise be. These transactions, if commenced, may be discontinued by the underwriters at any time.

Our Common Stock is listed on the NYSE MKT LLC under the symbol "AST." The other securities offered hereby are not listed on any securities exchange or other stock market and, unless we state otherwise in the applicable prospectus supplement, we do not intend to apply for listing of the other securities on any securities exchange or other stock market. Any underwriters to whom we sell securities for public offering and sale may make a market in the securities that they purchase, but the underwriters will not be obligated to do so and may discontinue any market making at any time without notice. Accordingly, we give you no assurance as to the development or liquidity of any trading market for the securities.

The anticipated date of delivery of the securities offered hereby will be set forth in the applicable prospectus supplement relating to each offering.

In order to comply with certain state securities laws, if applicable, the securities may be sold in such jurisdictions only through registered or licensed brokers or dealers. In certain states, the securities may not be sold unless the securities have been registered or qualified for sale in such state or an exemption from regulation or qualification is available and is complied with. Sales of securities must also be made by us in compliance with all other applicable state securities laws and regulations.

We shall pay all expenses of the registration of the securities.

LEGAL MATTERS

If and when the securities being registered hereunder are issued, the validity of such issuance will be passed upon for us by Dentons US LLP, New York, New York.

EXPERTS

OUM & Co. LLP, our independent registered public accounting firm, has audited our financial statements included in our Annual Reports on Form 10-K for the years ended December 31, 2015 and 2014, and the effectiveness of our internal control over financial reporting as of December 31, 2015 and 2014, as set forth in their reports, which are incorporated by reference in this prospectus and elsewhere in the registration statement. Our financial statements are incorporated by reference in reliance on OUM & Co. LLP's reports, given on their authority as experts in accounting and auditing.

Our statements of operations, comprehensive loss, stockholders' equity and cash flows for the year ended December 31, 2013 have been audited by Rothstein Kass, independent public accounting firm, as stated in their report which is incorporated herein by reference. Such financial statements are incorporated herein by reference in reliance on the report of such firm given upon their authority as experts in accounting and auditing.

WHERE YOU CAN FIND MORE INFORMATION

We file annual, quarterly and periodic reports, proxy statements and other information with the Commission. You may read and copy any materials that we file with the Commission at the Commission's Public Reference Room at 100 F Street, N.E., Washington, D.C. 20549. You may obtain information on the operation of the Public Reference Room by calling the Commission at 1-800-SEC-0330. Many of our Commission filings are also available to the public from the Commission's website at http://www.sec.gov. We make available free of charge our annual, quarterly and current reports, proxy statements and other information upon request. To request such materials, please send an e-mail to InvestorRelations@asteriasbio.com or contact Investor Relations, at the following address or telephone number: Asterias Biotherapeutics, Inc., 6300 Dumbarton Circle, Fremont, California 94555, Attention: Investor Relations; (510) 456-3800. Exhibits to the documents will not be sent, unless those exhibits have specifically been incorporated by reference in this prospectus.

We maintain our corporate website at http://www.asteriasbiotherapeutics.com. Our website and the information contained therein or connected thereto is not incorporated into this Registration Statement.

We have filed with the Commission a registration statement on Form S-3 under the Securities Act relating to the securities we are offering by this prospectus. This prospectus does not contain all of the information set forth in the registration statement and the exhibits and schedules to the registration statement. Please refer to the registration statement and its exhibits and schedules for further information with respect to us and our securities. Statements contained in this prospectus as to the contents of any contract or other document are not necessarily complete and, in each instance, we refer you to the copy of that contract or document filed as an exhibit to the registration statement. You may read and obtain a copy of the registration statement and its exhibits and schedules from the Commission, as described in the preceding paragraph.

