PROGENICS PHARMACEUTICALS INC Form 424B5 August 08, 2018

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Filed pursuant to Rule 424(b)(5)

Registration Statement No. 333-215454

PROSPECTUS SUPPLEMENT

(to Prospectus dated January 19, 2017)

9,090,909 Shares

Progenics Pharmaceuticals, Inc.

Common Stock

We are offering 9,090,909 shares of our common stock. Our common stock is quoted on The Nasdaq Global Select Market under the symbol "PGNX." On August 7, 2018, the last reported sale price of our common stock on The Nasdaq Global Select Market was \$8.93 per share.

Investing in our common stock involves a high degree of risk. Please read "Risk Factors" beginning on page S-5 of this prospectus supplement and in the documents incorporated by reference in this prospectus supplement and the accompanying prospectus.

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

	Per	Total
	Share	Total
Public Offering Price	\$8.250	\$74,999,999.25
Underwriting Discounts and Commissions	\$0.495	\$4,499,999.95
Proceeds to us, before expenses	\$7.755	\$70,499,999.30

Delivery of the shares of our common stock is expected to be made on or about August 10, 2018. We have granted the underwriters an option for a period of 30 days to purchase up to an additional 1,363,636 shares of our common stock. If the underwriters exercise the option in full, the total underwriting discounts and commissions payable by us will be \$5,174,999.78, and the total proceeds to us, before expenses, will be \$81,074,996.48.

Joint Book-Running Managers

Jefferies Credit Suisse

Lead Manager

Cantor

Co-Managers

Needham & Company BTIG CIM Securities, LLC

Prospectus Supplement dated August 7, 2018

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We are responsible only for the information contained in this prospectus supplement and the accompanying prospectus, the documents incorporated by reference herein and therein, and any related free writing prospectus issued or authorized by us for use in connection with this offering. We have not, and the underwriters have not, authorized anyone to provide you with different or additional information. We and the underwriters take no responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. You should assume that the information appearing in this prospectus supplement, the accompanying prospectus, the documents incorporated by reference in this prospectus supplement and the accompanying prospectus and any free writing prospectus that we have authorized for use in connection with this offering is accurate only as of the date of the respective document in which the information appears. Our business, financial condition, results of operations and prospectus, the documents incorporated by reference in this prospectus supplement, the accompanying this prospectus supplement, the accompanying prospectus supplement, the accompanying prospectus and any free writing prospectus and prospects may have changed since those dates. You should read this prospectus supplement and the accompanying prospectus and any free writing prospectus and any free writing prospectus that we have authorized for use in connection with this offering in their entirety before making an investment decision. We are not, and the underwriters are not, making an offer to sell these securities in any jurisdict

For investors outside the United States: Neither we nor the underwriters have done anything that would permit this offering or possession or distribution of this prospectus supplement and the accompanying prospectus in any jurisdiction where action for that purpose is required, other than the United States. You are required to inform yourselves about and to observe any restrictions relating to this offering and the distribution of this prospectus supplement and the accompanying prospectus outside of the United States.

ABOUT THIS PROSPECTUS SUPPLEMENT

This prospectus supplement and the accompanying prospectus are part of a registration statement on Form S-3 that we filed with the U.S. Securities and Exchange Commission (the "SEC") under the Securities Act of 1933, as amended (the "Securities Act"), on January 6, 2017, and was declared effective by the SEC on January 19, 2017 (the "Registration Statement").

This document is in two parts. The first part is this prospectus supplement, which describes the terms of this offering of common stock and also adds to, and updates, information contained in the accompanying prospectus and the documents incorporated by reference in this prospectus supplement and the accompanying prospectus. The second part is the accompanying prospectus contained in the Registration Statement, including the documents incorporated by reference therein, which provides more general business and financial information about us, some of which may not apply to this offering. Generally, when we refer to the prospectus, we are referring to both parts of this document combined and when we refer to the accompanying prospectus, we are referring to the base prospectus only. To the extent there is a conflict between the information contained in this prospectus supplement, on the one hand, and the information contained in the accompanying prospectus or in any document incorporated by reference that was filed with the SEC before the date of this prospectus supplement, on the other hand, you should rely on the information in this prospectus supplement. If any statement in one of these documents is inconsistent with a statement in another document having a later date—for example, a document incorporated by reference in the accompanying prospectus—the statement in the document having the later date modifies or supersedes the earlier statement.

This prospectus supplement and the accompanying prospectus contain and incorporate by reference market data, industry statistics and other data that have been obtained or compiled from information made available by third parties. This data, to the extent it contains estimates or projections, involves a number of assumptions and limitations, and you are cautioned not to give undue weight to such estimates or projections. Industry publications and other reports we have obtained from independent parties generally state that the data contained in these publications or other reports have been obtained in good faith or from sources considered to be reliable, but they do not guarantee the accuracy or completeness of such data.

All references in this prospectus supplement and the accompanying prospectus to "Progenics," "PGNX," the "Company," "we," "us," "our" or similar references refer to Progenics Pharmaceuticals, Inc., a Delaware corporation, and its subsidiaries, except where the context otherwise requires or as otherwise indicated.

This prospectus supplement, the accompanying prospectus and the information incorporated herein and therein by reference, include trademarks, service marks and trade names owned by us or other companies. All trademarks, service marks and trade names included or incorporated by reference in this prospectus supplement or the accompanying prospectus are the property of their respective owners.

You should read this prospectus supplement, the accompanying prospectus, the documents incorporated by reference in this prospectus supplement and the accompanying prospectus and any free writing prospectus that we have authorized for use in connection with this offering in their entirety before making an investment decision. You should also read and consider the information in the documents to which we have referred you in the sections of this prospectus supplement entitled "Where You Can Find More Information" and "Incorporation of Certain Information by Reference," and in particular, the periodic and current reporting documents we file with the SEC.

PROSPECTUS SUPPLEMENT SUMMARY

This summary highlights certain information about us, this offering and selected information contained elsewhere in or incorporated by reference in this prospectus supplement and the accompanying prospectus. This summary is not complete and does not contain all of the information that you should consider before deciding whether to invest in our common stock. For a more complete understanding of our company and this offering, we encourage you to read and consider carefully the more detailed information in this prospectus supplement and the accompanying prospectus, including the information incorporated by reference in this prospectus supplement and the accompanying prospectus, and the information included in any free writing prospectus that we have authorized for use in connection with this offering, including the information referred to under the heading "Risk Factors" in this prospectus supplement and the accompanying the accompanying prospectus supplement beginning on page S-5 and in the documents incorporated by reference in this prospectus supplement and the accompanying the accompanying prospectus.

Overview

Progenics develops innovative medicines and other technologies to target, diagnose and treat cancer, including: (1) therapeutic agents designed to treat cancer (AZEDRA[®], 1095, and PSMA TTC); (2) prostate-specific membrane antigen ("PSMA") targeted imaging agents for prostate cancer (1404 and PyIM); and (3) imaging analysis technology. We have two commercial products, RELISTOR[®] (methylnaltrexone bromide) subcutaneous injection for the treatment of opioid-induced constipation ("OIC"), which is partnered with Salix Pharmaceuticals, Inc. (a wholly-owned subsidiary of Bausch Health Companies Inc. (formerly known as Valeant Pharmaceuticals International, Inc.) ("Bausch")); and AZEDRA, for the treatment of patients with unresectable, locally advanced or metastatic pheochromocytoma or paraganglioma (rare neuroendocrine tumors of neural crest origin) who require systemic anticancer therapy.

On July 30, 2018, we received U.S. Food and Drug Administration ("FDA") approval of our New Drug Application ("NDA") for AZEDRA, which is the first and only approved therapy in the U.S. for the treatment of adult and pediatric patients 12 years and older with iobenguane scan positive, unresectable, locally advanced or metastatic pheochromocytoma or paraganglioma who require systemic anticancer therapy. We plan to commercialize AZEDRA in the U.S. ourselves and to seek strategic partnerships to commercialize AZEDRA in other countries, subject to the receipt of the necessary regulatory approvals in such jurisdictions. We are building a small commercial organization for our efforts in preparation of our planned launch of AZEDRA. We currently expect sales of AZEDRA to commence no sooner than the fourth quarter of this year.

We have licensed our exclusive rights to develop and commercialize methylnaltrexone, the active ingredient of RELISTOR, to Bausch and our PSMA antibody technology to Bayer AS ("Bayer"), and have partnered other internally-developed or acquired compounds and technologies with third parties. We have in the past considered opportunities for strategic collaborations, out-licenses and other arrangements with biopharmaceutical companies

involving proprietary research, development and clinical programs, and we continue to do so. We may in the future also in-license or acquire additional oncology compounds and/or programs.

Our goal is to become a preeminent, patient-centric oncology company and we intend to make a difference in how patients with cancer are diagnosed and treated. Our pipeline includes the following products and product candidates:

AZEDRA (iobenguane I 131) 555 MBq/mL injection for intravenous use is the first and only approved therapy in the U.S. for the treatment of adult and pediatric patients 12 years and older with iobenguane scan positive, unresectable, locally advanced or metastatic pheochromocytoma or paraganglioma who require systemic anticancer therapy.

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1404 is a technetium-99m labeled small molecule which binds to PSMA and is used as an imaging agent to diagnose and detect localized prostate cancer as well as soft tissue and bone metastases. In December 2017, we completed enrollment in a Phase 3 trial assessing the diagnostic accuracy of 1404 imaging in men with newly-diagnosed or low-grade prostate cancer, whose biopsy indicates a histopathologic Gleason grade of \leq 3+4 severity and/or are candidates for active surveillance. The study was designed to evaluate the (i) specificity of 1404 imaging to identify patients without clinically significant prostate cancer and (ii) sensitivity of 1404 to identify patients with clinically significant disease. The Phase 3 study enrolled approximately 450 patients in the U.S. and Canada and we expect top-line data from the Phase 3 study in the third quarter of 2018. We are also developing, based on data from our 1404 clinical trials, PSMA computer-assisted diagnostic tools that will automate reading of PSMA-targeted SPECT images.