INCORPORATION BY REFERENCE

The Commission allows us to "incorporate by reference" the information we file with it, which means that we can disclose important information to you by referring you to those documents. The information incorporated by reference is considered to be part of this prospectus, and information that we file later with the Commission will automatically update and supersede this information. We incorporate by reference the documents filed with Commission listed below:

- our Annual Report on Form 10-K for the fiscal year ended December 31, 2015, filed on March 29, 2016;
- our Quarterly Reports on Form 10-Q for the quarter ended March 31, 2016, filed on May 16, 2016, the quarter ended June 30, 2016, filed on August 15, 2016 and the quarter ended September 30, 2016, filed on November 14, 2016;
- our Current Reports on Form 8-K filed with the Commission on January 22, 2016, February 18, 2016, March 3, 2016; March 8, 2016; March 14, 2016; March 16, 2016; March 24, 2016; April 12, 2016; April 29, 2016; May 10, 2016; June 14, 2016; August 9, 2016; September 19, 2016; and November 17, 2016;
- the description of our Common Stock contained in our Registration Statement on Form 8-A filed with the Commission on September 26, 2014.

All reports and other documents subsequently filed by us with the Commission pursuant to Sections 13(a), 13(c), 14, or 15(d) of the Securities Exchange Act of 1934 after the date of this prospectus and before the termination of the offering shall be deemed to be incorporated by reference in this prospectus and to be a part of this prospectus from the date of filing of such reports and documents. This prospectus also incorporates by reference any documents that we file with the Commission after the date that the initial registration statement is filed with the Commission and before the effectiveness of the registration statement. Any statement contained in any document incorporated or deemed to be incorporated by reference herein shall be deemed to be modified or superseded for purposes of this prospectus to the extent that a statement contained in this prospectus or in any other subsequently filed document which also is or is deemed to be incorporated by reference in this prospectus modifies or supersedes such statement. Any statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this prospectus.

We will provide, without charge to each person, including any beneficial owner, to whom this prospectus is delivered, upon written or oral request of such person, a copy of any or all of the documents incorporated by reference in this prospectus other than exhibits, unless such exhibits specifically are incorporated by reference into such documents or this prospectus. Requests for such documents may be made by sending an e-mail to InvestorRelations@asteriasbio.com and requesting any one or more of such filings or by contacting Investor Relations, at the following address or telephone number: Asterias Biotherapeutics, Inc., 6300 Dumbarton Circle, Fremont, CA 94555, Attention: Investor Relations; (510) 456-3800.

$75,000,000

Preferred Stock
Series A Common Stock
Warrants

PROSPECTUS

, 2016

PART II.
INFORMATION NOT REQUIRED IN PROSPECTUS

Item 14. Other Expenses of Issuance and Distribution.

The following is a statement of the estimated costs and expenses, other than underwriting compensation, incurred or expected to be incurred by us in connection with the issuance and distribution of the securities being registered pursuant to this registration statement. All of the amounts shown are estimates except for the SEC registration fee. The amounts do not include the costs of preparing any prospectus supplements, NYSE MKT listing fees, FINRA filing fees, transfer agent fees or other expenses relating to the sale and distribution of particular securities registered pursuant to this registration statement, as those costs and expenses cannot be estimated at this time.

SEC Registration Fee	$	8,692.50
Accounting Fees and Expenses	$	(1)
Legal Fees and Expenses	$	(1)
Miscellaneous Fees and Expenses	$	(1)
Total:	$	(1)

(1) These fees and expenses depend on the securities offered and the number of issuances and, accordingly, cannot be estimated at this time.

Item 15. Indemnification of Officers and Directors.

Our certificate of incorporation provides that no director is personally liable to the Company or its stockholders for monetary damages for any breach of fiduciary duty by such director as a director. Nonetheless, a director is liable to the extent provided by applicable law, (i) for breach of the director's duty of loyalty to the Company or its stockholders, (ii) for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law, (iii) pursuant to Section 174 of the DGCL (relating to unlawful payment of dividend or unlawful stock purchase or redemption) or (iv) for any transaction from which the director derived an improper personal benefit. If the DGCL is amended to authorize the further elimination or limitation of the liability of directors, then the liability of a director of the Company, in addition to the limitation on personal liability provided in our certificate of incorporation, will be limited to the fullest extent permitted by the amended DGCL. No amendment to or repeal of the relevant article of our certificate of incorporation will apply to or have any effect on the liability or alleged liability of any director of the Company for or with respect to any acts or omissions of such director occurring prior to such amendment.

Our certificate of incorporation and bylaws furthermore state that the Company shall indemnify, to the fullest extent permitted by Section 145 of the DGCL, as amended from time to time, each person that such section grants the Company the power to indemnify.

Section 145 of the DGCL provides that a corporation may indemnify directors and officers as well as other employees and individuals against expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by such person in connection with any threatened, pending or completed actions, suits or proceedings in which such person is made a party by reason of such person being or having been a director, officer, employee of or agent to the Registrant. The statute provides that it is not exclusive of other rights to which those seeking indemnification may be entitled under any by-law, agreement, or vote of stockholders or disinterested directors or otherwise.

We have entered into indemnification agreements with one director and certain of our executive officers containing provisions that may require us, among other things, to indemnify them against liabilities that may arise by reason of their status or service as director or officers other than liabilities arising from willful misconduct of a culpable nature and to advance certain expenses incurred as a result of any proceeding against them as to which they could be indemnified. We have obtained limited directors' and officers' liability insurance.

Item 16. Exhibits

See Exhibit Index immediately following the signature pages.

Item 17. Undertakings

(a) The undersigned registrant hereby undertakes:

(1) To file, during any period in which offers or sales are being made, a post-effective amendment to this registration statement:

(i) To include any prospectus required by section 10(a)(3) of the Securities Act;

(ii) To reflect in the prospectus any facts or events arising after the effective date of the registration statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in the registration statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the Commission pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than a 20% change in the maximum aggregate offering price set forth in the "Calculation of Registration Fee" table in the effective registration statement;

(iii) To include any material information with respect to the plan of distribution not previously disclosed in the registration statement or any material change to such information in the registration statement;

provided, *however*, that paragraphs (1)(i), (1)(ii) and (1)(iii) above do not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in reports filed with or furnished to the Commission by the registrant pursuant to Section 13 or Section 15(d) of the Securities Exchange Act of 1934 that are incorporated by reference in the registration statement, or is contained in a form of prospectus filed pursuant to Rule 424(b) that is part of the registration statement.

(2) That, for the purpose of determining any liability under the Securities Act, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.

(4) That, for the purpose of determining liability under the Securities Act to any purchaser:

(i) Each prospectus filed by the registrant pursuant to Rule 424(b)(3) shall be deemed to be part of the registration statement as of the date the filed prospectus was deemed part of and included in the registration statement; and

(ii) Each prospectus required to be filed pursuant to Rule 424(b)(2), (b)(5), or (b)(7) as part of a registration statement in reliance on Rule 430B relating to an offering made pursuant to Rule 415(a)(1)(i), (vii), or (x) for the purpose of providing the information required by section 10(a) of the Securities Act shall be deemed to be part of and included in the registration statement as of the earlier of the date such form of prospectus is first used after effectiveness or the date of the first contract of sale of securities in the offering described in the prospectus. As provided in Rule 430B, for liability purposes of the issuer and any person that is at that date an underwriter, such date shall be deemed to be a new effective date of the registration statement relating to the securities in the registration statement to which that prospectus relates, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof. Provided, however, that no statement made in a registration statement or prospectus that is part of the registration statement or made in a document incorporated or deemed incorporated by reference into the registration statement or prospectus that is part of the registration statement will, as to a purchaser with a time of contract of sale prior to such effective date, supersede or modify any statement that was made in the registration statement or prospectus that was part of the registration statement or made in any such document immediately prior to such effective date; or

(5) That, for the purpose of determining liability of the registrant under the Securities Act of 1933 to any purchaser in the initial distribution of the securities, the undersigned registrant undertakes that in a primary offering of securities of the undersigned registrant pursuant to this registration statement, regardless of the underwriting method used to sell the securities to the purchaser, if the securities are offered or sold to such purchaser by means of any of the following communications, the undersigned registrant will be a seller to the purchaser and will be considered to offer or sell such securities to such purchaser:

(i) Any preliminary prospectus or prospectus of the undersigned registrant relating to the offering required to be filed pursuant to Rule 424;

(ii) Any free writing prospectus relating to the offering prepared by or on behalf of the undersigned registrant or used or referred to by the undersigned registrant;

(iii) The portion of any other free writing prospectus relating to the offering containing material information about the undersigned registrant or its securities provided by or on behalf of the undersigned registrant; and

(iv) Any other communication that is an offer in the offering made by the undersigned registrant to the purchaser.