PyL (also known as [18F]DCFPyL) is a fluorinated PSMA-targeted Positron Emission Topography ("PET") imaging agent that enables visualization of both bone and soft tissue metastases to determine the presence or absence of recurrent and/or metastatic prostate cancer. In 2016, we launched PyL Research Access ProgramTM making limited doses of PyL available to researchers. In June 2018, we completed enrollment in a Phase 2/3 trial to assess the diagnostic performance of PyL PET/CT imaging to detect prostate cancer in patients with recurrent and/or metastatic disease. We expect top-line data from the Phase 2/3 trial in the fourth quarter of 2018 while initiating a second Phase 3 study of PyL in patients with biochemical recurrence of prostate cancer by year-end.

1095 is a PSMA-targeted iodine-131 labeled small molecule that is designed to deliver a dose of beta radiation directly to prostate cancer cells with minimal impact on the surrounding healthy tissues. In collaboration with Memorial Sloan-Kettering Cancer Center, a Phase 1 trial is ongoing to assess the safety, tolerability, and preliminary efficacy of 1095, as well as define an optimal dose for a Phase 2 trial, in patients with metastatic castration-resistant prostate cancer who have demonstrated tumor avidity to 1095.

PSMA AI is an imaging analysis technology, which uses artificial intelligence and machine learning to quantify and automate the reading of PSMA targeted imaging. Data from our Phase 1 and 2 studies of 1404 was used to develop a deep learning algorithm for the purpose of the automatic detection and quantification of 1404 uptake from SPECT/CT images as compared to a manual process.

PSMA TTC is a thorium-227 labeled PSMA-targeted antibody therapeutic. The PSMA TTC is designed to deliver a dose of alpha radiation directly to prostate cancer cells with minimal impact on the surrounding healthy tissues. We granted Bayer exclusive worldwide rights to develop and commercialize products using our PSMA antibody technology in combination with Bayer's alpha-emitting radionuclides. We expect Bayer to initiate a Phase 1 study of PSMA TTC in patients with metastatic castration-resistant prostate cancer by year-end.

aBSI quantifies the hotspots on bone scans of prostate cancer patients and automatically calculates the bone scan index value, representing the disease burden of prostate cancer shown on the bone scan. This quantifiable and reproducible calculation of the bone scan index value is intended to aid in the diagnosis and treatment of prostate cancer and may have utility in monitoring the course of the disease. aBSI is sold as a standalone software program to FUJIFILM RI Pharma Co., Ltd. in Japan.

RELISTOR is a treatment for OIC that decreases the constipating side effects induced by opioid pain medications such as morphine and codeine without diminishing their ability to relieve pain. RELISTOR is approved in two forms: a subcutaneous injection and an oral tablet (450 mg once daily). RELISTOR subcutaneous injection is being sold in the U.S., the European Union, and Canada, and RELISTOR tablets are being sold in the U.S. Under the RELISTOR license agreement, Bausch is responsible for developing and commercializing RELISTOR.

For purposes of this summary, in general, our Phase 1 trials are initial evaluations of safety in humans which study mechanism of action and metabolism; our Phase 2 trials evaluate safety, dosing and activity or efficacy, and continue safety evaluation; and our Phase 3 trials involve larger scale evaluations of safety, efficacy and dosing.

Our current principal sources of revenue from operations are royalty, development and commercial milestone payments from Bausch and Bayer. Royalty and further milestone payments from Bausch or Bayer depend on success in development and commercialization of RELISTOR and our PSMA antibody technology, respectively, which is dependent on many factors, such as Bausch or Bayer's respective efforts, decisions by the FDA and other regulatory bodies, competition from drugs for the same or similar indications, and the outcome of clinical and other testing of the licensed products.

Recent Developments

FDA Approval for AZEDRA

On July 30, 2018, we received FDA approval of our NDA for AZEDRA. In connection with such approval, FDA included a post-marketing requirement for us to assess the risk of myelodysplastic syndrome, acute leukemia, and other secondary malignancies. We will conduct cumulative, integrated safety analyses after 5 and after 10 years of follow-up of patients from an adequate number of clinical trials to identify and characterize the risks of myelodysplastic syndrome, acute leukemia and other secondary malignancies with AZEDRA; including incidence rates, time to onset, predisposing factors, and outcomes. We plan to commercialize AZEDRA in the U.S. ourselves and to seek strategic partnerships to commercialize AZEDRA in other countries, subject to the receipt of the necessary regulatory approvals in such jurisdictions. We are building a small commercial organization for our efforts in preparation of our planned launch of AZEDRA. We currently expect sales of AZEDRA to commence no sooner than the fourth quarter of this year.

Completion of Enrollment in Phase 2/3 Study of PyL

The enrollment in our Phase 2/3 trial evaluating the diagnostic accuracy of PyL in prostate cancer was completed in June 2018.

Corporate Information

Progenics, which has been listed on Nasdaq since 1997, was incorporated in Delaware in 1986, commenced principal operations in 1988, and throughout has been engaged primarily in research and development efforts, establishing corporate collaborations and related activities. Additional information concerning the Company is contained in the documents we file with the SEC. We maintain a website at *www.progenics.com* which contains information about Progenics and our subsidiaries. Information contained in or accessed through our website is not part of or incorporated into this prospectus supplement or the accompanying prospectus and should not be considered part of these documents.

Our mailing address is One World Trade Center, New York, New York 10007 (telephone number (646) 975-2500), where our principal executive offices are located.

THE OFFERING

Common stock we are offering	9,090,909 shares
Common stock to be outstanding after this offering	83,849,913 shares
Option to purchase additional shares	We have granted the underwriters an option to purchase 1,363,636 additional shares of our common stock. This option is exercisable, in whole or in part, for a period of 30 days from the date of this prospectus supplement.
Use of proceeds	We intend to use the net proceeds from this offering for research and development and general corporate purposes. We may also use a portion of the net proceeds to acquire, license or invest in businesses, products, product candidates, technologies, intellectual property or other assets that are complementary to our own. We regularly consider such opportunities, but have no current understandings, agreements or commitments to effect any such transaction. Pending the application of the net proceeds, we may invest the net proceeds in short-term, interest-bearing instruments or other investment-grade securities, certificates of deposits or short-term U.S. government securities. See "Use of Proceeds" on page S-9 of this prospectus supplement.
Nasdaq Global Select Market Listing	Our common stock is listed on The Nasdaq Global Select Market under the symbol "PGNX."
Risk factors	Investing in our common stock involves a high degree of risk. See "Risk Factors" beginning on page S-5 of this prospectus supplement and in the documents incorporated by reference in this prospectus supplement and the accompanying prospectus.
Outstanding Sha	ares

The number of shares of our common stock to be outstanding immediately after this offering is based on 74,759,004 shares outstanding as of June 30, 2018, and excludes as of such date:

6,773,331 shares of our common stock issuable upon the exercise of outstanding options, at a weighted average exercise price of \$7.15 per share; and

7,329,870 shares of our common stock available for future issuance pursuant to our existing stock incentive plans.

As of the date of this prospectus supplement, subject to the lock-up arrangement discussed under "Underwriting—No Sales of Similar Securities," pursuant to a controlled equity offering sales agreement (the "Sales Agreement") with Cantor Fitzgerald & Co. ("Cantor"), as sales agent, we may offer and sell through Cantor, from time to time, additional shares of our common stock up to an aggregate offering price of approximately \$39.2 million. In addition, subject to the lock-up arrangement discussed under "Underwriting—No Sales of Similar Securities," we may issue shares of our common stock in connection with a certain stock purchase and sale agreement (the "MIP Stock Purchase Agreement"), pursuant to which we have agreed to pay to certain former stockholders of Molecular Insight Pharmaceuticals, Inc. ("Former MIP Stockholders") potential milestone payments, in cash or shares of our common stock, at our option, upon our achievement of specified commercialization events, including the \$8 million milestone payment in connection with the first commercial sale of AZEDRA. We currently intend to make any such payment triggered by the first commercial sale of AZEDRA, if any, in shares of our common stock.

Except as otherwise indicated, all information in the prospectus supplement assumes no exercise by the underwriters of their option to purchase additional shares.

RISK FACTORS

An investment in our common stock involves a high degree of risk. Before deciding whether to invest in our common stock, you should consider carefully the risks discussed below, together with other information in this prospectus supplement, the accompanying prospectus, the information and documents incorporated by reference in this prospectus supplement and the accompanying prospectus, including those "Risk Factors" included in our Annual Report on Form 10-K for the year ended December 31, 2017 and our Quarterly Report on Form 10-Q for the quarter ended June 30, 2018, and in any free writing prospectus that we have authorized for use in connection with this offering. The risks described below may not be the only ones relating to our company, business or common stock or to this offering. Additional risks that we currently believe are immaterial may also impair our business operations. Our business, results of operation, financial condition, cash flow and prospects and the trading price of our common stock could be harmed as a result of any of these risks, and investors may lose all or part of their investment.

Risks Related to this Offering and our Common Stock

We have broad discretion in the use of the net proceeds from this offering.