(b) The undersigned registrant hereby undertakes that, for purposes of determining any liability under the Securities Act, each filing of the registrant's annual report pursuant to Section 13(a) or 15(d) of the Exchange Act (and, where applicable, each filing of an employee benefit plan's annual report pursuant to Section 15(d) of the Exchange Act) that is incorporated by reference in the registration statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

(c) Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of ours under Delaware law or otherwise, we have been advised the opinion of the SEC is that such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event a claim for indemnification against such liabilities (other than payment by us for expenses incurred or paid by a director, officer or controlling person of ours in successful defense of any action, suit, or proceeding) is asserted by a director, officer or controlling person in connection with the securities being registered, we will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction, the question of whether such indemnification by it is against public policy in the Securities Act and will be governed by the final adjudication of such issue.

(d) The undersigned registrant hereby undertakes that:

(1) For purposes of determining any liability under the Securities Act of 1933, the information omitted from the form of prospectus filed as part of this registration statement in reliance upon Rule 430A and contained in a form of prospectus filed by the registrant pursuant to Rule 424(b) (1) or (4) or 497(h) under the Securities Act shall be deemed to be part of this registration statement as of the time it was declared effective.

(2) For the purpose of determining any liability under the Securities Act of 1933, each post-effective amendment that contains a form of prospectus shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

SIGNATURES

Pursuant to the requirements of the Securities Act, the registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-3 and has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Fremont, State of California, on December 16, 2016.

ASTERIAS BIOTHERAPEUTICS, INC.
(Registrant)

By: /s/ Stephen L. Cartt
Stephen L. Cartt
President and Chief Executive Officer

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS that each individual whose signature appears below constitutes and appoints Stephen L. Cartt and Ryan D. Chavez, and each of them, his or her true and lawful attorneys-in-fact and agents with full power of substitution, for him or her and in his or her name, place and stead, in any and all capacities, to sign any and all amendments (including post-effective amendments) to this registration statement, and to sign any registration statement for the same offering covered by the registration statement that is to be effective upon filing pursuant to Rule 462(b) promulgated under the Securities Act, and all post-effective amendments thereto, and to file the same, with all exhibits thereto and all documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully to all intents and purposes as he or she might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents or any of them, or his, her or their substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act, this registration statement has been signed by the following persons in the capacities indicated, on December 16, 2016.

Signature	Title	Date
/S/ Stephen L. Cartt Stephen L. Cartt	Chief Executive Officer, President and Director *(Principal Executive Officer)*	December 16, 2016
/S/ Ryan D. Chavez Ryan D. Chavez	Chief Financial Officer and General Counsel *(Principal Financial and Accounting Officer)*	December 16, 2016
/s/ Don M. Bailey Don M. Bailey	Chairman of the Board	December 16, 2016
/s/ Andrew Arno Andrew Arno	Director	December 16, 2016
/s/ Alfred D. Kingsley Alfred D. Kingsley	Director	December 16, 2016
/s/ Richard T. LeBuhn Richard T. LeBuhn	Director	December 16, 2016

Signature	Title	Date
/s/ Aditya Mohanty Aditya Mohanty	Director	December 16, 2016
/s/ Nat Ricciardi Nat Ricciardi	Director	December 16, 2016
/s/ Howard I. Scher Howard I. Scher	Director	December 16, 2016
/s/ Michael D. West Michael D. West	Director	December 16, 2016