Our management will have broad discretion in the application of the net proceeds from this offering and could spend the proceeds in ways with which you may not agree. Accordingly, you will be relying on the judgment of our management with regard to the use of the net proceeds, and you will not have the opportunity, as part of your investment decision, to assess whether the proceeds are being used appropriately. It is possible that the net proceeds will be invested or otherwise used in a way that does not yield a favorable, or any, return for the Company.

Investors in this offering will experience immediate and substantial dilution in the net tangible book value per share of the common stock they purchase.

Since the price per share of our common stock being offered is higher than the net tangible book value per share of our common stock, you will suffer substantial dilution in the net tangible book value of the common stock you purchase in this offering. See "Dilution" for a more detailed discussion of the dilution you will incur if you purchase our common stock in this offering.

Our stockholders may experience significant dilution as a result of future equity offerings and exercise of outstanding options.

In order to raise additional capital, we expect in the future to offer additional shares of our common stock or other securities convertible into or exchangeable for our common stock. We cannot assure you that we will be able to sell shares or other securities in any other offering at a price per share that is equal to or greater than the price per share paid by investors in this offering, and investors purchasing shares or other securities in the future could have rights superior to existing stockholders. The price per share at which we sell additional shares of our common stock or other securities convertible into or exchangeable for our common stock in future transactions may be higher or lower than the price per share in this offering.

In addition, we have a significant number of securities convertible into, or allowing the purchase of, our common stock. As of June 30, 2018, 7,329,870 shares of common stock were reserved for future issuance under our stock incentive plans. As of that date, there were also 6,773,331 options to purchase shares of our common stock outstanding. The exercise of outstanding options having an exercise price per share that is less than the offering price per share in this offering will increase dilution to investors in this offering.

Furthermore, as of the date of this prospectus supplement, subject to the lock-up arrangement discussed under "Underwriting—No Sales of Similar Securities," pursuant to the Sales Agreement, we may offer and sell through Cantor, from time to time, additional shares of our common stock up to an aggregate offering price of approximately \$39.2 million. In addition, subject to the lock-up arrangement discussed under "Underwriting—No Sales of Similar Securities," we may issue shares of our common stock in connection with the MIP Stock Purchase Agreement, pursuant to which we have agreed to pay to certain Former MIP Stockholders potential milestone payments, in cash or shares of our common stock, at our option, upon our achievement of specified commercialization events, including the \$8 million milestone payment in connection with the first commercial sale of AZEDRA. We currently intend to make any such payment triggered by the first commercial sale of AZEDRA, if any, in shares of our common stock. The issuance of any of these shares could result in dilution to our stockholders.

Future sales of our common stock in the public market could cause our stock price to fall.

Sales of a substantial number of shares of our common stock in the public market, or the perception that these sales might occur, could depress the market price of our common stock and could impair our ability to raise capital through the sale of additional equity securities. As of June 30, 2018, we had 74,759,004 shares of our common stock outstanding, all of which shares, other than shares held by our directors and certain officers, were eligible for sale in the public market, subject in some cases to compliance with the requirements of Rule 144 under the Securities Act, including the volume limitations and manner of sale requirements. In addition, shares of our common stock issuable upon exercise of outstanding options and shares reserved for future issuance under our stock incentive plans will become eligible for sale in the public market to the extent permitted by applicable vesting requirements and subject in some cases to compliance with the requirements Act. Further, it is possible that we could issue and sell additional shares of our common stock in the public markets. We cannot predict the effect that future sales of our common stock would have on the market price of our common stock.

We do not intend to pay dividends on our common stock. Until such time as we pay cash dividends, our stockholders must rely on increases in our stock price for appreciation.

We have never declared or paid dividends on our common stock. We intend to retain future earnings to develop and commercialize our products and product candidates. Therefore, we do not intend to pay cash dividends in the foreseeable future. Until such time as we determine to pay cash dividends on our common stock, our stockholders must rely on increases in the market price of our common stock for appreciation of their respective investments.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

Certain statements contained or incorporated by reference in this prospectus supplement and the accompanying prospectus constitute "forward-looking statements" within the meaning of the U.S. Private Securities Litigation Reform Act of 1995. Statements contained in this communication that refer to our estimated or anticipated future results or other non-historical facts are forward-looking statements that reflect our current perception of existing trends and information as of the date of this communication. Forward-looking statements generally will be accompanied by words such as "anticipate," "believe," "plan," "could," "should," "estimate," "expect," "forecast," "outlook," "guidance," "inte "might," "will," "possible," "potential," "predict," "project," or other similar words, phrases or expressions. Such statements ar predictions only, and are subject to risks and uncertainties that could cause actual events or results to differ materially.

Forward-looking statements involve known and unknown risks and uncertainties which may cause our actual results, performance or achievements to be materially different from those expressed or implied by forward-looking statements. While it is impossible to identify or predict all such matters, these differences between forward-looking statements and our actual results, performance or achievement may result from, among other things, the inherent uncertainty of the timing and success of, and expense associated with, research, development, regulatory approval and commercialization of our products and product candidates, including the risks that clinical trials will not commence or proceed as planned; products which appear to be promising in early trials will not demonstrate efficacy or safety in larger-scale trials; clinical trial data on our products and product candidates will be unfavorable; our products will not receive marketing approval from regulators or, if approved, do not gain sufficient market acceptance to justify development and commercialization costs; the sales of RELISTOR and other products by our partners and the revenue and income generated for us thereby may not meet expectations; the planned commercial launch of AZEDRA may not meet revenue and income expectations; competing products currently on the market or in development might reduce the commercial potential of our products; we, our collaborators or others might identify side effects after the product is on the market; or efficacy or safety concerns regarding marketed products, whether or not originating from subsequent testing or other activities by us, governmental regulators, other entities or organizations or otherwise, and whether or not scientifically justified, may lead to product recalls, withdrawals of marketing approval, reformulation of the product, additional pre-clinical testing or clinical trials, changes in labeling of the product, the need for additional marketing applications, declining sales or other adverse events.

We are also subject to risks and uncertainties associated with the actions of our corporate, academic and other collaborators and government regulatory agencies, including risks from market forces and trends; potential product liability; intellectual property, litigation and other dispute resolution, environmental and other risks; the risk that we may not be able to obtain sufficient capital, recruit and retain employees, enter into favorable collaborations or transactions, or other relationships or that existing or future relationships or transactions may not proceed as planned; the risk that current and pending patent protection for our products may be invalid, unenforceable or challenged, or fail to provide adequate market exclusivity, or that our rights to in-licensed intellectual property may be terminated for our failure to satisfy performance milestones; the risk of difficulties in, and regulatory compliance relating to, manufacturing products; and the uncertainty of our future profitability.

Risks and uncertainties to which we are subject also include general economic conditions, including interest and currency exchange-rate fluctuations and the availability of capital; changes in generally accepted accounting principles; the impact of legislation and regulatory compliance; the highly regulated nature of our business, including government cost-containment initiatives and restrictions on third-party payments for our products; trade buying patterns; the competitive climate of our industry; and other factors set forth in this document and other reports filed with the SEC. In particular, we cannot assure you that AZEDRA or RELISTOR will be commercially successful or be approved in the future in other formulations, indications or jurisdictions, or that any of our other programs will result in a commercial product.

Although we believe that our expectations are based on reasonable assumptions within the bounds of our current knowledge of our industry, business and operations, we cannot guarantee that actual results will not differ materially from our expectations. In evaluating such forward-looking statements, you should specifically consider various factors, including the risks outlined under the heading "Risk Factors" contained in this prospectus supplement and in our Annual Report on Form 10-K for the year ended December 31, 2017 and our Quarterly Report on Form 10-Q for the quarter ended June 30, 2018. The discussion of risks and uncertainties set forth in those filings is not necessarily a complete or exhaustive list of all risks facing us at any particular point in time. We operate in a highly competitive, highly regulated and rapidly changing environment, and our business is in a state of evolution. Therefore, it is likely that over time new risks will emerge and the nature and elements of existing risks will change. It is not possible for management to predict all such risk factors or changes therein or to assess either the impact of all such risk factors on our business or the extent to which any individual risk factor, combination of factors or new or altered factors may cause results to differ materially from those contained in any forward-looking statement. Forward-looking statements represent our estimates and assumptions only as of the date such forward-looking statements are made. You should carefully read this prospectus supplement and the accompanying prospectus, together with the information incorporated herein or therein by reference, and with the understanding that our actual future results may materially differ from what we expect.

Except as required by law, forward-looking statements speak only as of the date they are made. We do not have a policy of updating or revising forward-looking statements and, except as expressly required by law, we disclaim any intent or obligation to update or revise any statements as a result of new information or future events or developments. It should not be assumed that our silence over time means that actual events are bearing out as expressed or implied in forward-looking statements.

USE OF PROCEEDS

We estimate that the net proceeds from the sale of the 9,090,909 shares of common stock that we are offering will be approximately \$70.0 million, or approximately \$80.6 million if the underwriters exercise in full their option to purchase 1,363,636 additional shares of common stock, based on the public offering price of \$8.25 per share and after deducting the underwriting discounts and commissions and estimated offering expenses payable by us.

We intend to use the net proceeds from this offering for research and development and general corporate purposes. We may also use a portion of the net proceeds to acquire, license or invest in businesses, products, product candidates, technologies, intellectual property or other assets that are complementary to our own. We regularly consider such opportunities, but have no current understandings, agreements or commitments to effect any such transaction.

The amounts and timing of our actual expenditures depend on a number of factors, including the timing, scope, progress and results of our research and development efforts, the results of clinical trials and other studies, the timing and progress of any partnering efforts, the competitive environment for our products and product candidates and any unforeseen cash needs. Successful development of product candidates is highly uncertain and may not result in approved products. Completion dates and completion costs can vary significantly for each product candidate and are difficult to predict. As of the date of this prospectus supplement, we cannot specify with certainty all of the particular uses of the proceeds from this offering. Accordingly, we will have broad discretion in the use of the net proceeds from this offering and could spend the proceeds in ways that do not improve our results of operations or enhance the value of our stock.

Pending the application of the net proceeds as described above, we may invest the net proceeds in short-term, interest-bearing instruments or other investment-grade securities, certificates of deposit or short-term U.S. government securities.

DILUTION

Our net tangible book value as of June 30, 2018 was approximately \$19.5 million, or \$0.26 per share of our common stock. Net tangible book value per share is determined by dividing our total tangible assets, less total liabilities, by the number of shares of our common stock outstanding as of June 30, 2018. Dilution in net tangible book value per share represents the difference between the amount per share paid by purchasers of shares of common stock in this offering and the as adjusted net tangible book value per share of our common stock immediately after this offering.

After giving effect to the sale of 9,090,909 shares of our common stock in this offering at the public offering price of \$8.25 per share and after deducting the underwriting discounts and commissions and estimated offering expenses payable by us, our as adjusted net tangible book value as of June 30, 2018 would have been approximately \$89.5 million, or \$1.07 per share. This represents an immediate increase in net tangible book value of \$0.81 per share to existing stockholders and immediate dilution in net tangible book value of \$7.18 per share to new investors purchasing our common stock in this offering. The following table illustrates this dilution on a per share basis:

Public offering price per share	\$8.25	
Net tangible book value per share as of June 30, 2018	\$0.26	
Increase per share attributable to new investors	0.81	
As adjusted net tangible book value per share as of June 30, 2018 after this offering	1.07	
Dilution in net tangible book value per share to new investors	\$7.18	

If the underwriters exercise in full their option to purchase 1,363,636 additional shares of common stock at the public offering price of \$8.25 per share, the as adjusted net tangible book value after this offering would be \$1.17 per share of common stock, representing an increase in net tangible book value of \$0.91 per share to existing stockholders and immediate dilution in net tangible book value of \$7.08 per share to new investors purchasing our common stock in this offering.

The number of shares of our common stock to be outstanding immediately after this offering is based on 74,759,004 shares outstanding as of June 30, 2018, and excludes as of such date:

6,773,331 shares of our common stock issuable upon the exercise of outstanding options, at a weighted average exercise price of \$7.15 per share; and

7,329,870 shares of our common stock available for future issuance pursuant to our existing stock incentive plans.

To the extent that outstanding options are exercised or new stock awards are issued under our existing stock incentive plans, investors purchasing our common stock in this offering will experience further dilution. In addition, we may choose to raise additional capital due to market conditions or strategic considerations even if we believe we have sufficient funds for our current or future operating plans. As of the date of this prospectus supplement, subject to the lock-up arrangement discussed under "Underwriting—No Sales of Similar Securities," pursuant to the Sales Agreement, we may offer and sell through Cantor, from time to time, shares of our common stock up to an aggregate offering price of approximately \$39.2 million. To the extent that additional capital is raised through the sale of equity or convertible debt securities, the issuance of these securities could result in further dilution to our stockholders.

PRICE RANGE OF COMMON STOCK

Our common stock is quoted on The Nasdaq Global Select Market under the symbol "PGNX". The following table sets forth, for the periods indicated, the high and low sales price per share of our common stock, as reported on The Nasdaq Global Select Market.

PERIOD	High	Low
Year Ended December 31, 2018	¢0.(2	<u> </u>
First Quarter	\$8.63	
Second Quarter	9.12	01.0
Third Quarter (July 2 to August 7, 2018)	9.42	7.13
Year Ended December 31, 2017		
First Quarter	11.72	8.15
Second Quarter	9.56	6.10
Third Quarter	7.39	4.60
Fourth Quarter	7.81	5.16
Year Ended December 31, 2016		
First Quarter	6.13	3.61
Second Quarter	5.75	4.00
Third Quarter	7.09	4.19
Fourth Quarter	9.78	4.84
Year Ended December 31, 2015		
	7.04	5 25
First Quarter	7.84	0.00
Second Quarter	9.27	
Third Quarter	11.15	5.38
Fourth Quarter	8.37	5.20

On August 7, 2018, the last sale price of our common stock, as reported on The Nasdaq Global Select Market, was \$8.93. There were approximately 64 holders of record of our common stock as of July 25, 2018.

DIVIDENDS

We have never paid any dividends, and we currently anticipate that all earnings, if any, will be retained for development of our business and no dividends will be declared in the foreseeable future. Payment of cash dividends, if any, in the future will be at the discretion of our board of directors and will depend on then-existing conditions, including our financial condition, operating results, contractual restrictions, capital requirements, business prospects and other factors our board of directors may deem relevant.

MATERIAL U.S. FEDERAL INCOME AND ESTATE TAX CONSEQUENCES TO NON-U.S. HOLDERS

The following summary describes the material U.S. federal income and estate tax consequences of the acquisition, ownership and disposition of our common stock acquired in this offering by a Non-U.S. Holder (as defined below). This discussion does not address all aspects of U.S. federal income and estate taxes, does not discuss any other U.S. federal tax consequences, does not deal with foreign, state and local consequences that may be relevant to Non-U.S. Holders in light of their particular circumstances, and does not discuss any aspects of the unearned income Medicare contribution tax pursuant to the Health Care and Education Reconciliation Act of 2010. Special rules may apply to certain Non-U.S. Holders that are subject to special treatment under the U.S. Internal Revenue Code of 1986, as amended (the "Code"), such as financial institutions, insurance companies, tax-exempt organizations, broker-dealers and traders in securities, U.S. expatriates, "controlled foreign corporations," "passive foreign investment companies," corporations that accumulate earnings to avoid U.S. federal income tax, persons that hold our common stock as part of a "straddle," "hedge," "conversion transaction," "synthetic security" or integrated investment or other risk reduction strategy, partnerships and other pass-through entities, and investors in such pass-through entities. Such Non-U.S. Holders are urged to consult their own tax advisors to determine the U.S. federal, state, local and other tax consequences that may be relevant to them. Furthermore, the discussion below is based upon the provisions of the Code, and Treasury regulations, rulings and judicial decisions thereunder as of the date hereof, and such authorities may be repealed, revoked or modified, perhaps retroactively, so as to result in U.S. federal income and estate tax consequences different from those discussed below. We have not requested a ruling from the U.S. Internal Revenue Service (the "IRS") with respect to the statements made and the conclusions reached in the following summary, and there can be no assurance that the IRS will agree with such statements and conclusions. This discussion is limited to Non-U.S. Holders that purchase our common stock pursuant to this offering and hold our common stock as a capital asset within the meaning of Code Section 1221 (generally, property held for investment).

The following discussion is for information only and is not tax advice. Persons considering the purchase of our common stock should consult their own tax advisors concerning the U.S. federal income and estate tax consequences of acquiring, owning and disposing of our common stock in light of their particular situations as well as any consequences arising under the laws of any other taxing jurisdiction, including any state, local or foreign tax consequences, and those arising under any applicable tax treaty.

Except as otherwise described in the discussion of estate tax below, a "Non-U.S. Holder" is a beneficial owner of our common stock that is neither a U.S. Holder nor a partnership or other entity treated as a partnership for U.S. tax purposes. A "U.S. Holder" means a beneficial owner of our common stock that is for U.S. federal income tax purposes (i) an individual who is a citizen or resident of the United States, (ii) a corporation or other entity treated as a corporation created or organized in or under the laws of the United States or any political subdivision thereof, (iii) an estate the income of which is subject to U.S. federal income taxation regardless of its source or (iv) a trust if it (x) is subject to the primary supervision of a court within the United States and one or more U.S. persons have the authority to control all substantial decisions of the trust or (y) has a valid election in effect under applicable U.S. Treasury regulations to be treated as a U.S. person.

If a partnership (including any entity or arrangement treated as a partnership for U.S. federal income tax purposes) acquires our common stock, the tax treatment of a partner in the partnership will generally depend upon the status of the partner and the activities of the partnership. Persons who are partners of partnerships holding our common stock are urged to consult their tax advisors.

Distributions

Subject to the discussion below, distributions, if any, made to a Non-U.S. Holder of our common stock out of our current or accumulated earnings and profits (as determined under U.S. federal income tax principles) generally will constitute dividends for U.S. tax purposes and will be subject to withholding tax at a thirty percent rate or such lower rate as may be specified by an applicable income tax treaty. To obtain a reduced rate of withholding under a treaty, a Non-U.S. Holder generally will be required to provide us with a properly-executed IRS Form W-8BEN or IRS Form W-8BEN-E, or other appropriate form, certifying the Non-U.S. Holder's entitlement to benefits under that treaty. Treasury regulations provide special rules to determine whether, for purposes of determining the applicability of a tax treaty, dividends paid to a Non-U.S. Holder that is an entity should be treated as paid to the entity or to those holding an interest in that entity. If a Non-U.S. Holder will be required to provide appropriate documentation to such agent. The holder's behalf, the holder will be required to provide appropriate documentation to such agent. The holder's agent will then be required to provide certification to us or our paying agent, either directly or through other intermediaries.