EXHIBIT INDEX

Exhibit Number	Exhibit Title
4.1	Specimen of Series A Common Stock Certificate(1)
4.2	Certificate of Designation with respect to any preferred stock to be issued hereunder(2)
4.3	Form of preferred stock certificate(2)
4.4	Form of warrant agreement(2)
5.1	Opinion of Dentons US LLP(3)
23.1	Consent of Rothstein Kass, independent public accounting firm(3)
23.2	Consent of OUM & Co., LLP, independent registered public accounting firm(3)
23.3	Consent of Dentons US LLP (included in Exhibit 5.1)(3)
24.1	Power of Attorney (included on the signature page hereto)(3)

(1) Incorporated by reference to Registration Statement on Form S-1 (333-187706) filed with the Securities and Exchange Commission on April 3, 2013.

(2) To be incorporated by reference in connection with the offering of the offered securities.

(3) Filed herewith.

Dentons US LLP
1221 Avenue of the Americas
New York, NY 10020-1089
United States

大成 Salans FMC SNR Denton McKenna Long
dentons.com

Exhibit 5.1

December 16, 2016

Board of Directors
Asterias Biotherapeutics, Inc.
6300 Dumbarton Circle
Fremont, CA 94555

Re: Asterias Biotherapeutics, Inc. Registration Statement on Form S-3

Ladies and Gentlemen:

We have acted as counsel to Asterias Biotherapeutics, Inc., a corporation organized under the laws of the State of Delaware (the "Company"), in connection with the registration under the Securities Act of 1933, as amended (the "Securities Act"), of the issuance and sale from time to time pursuant to Rule 415(a)(1)(x), promulgated under the Securities Act, of securities (collectively, the "Securities") with an aggregate public offering price of $75,000,000 on a Registration Statement on Form S-3 (as it may be amended, the "Registration Statement") being filed on the date hereof by the Company with the U.S. Securities and Exchange Commission (the "Commission"), with such Securities consisting of: (i) shares of preferred stock, par value $0.0001 per share, of the Company (the "Preferred Stock"), (ii) shares of Series A Common Stock, par value $0.0001 per share, of the Company (the "Series A Shares"); and (iii) warrants to purchase shares of Preferred Stock or Series A Shares (the "Warrants").

We are delivering this opinion to you in accordance with the requirements of Item 16 of Form S-3 and Item 601(b)(5)(i) of Regulation S-K promulgated by the Commission.

In connection with rendering this opinion, we have examined originals, certified copies or copies otherwise identified as being true copies of the following:

(a) the Registration Statement;

(b) the Amended and Restated Certificate of Incorporation of the Company, (the "Certificate of Incorporation");

(c) the By-Laws of the Company, as amended (as so amended, the "By-Laws");

(d) corporate proceedings of the Company relating to its proposed issuance of the Securities; and

(e) such other instruments and documents as we have deemed relevant or necessary in connection with our opinions set forth herein.

In making the aforesaid examinations, we have assumed the genuineness and authenticity of all documents examined by us and all signatures therein and the conformity to originals of all copies of all documents examined by us. We have also assumed that the corporate records furnished to us by the Company include all corporate proceedings taken by it to date.

Based on and subject to the assumptions, qualifications and limitations set forth herein, we are of the opinion that:

(1) When (i) the Registration Statement has become effective under the Securities Act and (ii) an issuance of the Series A Shares has been duly authorized by the Company and, upon issuance and delivery of certificates for the Series A Shares against payment therefor in accordance with the terms of such corporate proceeding taken by the Company and any applicable underwriting agreement or purchase agreement, and as contemplated by the Registration Statement and/or the applicable prospectus supplement, or upon the exercise of any Warrants to purchase Series A Shares in accordance with the terms thereof, or conversion or exchange of Preferred Stock that, by its terms, is convertible into or exchangeable for Series A Shares, and receipt by the Company of any additional consideration payable upon such conversion, exchange or exercise, as applicable, the Series A Shares represented by such certificates will be validly issued, fully paid and nonassessable.