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We generally are not required to withhold tax on dividends paid to a Non-U.S. Holder that are effectively connected with the Non-U.S. Holder's conduct of a trade or business within the United States (and, if required by an applicable tax treaty, are attributable to a permanent establishment maintained by the holder in the United States) if a properly-executed IRS Form W-8ECI, stating that the dividends are so connected (and are not exempt from U.S. federal income tax on net income under a treaty as described below), is filed with us. In general, effectively connected dividends will be subject to U.S. federal income tax on net income, generally in the same manner and at the regular rate as if the Non-U.S. Holder were a U.S. citizen or resident alien or a domestic corporation, as the case may be, unless a specific treaty exemption applies. A corporate Non-U.S. Holder receiving effectively connected dividends may also be subject to an additional "branch profits tax," which is imposed, under certain circumstances, at a rate of thirty percent (or such lower rate as may be specified by an applicable treaty) of the corporate Non-U.S. Holder's effectively connected earnings and profits, subject to certain adjustments.

If you are eligible for a reduced rate of withholding tax pursuant to a tax treaty, you may generally obtain a refund of any excess amounts currently withheld if you timely file an appropriate claim for refund with the IRS.

To the extent distributions on our common stock, if any, exceed our current and accumulated earnings and profits, they will constitute a return of capital and will first reduce your basis in our common stock, but not below zero, and then will be treated as gain from the sale of stock.

Gain on Disposition of Common Stock

Subject to the discussions below regarding backup withholding and FATCA (as defined below), a Non-U.S. Holder generally will not be subject to U.S. federal income tax with respect to gain realized on a sale or other disposition of our common stock unless (i) the gain is effectively connected with a trade or business of such Non-U.S. Holder in the United States and, if required by an applicable income tax treaty, attributable to a permanent establishment maintained in the United States by the Non-U.S. Holder, (ii) the Non-U.S. Holder is a nonresident alien individual and is present in the United States for 183 or more days in the taxable year of the disposition and certain other conditions are met, or (iii) we are or have been a "United States real property holding corporation" within the meaning of Code Section 897(c)(2) at any time within the shorter of the five-year period preceding such disposition or such holder's holding period. In general, we would be a United States real property holding corporation if the fair market value of our interests in U.S. real estate comprised at least half of the sum of the fair market value of worldwide real property interests plus our other assets used or held for use in trade or business. We believe that we are not, and do not anticipate becoming, a United States real property holding corporation. Even if we are treated as a United States real property holding corporation, gain realized by a Non-U.S. Holder on a disposition of our common stock will not be subject to U.S. federal income tax so long as (1) the Non-U.S. Holder owned directly, indirectly and constructively, no more than five percent of our common stock at all times within the shorter of (a) the five year period preceding the disposition or (b) the holder's holding period and (2) our common stock is regularly traded on an established securities market. There can be no assurance that our common stock will continue to qualify as regularly traded on an established securities market.

If you are a Non-U.S. Holder described in (i) above, you will be required to pay tax on the net gain derived from the sale at generally applicable United States federal income tax rates, subject to an applicable income tax treaty providing otherwise, and corporate Non-U.S. Holders described in (i) above may be subject to the branch profits tax at a thirty percent rate or such lower rate as may be specified by an applicable income tax treaty. If you are an individual Non-U.S. Holder described in (ii) above, you will be required to pay a flat thirty percent tax (or a reduced rate under an applicable income tax treaty) on the gain derived from the sale, which gain may be offset by U.S. source capital losses if you have timely filed tax returns with respect to such losses (even though you are not considered a resident of the United States). If you are a Non-U.S. Holder described in (ii) above and an exception from U.S. federal income tax does not apply (e.g., because our common stock does not qualify as regularly traded on an established securities market or, if it does so qualify, you own more than five percent of our common stock during the relevant period), any gain derived from the sale would be treated as effectively connected with a trade or business in the United States, generally taxable in the manner described in (i) above (except that corporate Non-U.S. Holders would not be subject to branch profits tax on such gain), and a withholding tax could apply.

Information Reporting and Backup Withholding

Generally, we must report to the IRS the amount of dividends paid, the name and address of the recipient, and the amount, if any, of tax withheld. A similar report is sent to the holder. Pursuant to tax treaties or certain other agreements, the IRS may make its reports available to tax authorities in the recipient's country of residence. Backup withholding will generally not apply to payments of dividends made by us or our paying agents to a Non-U.S. Holder if the holder provides a valid IRS Form W-8BEN or IRS Form W-8BEN-E, or an acceptable substitute form upon which the holder certifies, under penalties of perjury, that it is not a U.S. person or other documentation upon which the payer may rely to treat the payments as made to a non-U.S. person in accordance with Treasury regulations and the payer otherwise has no knowledge or reason to know that the payee is a U.S. person, or the Non-U.S. Holder otherwise establishes an exemption. The backup withholding rate is currently 24%.

Under current U.S. federal income tax law, information reporting and backup withholding will apply to the proceeds of a disposition of our common stock effected by or through a U.S. office of a broker unless the disposing holder certifies as to its non-U.S. status or otherwise establishes an exemption. Generally, U.S. information reporting and backup withholding will not apply to a payment of disposition proceeds where the transaction is effected outside the United States through a non-U.S. office of a non-U.S. broker. However, information reporting and backup withholding will apply to a payment of disposition proceeds if the broker has actual knowledge or reason to know that the holder is a U.S. person.

Backup withholding is not an additional tax. Rather, the tax liability of persons subject to backup withholding will be reduced by the amount of tax withheld. If withholding results in an overpayment of taxes, a refund may be obtained, provided that the required information is timely furnished to the IRS.

FATCA

Sections 1471 through 1474 of the Code and the Treasury regulations promulgated thereunder (commonly referred to as "FATCA") generally impose a 30% withholding tax on U.S. source dividends and, beginning January 1, 2019, gross proceeds from the sale or other disposition of stock or property that is capable of producing U.S. source dividends paid to (i) a foreign financial institution (as defined in Section 1471(d)(4) of the Code) unless such foreign financial institution agrees, pursuant to an agreement with the U.S. Treasury Department or otherwise, to collect and disclose certain information regarding its direct and indirect U.S. owners (which, for this purpose, can include certain debt and equity holders of such foreign financial institution as well as the direct and indirect owners of financial accounts maintained by such institution) and satisfies certain other requirements, and (ii) certain other non-U.S. entities unless such entities provide the payor with information regarding certain direct and indirect U.S. owners of the entity, or certify that they have no such U.S. owners, and comply with certain other requirements. Withholding under FATCA is imposed on payments to foreign financial institutions and other applicable payees whether they receive such payments in the capacity of an intermediary or for their own account. Certain countries have entered into, and other countries are expected to enter into, agreements with the United States to facilitate the type of information reporting required under FATCA. Each Non-U.S. Holder holding our common stock is urged to consult its tax advisor about the possible impact of these rules on their investment in our common stock, and the entities through which they hold our common stock, including, without limitation, the process and deadlines for meeting the applicable requirements to prevent the

imposition of this 30% withholding of tax under FATCA..

Federal Estate Tax

An individual who at the time of death is not a citizen or resident of the United States and who is treated as the owner of, or has made certain lifetime transfers of, an interest in our common stock will be required to include the value thereof in his or her taxable estate for U.S. federal estate tax purposes, and may be subject to U.S. federal estate tax unless an applicable estate tax treaty provides otherwise. The test for whether an individual is a resident of the United States for federal estate tax purposes differs from the test used for U.S. federal income tax purposes. Some individuals, therefore, may be "Non-U.S. Holders" for U.S. federal income tax purposes, but not for U.S. federal estate tax purposes, and vice versa.

THE FOREGOING DISCUSSION OF U.S. FEDERAL INCOME AND ESTATE TAX CONSIDERATIONS IS FOR INFORMATION ONLY. IT IS NOT TAX ADVICE. EACH PROSPECTIVE INVESTOR SHOULD CONSULT HIS, HER OR ITS OWN TAX ADVISOR REGARDING THE TAX CONSEQUENCES OF PURCHASING, HOLDING AND DISPOSING OF OUR COMMON STOCK, INCLUDING THE CONSEQUENCES OF ANY PROPOSED CHANGE IN APPLICABLE LAW.

UNDERWRITING

Subject to the terms and conditions set forth in the underwriting agreement to be dated on or about August 7, 2018, among us and Jefferies LLC and Credit Suisse Securities (USA) LLC, as representatives of the underwriters named below, and the joint book-running managers of this offering, we have agreed to sell to the underwriters, and each underwriter has agreed, severally and not jointly, to purchase from us, the number of shares of our common stock shown opposite its name below.

Underwriter	Number of Shares
Jefferies LLC	3,409,091
Credit Suisse Securities (USA) LLC	3,409,091
Cantor Fitzgerald & Co.	909,091
Needham & Company, LLC	727,273
BTIG, LLC	454,545
CIM Securities, LLC	181,818
Total	9,090,909

The underwriting agreement provides that the obligations of the underwriters are subject to certain conditions precedent such as the receipt by the underwriters of officers' certificates and legal opinions and approval of certain legal matters by their counsel. The underwriting agreement provides that the underwriters will purchase all of the shares, other than those shares covered by the option to purchase additional shares described below, if any of them are purchased. If an underwriter defaults on its purchase commitment, the underwriting agreement provides that the purchase commitments of the nondefaulting underwriters may be increased or the underwriting agreement may be terminated. We have agreed to indemnify the underwriters and certain of their controlling persons against certain liabilities, including liabilities under the Securities Act, and to contribute to payments that the underwriters may be required to make in respect of those liabilities.

The underwriters have advised us that, following the completion of this offering, they currently intend to make a market in our common stock as permitted by applicable laws and regulations. However, the underwriters are not obligated to do so and the underwriters may discontinue any market-making activities at any time without notice in their sole discretion. Accordingly, no assurance can be given as to the liquidity of the trading market for our common stock, that you will be able to sell any of our common stock held by you at a particular time or that the prices that you receive when you sell will be favorable.

The underwriters are offering the shares of our common stock subject to their acceptance of the shares from us and subject to prior sale. The underwriters reserve the right to withdraw, cancel or modify offers to the public and to reject orders in whole or in part. In addition, the underwriters have advised us that they do not intend to confirm sales to any account over which they exercise discretionary authority.

Commissions and Expenses

The underwriters have advised us that they propose to offer the shares of our common stock to the public at the public offering price set forth on the cover page of this prospectus supplement and to certain dealers, which may include the underwriters, at that price less a concession not in excess of \$0.297 per share of common stock. The underwriters may allow, and certain dealers may reallow, a discount from the concession not in excess of \$0.099 per share of common stock to certain brokers and dealers. After the offering, the public offering price, concession and reallowance to dealers may be reduced by the representatives. No such reduction will change the amount of proceeds to be received by us as set forth on the cover page of this prospectus supplement.

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The following table shows the public offering price, the underwriting discounts and commissions that we are to pay the underwriters and the proceeds, before expenses, to us in connection with this offering. Such amounts are shown assuming both no exercise and full exercise of the underwriters' option to purchase additional shares.

	Per Share Without Option to Option	Total Without Option to	With Option to
	to Purchase Purchase	Purchase	Purchase
	Additiona Additional	l Additional	Additional
	Auunuonai		
	Shares Shares	Shares	Shares
Public offering price	Shares		
Public offering price Underwriting discounts and commissions payable by us	Shares Shares	Shares	

We estimate expenses payable by us in connection with this offering, other than the underwriting discounts and commissions referred to above, will be approximately \$516,000.

Listing

Our common stock is listed on The Nasdaq Global Select Market under the trading symbol "PGNX."

Option to Purchase Additional Shares

We have granted to the underwriters an option, exercisable for 30 days from the date of this prospectus supplement, to purchase up to an aggregate of 1,363,636 additional shares of our common stock at the public offering price set forth on the cover page of this prospectus supplement, less underwriting discounts and commissions.

No Sales of Similar Securities

We, our executive officers and our directors have agreed, subject to specified exceptions, not to directly or indirectly:

sell, offer, contract or grant any option to sell (including any short sale), pledge, transfer, establish an open "put equivalent position" within the meaning of Rule 16a-l(h) under the U.S. Securities Exchange Act of 1934, as amended (the "Exchange Act"), or

otherwise dispose of any shares of our common stock, options or warrants to acquire shares of our common stock, or securities exchangeable or exercisable for or convertible into shares of our common stock currently or hereafter owned either of record or beneficially, or

publicly announce an intention to do any of the foregoing,

for a period of 90 days after the date of this prospectus supplement without the prior written consent of the representatives; provided that, after 30 days from the date of this prospectus supplement, we are permitted to issue shares of our common stock in connection with a certain stock purchase and sale agreement, pursuant to which we have agreed to pay to certain former stockholders of Molecular Insight Pharmaceuticals, Inc. potential milestone payments, in cash or shares of our common stock, at our option, upon our achievement of specified commercialization events, including the \$8 million milestone payment in connection with the first commercial sale of AZEDRA. We currently intend to make any such payment triggered by the first commercial sale of AZEDRA, if any, in shares of our common stock.

These restrictions terminate after the close of trading of the shares of our common stock on and including the 90th day after the date of this prospectus supplement. However, subject to certain exceptions, in the event that either:

during the last 17 days of the 90-day restricted period, we issue an earnings release or material news or a material event relating to us occurs, or

prior to the expiration of the 90-day restricted period, we announce that we will release earnings results during the 16-day period beginning on the last day of the 90-day restricted period,

then in each case the 90-day restricted period will be extended until the expiration of the 18-day period beginning on the date of the issuance of the earnings release or material news or the occurrence of the material event, as applicable, unless the representatives waive, in writing, such extension.

The representatives may, in their sole discretion and at any time or from time to time before the termination of the 90-day restricted period, without public notice, release all or any portion of the securities subject to lock-up agreements. Other than the exceptions specified in the lock-up agreements, there are no existing agreements between the underwriters and us or any of our stockholders who will execute a lock-up agreement providing consent to the sale of shares prior to the expiration of the restricted period.

Stabilization

The underwriters have advised us that, pursuant to Regulation M under the Exchange Act, certain persons participating in the offering may engage in short sale transactions, stabilizing transactions, syndicate covering transactions or the imposition of penalty bids in connection with this offering. These activities may have the effect of stabilizing or maintaining the market price of our common stock at a level above that which might otherwise prevail in the open market. Establishing short sales positions may involve either "covered" short sales or "naked" short sales.

"Covered" short sales are sales made in an amount not greater than the underwriters' option to purchase additional shares of our common stock in this offering. The underwriters may close out any covered short position by either exercising their option to purchase additional shares of our common stock or purchasing shares of our common stock in the open market. In determining the source of shares to close out the covered short position, the underwriters will consider, among other things, the price of shares available for purchase in the open market as compared to the price at which they may purchase shares through the option to purchase additional shares.

"Naked" short sales are sales in excess of the option to purchase additional shares of our common stock. The underwriters must close out any naked short position by purchasing shares in the open market. A naked short position is more likely to be created if the underwriters are concerned that there may be downward pressure on the price of our common stock in the open market after pricing that could adversely affect investors who purchase in this offering.

A stabilizing bid is a bid for the purchase of shares of our common stock on behalf of the underwriters for the purchase of fixing or maintaining the price of our common stock. A syndicate covering transaction is the bid for or the purchase of shares of our common stock on behalf of the underwriters to reduce a short position incurred by the underwriters in connection with the offering. Similar to other purchase transactions, the underwriters' purchases to cover the syndicate short sales may have the effect of raising or maintaining the market price of our common stock or preventing or retarding a decline in the market price of our common stock. As a result, the price of our common stock may be higher than the price that might otherwise exist in the open market. A penalty bid is an arrangement permitting the underwriters to reclaim the selling concession otherwise accruing to a syndicate member in connection with the offering if shares of our common stock originally sold by such syndicate member are purchased in a syndicate covering transaction and therefore have not been effectively placed by such syndicate member.

Neither we nor any of the underwriters make any representation or prediction as to the direction or magnitude of any effect that the transactions described above may have on the price of our common stock. The underwriters are not obligated to engage in these activities and, if commenced, any of the activities may be discontinued at any time.

The underwriters may also engage in passive market making transactions in our common stock on The Nasdaq Global Market in accordance with Rule 103 of Regulation M during a period before the commencement of offers or sales of shares of our common stock in this offering and extending through the completion of distribution. A passive market

maker must display its bid at a price not in excess of the highest independent bid of that security. However, if all independent bids are lowered below the passive market maker's bid, that bid must then be lowered when specified purchase limits are exceeded.

Electronic Distribution

A prospectus in electronic format may be made available by e-mail or on web sites or through online services maintained by the underwriters or their affiliates. In those cases, prospective investors may view offering terms online and may be allowed to place orders online. The underwriters may agree with us to allocate a specific number of shares of our common stock for sale to online brokerage account holders. Any such allocation for online distributions will be made by the underwriters on the same basis as other allocations. Other than the prospectus in electronic format, the information on the underwriters' respective websites and any information contained in any other website maintained by any of the underwriters is not part of this prospectus supplement, has not been approved and/or endorsed by us or the underwriters and should not be relied upon by investors.

Other Activities and Relationships

The underwriters and certain of their affiliates are full service financial institutions engaged in various activities, which may include securities trading, commercial and investment banking, financial advisory, investment management, investment research, principal investment, hedging, financing and brokerage activities. The underwriters and certain of their affiliates may in the future perform, various financial advisory and investment banking services for the issuer, for which they received or will receive customary fees and expenses.

In the ordinary course of their various business activities, the underwriters and certain of their affiliates may make or hold a broad array of investments and actively trade debt and equity securities (or related derivative securities) and financial instruments (including bank loans) for their own account and for the accounts of their customers, and such investment and securities activities may involve securities and/or instruments of the issuer. The underwriters and certain of their affiliates may also make investment recommendations and/or publish or express independent research views in respect of such securities or instruments and may at any time hold, or recommend to clients that they acquire, long and/or short positions in such securities and instruments.

NOTICE TO INVESTORS

Canada

Resale Restrictions

The distribution of our shares of common stock in Canada is being made only in the provinces of Ontario, Quebec, Manitoba, Alberta and British Columbia on a private placement basis exempt from the requirement that we prepare and file a prospectus with the securities regulatory authorities in each province where trades of these securities are made. Any resale of the shares of common stock in Canada must be made under applicable securities laws which may vary depending on the relevant jurisdiction, and which may require resales to be made under available statutory exemptions or under a discretionary exemption granted by the applicable Canadian securities regulatory authority. Purchasers are advised to seek legal advice prior to any resale of the securities.

Representations of Canadian Purchasers

By purchasing our shares of common stock in Canada and accepting delivery of a purchase confirmation, a purchaser is representing to us and the dealer from whom the purchase confirmation is received that:

the purchaser is entitled under applicable provincial securities laws to purchase the shares without the benefit of a prospectus qualified under those securities laws as it is an "accredited investor" as defined under National Instrument 45-106—Prospectus Exemptions,

the purchaser is a "permitted client" as defined in National Instrument 31-103—Registration Requirements, Exemptions and Ongoing Registrant Obligations,

where required by law, the purchaser is purchasing as principal and not as agent, and the purchaser has reviewed the text above under Resale Restrictions.

Conflicts of Interest

Canadian purchasers are hereby notified that the underwriters are relying on the exemption set out in section 3A.3 or 3A.4, if applicable, of National Instrument 33-105—Underwriting Conflicts from having to provide certain conflict of interest disclosure in this document.