(2) When (i) the Registration Statement has become effective under the Securities Act, (ii) a series of Preferred Stock has been duly authorized and established by the Company in accordance with the terms of the Certificate of Incorporation, the By-Laws and applicable law, (iii) one or more appropriate Certificate or Certificates of Designation has or have been filed with the Secretary of State of the State of Delaware and (iv) the issuance of such series of Preferred Stock has been appropriately authorized by the Company and, upon issuance and delivery of certificates for such series of Preferred Stock against payment therefor in accordance with the terms of such corporate proceeding taken by the Company and any applicable underwriting agreement or purchase agreement, and as contemplated by the Registration Statement and/or the applicable prospectus supplement, or upon the exercise of any Warrants to purchase such series of Preferred Stock in accordance with the terms thereof, and receipt by the Company of any additional consideration payable upon such exercise, such series of Preferred Stock represented by such certificates will be validly issued, fully paid and nonassessable.

(3) When (i) the Registration Statement has become effective under the Securities Act, (ii) the Warrants and, if applicable, a warrant agreement conforming to the description thereof in the Registration Statement and/or the applicable prospectus supplement have been duly authorized by the Company and any such warrant agreement has been duly executed and delivered by the Company and the warrant agent named therein and (iii) Warrants conforming to the requirements of any related warrant agreement have been duly authenticated by the applicable warrant agent and duly executed and delivered on behalf of the Company against payment therefor in accordance with the terms of such corporate proceeding taken by the Company, any applicable underwriting agreement or purchase agreement and any applicable warrant agreement, and as contemplated by the Registration Statement and/or the applicable prospectus supplement, the Warrants will constitute binding obligations of the Company, enforceable against the Company in accordance with their terms.

The Company has informed us that it intends to issue Securities from time to time on a delayed or continuous basis. The opinions set forth above are limited to applicable laws as in effect on the date hereof. Prior to issuing any Securities pursuant to the Registration Statement (i) the Company will advise us in writing of the terms thereof, and (ii) the Company will afford us an opportunity to review the documents pursuant to which such Securities are to be issued or sold (including the applicable offering documents) and the Company will file such supplement or amendment to this opinion (if any) as we may reasonably consider necessary or appropriate.

We express no opinion as to the laws of any jurisdiction other than the corporate laws of the State of Delaware (including the Delaware General Corporation Law and applicable provisions of the Delaware constitution, as well as reported judicial decisions interpreting the same, but excluding local laws), the federal laws of the United States of America and with respect to the opinion set forth in paragraph 3 above, the laws of the State of New York.

We hereby consent to the use of our opinion as herein set forth as an exhibit to the Registration Statement and to the use of our name under the caption "Legal Matters" in the prospectus forming a part of the Registration Statement. We do not, by giving such consent, admit that we are within the category of persons whose consent is required under Section 7 of the Act.

Very truly yours,

/s/ Dentons US LLP

Exhibit 23.1

Consent of Independent Public Accounting Firm

We consent to the reference to our firm under the caption "Experts" in the Registration Statement and related Prospectus of Asterias Biotherapeutics, Inc. for the registration of up to $75,000,000 of its Preferred Stock, Series A Common Stock , or Warrants and to the incorporation by reference therein of our report dated March 17, 2014, with respect to the financial statements of Asterias Biotherapeutics, Inc. for the year ended December 31, 2013, included in its Annual Report (Form 10-K) for the year ended December 31, 2015, filed with the U.S. Securities and Exchange Commission.

/s/ Rothstein Kass

New York, New York
December 16, 2016

EXHIBIT 23.2

CONSENT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

We hereby consent to the incorporation by reference in the prospectus constituting a part of this Registration Statement on Form S-3 of Asterias Biotherapeutics, Inc., of our reports dated March 29, 2016 relating to the financial statements and the effectiveness of Asterias Biotherapeutics' internal control over financial reporting appearing in the Company's Annual Report on Form 10-K for the year ended December 31, 2015.

We also consent to the reference to us under the caption "Experts" in the Prospectus.

/s/ OUM & CO. LLP

San Francisco, California
December 16, 2016