Statutory Rights of Action

Securities legislation in certain provinces or territories of Canada may provide a purchaser with remedies for rescission or damages if the prospectus (including any amendment thereto) such as this document contains a misrepresentation, provided that the remedies for rescission or damages are exercised by the purchaser within the time limit prescribed by the securities legislation of the purchaser's province or territory. The purchaser of these securities in Canada should refer to any applicable provisions of the securities legislation of the purchaser's province or territory for particulars of these rights or consult with a legal advisor.

Enforcement of Legal Rights

All of our directors and officers as well as the experts named herein may be located outside of Canada and, as a result, it may not be possible for Canadian purchasers to effect service of process within Canada upon us or those persons. All or a substantial portion of our assets and the assets of those persons may be located outside of Canada and, as a result, it may not be possible to satisfy a judgment against us or those persons in Canada or to enforce a judgment obtained in Canadian courts against us or those persons outside of Canada.

Taxation and Eligibility for Investment

Canadian purchasers of our shares of common stock should consult their own legal and tax advisors with respect to the tax consequences of an investment in the shares in their particular circumstances and about the eligibility of the shares for investment by the purchaser under relevant Canadian legislation.

European Economic Area

In relation to each member state of the European Economic Area which has implemented the Prospectus Directive (each, a Relevant Member State), an offer to the public of any shares of our common stock which are the subject of the offering contemplated by this prospectus supplement and the accompanying prospectus may not be made in that Relevant Member State except that an offer to the public in that Relevant Member State of any shares of our common stock may be made at any time under the following exemptions under the Prospectus Directive, if they have been implemented in that Relevant Member State:

(a) to any legal entity which is a "qualified investor" as defined in the Prospectus Directive;

to fewer than 100 or, if the Relevant Member State has implemented the relevant provision of the 2010 PD Amending Directive, 150, natural or legal persons (other than qualified investors as defined in the Prospectus Directive), as permitted under the Prospectus Directive, subject to obtaining the prior consent of the underwriter or the underwriters nominated by us for any such offer; or

(c) in any other circumstances falling within Article 3(2) of the Prospectus Directive,

provided that no such offer of shares of our common stock shall require us or the underwriters to publish a prospectus pursuant to Article 3 of the Prospectus Directive or supplement a prospectus pursuant to Article 16 of the Prospectus Directive.

For the purposes of this provision, the expression an "offer of shares of our common stock to the public" in relation to the shares of our common stock in any Relevant Member State means the communication in any form and by any means of sufficient information on the terms of the offer and the shares of our common stock to be offered so as to enable an investor to decide to purchase or subscribe to the shares of our common stock, as the same may be varied in that Relevant Member State by any measure implementing the Prospectus Directive in that Relevant Member State and the expression "Prospectus Directive" means Directive 2003/71/EC (and amendments thereto, including the 2010 PD Amending Directive, to the extent implemented in the Relevant Member State), and includes any relevant implementing measure in the Relevant Member State and the expression "2010 PD Amending Directive" means Directive 2010/73/EU.

Switzerland

This document is not intended to constitute an offer or solicitation to purchase or invest in the shares described herein. The shares may not be publicly offered, sold or advertised, directly or indirectly, in, into or from Switzerland and will not be listed on the SIX Swiss Exchange or on any other exchange or regulated trading facility in Switzerland. Neither this document nor any other offering or marketing material relating to the shares constitutes a prospectus as such term is understood pursuant to article 652a or article 1156 of the Swiss Code of Obligations or a listing prospectus within the meaning of the listing rules of the SIX Swiss Exchange or any other regulated trading facility in Switzerland, and neither this document nor any other offering or marketing material relating to the shares may be publicly distributed or

otherwise made publicly available in Switzerland.

Neither this document nor any other offering or marketing material relating to the offering, nor the Company nor the shares have been or will be filed with or approved by any Swiss regulatory authority. The shares are not subject to the supervision by any Swiss regulatory authority, e.g., the Swiss Financial Markets Supervisory Authority FINMA (FINMA), and investors in the shares will not benefit from protection or supervision by such authority.

United Kingdom

This prospectus supplement and the accompanying prospectus is only being distributed to, and is only directed at, persons in the United Kingdom that are qualified investors within the meaning of Article 2(1)(e) of the Prospectus Directive that are also (i) investment professionals falling within Article 19(5) of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005, as amended (Order) and/or (ii) high net worth entities falling within Article 49(2)(a) to (d) of the Order and other persons to whom it may lawfully be communicated (each such person being referred to as a "relevant person").

This prospectus supplement and the accompanying prospectus and its contents are confidential and should not be distributed, published or reproduced (in whole or in part) or disclosed by recipients to any other persons in the United Kingdom. Any person in the United Kingdom that is not a relevant person should not act or rely on this document or any of its contents.

Italy

This prospectus supplement and the accompanying prospectus have not been and will not be filed with or cleared by the Italian securities exchange commission, Commissione Nazionale per le societa e la Borsa (CONSOB), pursuant to Legislative Decree No. 58 of 24 February 1998, as amended (Finance Law), and to CONSOB Regulation No. 11971 of 14 May 1999, as amended (Issuers Regulation). Accordingly, copies of this prospectus supplement and the accompanying prospectus or any other document relating to our common stock may not be distributed, made available or advertised in Italy, nor may our common stock be offered, purchased, sold, promoted, advertised or delivered, directly or indirectly, to the public other than (i) to Professional Investors (such being the persons and entities as defined pursuant to article 31(2) of CONSOB Regulation No. 11522 of 1 July 1998, as amended, the Intermediaries Regulation) pursuant to article 100 of the Finance Law; (ii) to prospective investors where the offer of our common stock relies on the exemption from the investment solicitation rules pursuant to, and in compliance with, the conditions set out by article 100 of the Finance Law and article 33 of the Issuers Regulation, or by any applicable exemption; provided that any such offer, sale, promotion, advertising or delivery of our common stock or distribution of this prospectus supplement and the accompanying prospectus, or any part thereof, or of any other document or material relating to our common stock in Italy is made: (a) by investment firms, banks or financial intermediaries authorized to carry out such activities in the Republic of Italy in accordance with the Finance Law, the Issuers Regulation, Legislative Decree No. 385 of 1 September 1993, as amended (Banking Law), the Intermediaries Regulation, and any other applicable laws and regulations; and (b) in compliance with any applicable notification requirement or duty which may, from time to time, be imposed by CONSOB, Bank of Italy or by any other competent authority.

Germany

Any offer or solicitation of securities within Germany must be in full compliance with the German Securities Prospectus Act (Wertpapierprospektgesetz—WpPG). The offer and solicitation of securities to the public in Germany requires the publication of a prospectus that has to be filed with and approved by the German Federal Financial Services Supervisory Authority (Bundesanstalt für Finanzdienstleistungsaufsicht—BaFin). This prospectus supplement and the accompanying prospectus have not been and will not be submitted for filing and approval to the BaFin and, consequently, will not be published. Therefore, this prospectus supplement does not constitute a public offer under the German Securities Prospectus Act (Wertpapierprospektgesetz). This prospectus supplement, the accompanying prospectus and any other document relating to our common stock, as well as any information contained therein, must therefore not be supplied to the public in Germany or used in connection with any offer for subscription of our common stock to the public in Germany, any public marketing of our common stock or any public solicitation for offers to subscribe for or otherwise acquire our common stock. This prospectus supplement, the accompanying prospectus and other offering materials relating to the offer of our common stock are strictly confidential and may not be distributed to any person or entity other than the designated recipients hereof.

France

This prospectus supplement and the accompanying prospectus have not been prepared in the context of a public offering of financial securities in France within the meaning of Article L.411-1 of the French Code Monétaire et Financier and Title I of Book II of the Règlement Général of the Autorité des marchés financiers (the "AMF") and therefore has not been and will not be filed with the AMF for prior approval or submitted for clearance to the AMF. Consequently, the shares of our common stock may not be, directly or indirectly, offered or sold to the public in France and offers and sales of the shares of our common stock may only be made in France to qualified investors (investisseurs qualifiés) acting for their own, as defined in and in accordance with Articles L.411-2 and D.411-1 to D.411-4, D.734-1, D.744-1, D.754-1 and D.764-1 of the French Code Monétaire et Financier. None of this prospectus supplement, the accompanying prospectus or any other offering material may be released, issued or distributed to the public in France. The subsequent direct or indirect retransfer of the shares of our common stock to the public in France may only be made in compliance with Articles L.411-2, L.412-1 and L.621-8 through L.621-8-3 of the French Code Monétaire et Financier.

Sweden

This is not a prospectus under, and has not been prepared in accordance with the prospectus requirements provided for in, the Swedish Financial Instruments Trading Act [lagen (1991:980) om handel med finasiella instrument] nor any other Swedish enactment. Neither the Swedish Financial Supervisory Authority nor any other Swedish public body has examined, approved, or registered this document.

LEGAL MATTERS

The validity of the common stock offered by this prospectus supplement and the accompanying prospectus will be passed upon for us by O'Melveny & Myers LLP. Wilmer Cutler Pickering Hale and Dorr LLP is counsel for the underwriters in connection with this offering.

EXPERTS

The consolidated financial statements of Progenics Pharmaceuticals, Inc. appearing in Progenics Pharmaceuticals, Inc.'s Annual Report (Form 10-K) for the year ended December 31, 2017 (including schedule appearing therein), and the effectiveness of Progenics Pharmaceuticals, Inc.'s internal control over financial reporting as of December 31, 2017, have been audited by Ernst & Young LLP, independent registered public accounting firm, as set forth in their reports thereon, including therein, and incorporated herein by reference. Such consolidated financial statements are incorporated herein by reference in reliance upon such reports given on the authority of such firm as experts in accounting and auditing.

WHERE YOU CAN FIND MORE INFORMATION

This prospectus supplement and the accompanying prospectus are part of a registration statement on Form S-3 that we filed with the SEC under the Securities Act on January 6, 2017, which registration statement was declared effective by the SEC on January 19, 2017. This prospectus supplement and the accompanying prospectus, which constitute a part of the registration statement, do not contain all the information set forth in the registration statement and the exhibits to the registration statement or the exhibits to the reports or other documents incorporated by reference in this prospectus supplement and the accompanying prospectus. For further information about us, the common stock we are offering by this prospectus supplement and the accompanying prospectus and related matters, you should review the registration statement, including the exhibits filed as a part of the registration statement and the exhibits to the reports or other documents and the accompanying prospectus. Whenever a reference is made in this prospectus supplement or the accompanying prospectus to any of our contracts, agreements or other documents, the reference may not be complete and you should refer to the exhibits that are a part of the registration statement or the exhibits to the reports or other documents incorporated by reference in this prospectus supplement and you should refer to the exhibits that are a part of the registration statement or the exhibits to the reports or other documents incorporated by reference in this prospectus supplement and you should refer to the exhibits that are a part of the registration statement or the exhibits to the reports or other documents incorporated by reference in this prospectus supplement and you should refer to the exhibits that are a part of the registration statement or the exhibits to the reports or other documents incorporated by reference in this prospectus supplement and the accompanying prospectus or other documents incorporated by reference in this prospectus or other documents incorp

Because we are subject to the information and periodic reporting requirements of the Exchange Act, we file annual, quarterly and current reports, proxy statements and other information with the SEC. Our SEC filings and the registration statement of which this prospectus supplement and the accompanying prospectus are a part, as well as the exhibits that were filed with the registration statement and the exhibits to the reports or other documents incorporated by reference in this prospectus supplement and the accompanying prospectus, are available to the public over the Internet at the SEC's website at www.sec.gov. You may also read and copy any document we file at the SEC's Public Reference Room at 100 F Street, N.E., Washington, D.C. 20549. Information on the operation of the public reference facilities may be obtained by calling the SEC at 1-800-SEC-0330.

We also make these documents available on our website at www.progenics.com. Information contained in or accessed through our website is not part of or incorporated into this prospectus supplement or the accompanying prospectus and should not be considered part of these documents.

INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

SEC rules permit us to incorporate by reference information in this prospectus supplement and the accompanying prospectus. This means that we can disclose important information to you by referring you to another document filed separately with the SEC. The information incorporated by reference is considered to be part of this prospectus supplement and the accompanying prospectus, except for information superseded by information contained in this prospectus supplement or the accompanying prospectus itself or in any subsequently filed incorporated document. Any statement contained herein or in a document incorporated or deemed to be incorporated by reference in this prospectus supplement or the accompanying prospectus shall be deemed to be modified or superseded for purposes of this prospectus supplement and the accompanying prospectus, or in any other subsequently filed document which also is or is deemed to be incorporated by reference in this prospectus supplement or the accompanying prospectus, or in any other subsequently filed document which also is or supersedes such earlier statement. Any statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this prospectus supplement and the accompanying prospectus.

We incorporate by reference in this prospectus supplement and the accompanying prospectus the documents listed below and any future documents we file with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act after the date of this prospectus supplement and until the completion or termination of this offering (in each case, except for the information in any of the foregoing Current Reports on Form 8-K furnished under Item 2.02 or Item 7.01 thereof). These documents contain important information about Progenics and its business and financial condition:

our Annual Report on Form 10-K for the year ended December 31, 2017 ("Annual Report");

the information specifically incorporated by reference into our Annual Report from our Definitive Proxy Statement on Schedule 14A for our 2018 Annual Meeting of Shareholders;

our Quarterly Reports on Form 10-Q for the periods ended March 31 and June 30, 2018;

our Current Reports on Form 8-K filed on March 22, 2018, May 11, 2018, May 31, 2018, June 14, 2018, July 3, 2018 and August 7, 2018 (with respect to Item 8.01 only); and

the description of our common stock contained in our registration statement on Form 8-A, dated September 29, 1997, including any amendments or reports filed for the purpose of updating such description.

You may obtain documents incorporated by reference in this prospectus supplement and the accompanying prospectus, including any future filings, free of charge by requesting them in writing or by telephone from us at our

executive offices at:

Progenics Pharmaceuticals, Inc. One World Trade Center New York, New York 10007 (646) 975-2500 Attention: Investor Relations and Corporate Communications

PROSPECTUS

\$250,000,000

Common Stock Preferred Stock Debt Securities Warrants Rights Units

From time to time, we may sell common stock, par value \$0.0013 per share, preferred stock, par value \$0.001 per share, debt securities, warrants, rights and/or units in one or more offerings. This prospectus describes the general manner in which such securities may be offered using this prospectus. We will specify in an accompanying prospectus supplement the terms of securities offered and the offering thereof. Our common stock, currently the only security outstanding, is listed on The NASDAQ Global Select Market under the symbol "PGNX."

Investing in our securities involves a high degree of risk. See "Risk Factors" on page 6 of this prospectus and in the "Risk Factors" section of our period reports filed with the U.S. Securities and Exchange Commission (the "SEC") and in any applicable prospectus supplement before investing in our securities.

The securities covered by this prospectus may be sold directly by us to investors, through agents designated from time to time or through underwriters or dealers at prices and on terms to be determined at the time of offering. We will include in the accompanying prospectus supplement the names of any underwriters or agents and any applicable commissions or discounts; additional information on the methods of sale appears under "Plan of Distribution." We will also describe in the prospectus supplement the way(s) in which we expect to use the net proceeds we receive from any sale.

Neither the U.S. Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus or the accompanying prospectus supplement is

truthful or complete. Any representation to the contrary is a criminal offense.

This prospectus may not be used to offer or sell any securities unless accompanied by a prospectus supplement.

The date of this prospectus is January 19, 2017.

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You should rely only on the information contained or incorporated by reference in this prospectus and in any applicable supplement to this prospectus. We have not authorized any other person to provide you with different information. If anyone provides you with different or inconsistent information, you should not rely on it. We are not making an offer to sell these securities in any jurisdiction where the offer or sale is not permitted. You should assume that the information appearing in this prospectus, the accompanying prospectus supplement and any free writing prospectus prepared by or on behalf of us is accurate only as of the date on their respective covers. Additionally, any information we have incorporated by reference in this prospectus or in any applicable prospectus supplement is accurate only as of the date of the document incorporated by reference, regardless of the time of delivery of this prospectus, any applicable prospectus supplement or any sale of securities. Our business, financial condition, results of operations and prospects may have changed since that date.

This prospectus and any applicable prospectus supplement contain and incorporate by reference market data, industry statistics and other data that have been obtained or compiled from information made available by third parties. We have not independently verified such data. This prospectus, any applicable prospectus supplement and the information incorporated herein or therein by reference include trademarks, service marks and trade names owned by us or other companies. All trademarks, service marks and trade names included or incorporated by reference in this prospectus, any applicable prospectus supplement or any related free writing prospectus are the property of their respective owners.

When used in this prospectus, the terms "Progenics," "we," "our" and "us" refer to Progenics Pharmaceuticals, Inc., a Delaware corporation, and its subsidiaries, unless otherwise specified.

ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement that we have filed with the SEC using a shelf registration process. By using a shelf registration statement, we may, from time to time, offer and sell securities described in this prospectus in one or more offerings with an aggregate total offering price of not more than \$250,000,000. This prospectus describes the general manner in which we may offer securities by this prospectus. Each time we sell securities pursuant to the registration statement we will provide a prospectus supplement (which term includes, as applicable, the at-the-market sales agreement prospectus filed with the registration statement of which this prospectus forms a part) that will contain specific information about the offering and the securities offered and may also add, update or change information contained in this prospectus. If there is any inconsistency between information in this prospectus and the accompanying prospectus supplement, you should rely on the information in the latest supplement and documents incorporated by reference herein. This prospectus may not be used to offer to sell, solicit an offer to buy or consummate a sale of securities unless it is accompanied by a prospectus supplement.

This prospectus, together with the accompanying prospectus supplement, contains important information you should know before investing, including important information about us and the securities being offered. You should carefully read both documents, as well as the additional information contained in the documents described under "Where You Can Find More Information" and "Incorporation of Certain Information by Reference" in both this prospectus and the accompanying prospectus supplement, and in particular the periodic and current reporting documents we file with the SEC.

WHERE YOU CAN FIND MORE INFORMATION

This prospectus and the accompanying prospectus supplement do not contain all of the information set forth in the registration statement and its exhibits and schedules in accordance with SEC rules and regulations. For further information with respect to us and the securities being offered hereby, you should read the registration statement, including its exhibits and schedules. Statements contained in this prospectus and the accompanying prospectus supplement, including documents that we have incorporated by reference, as to the contents of any contract or other document referred to are not necessarily complete, and, with respect to any contract or other document filed as an exhibit to the registration statement or any other such document, each such statement is qualified in all respects by reference to the corresponding exhibit. You should review the complete document to evaluate these statements. You may obtain copies of the registration statement and its exhibits via the SEC's EDGAR database or our website, or at the offices of the SEC, where they may be examined without charge at the Public Reference Room, at the address listed below, or obtained upon payment of the prescribed fees.

We file annual, quarterly and current reports, proxy statements and other documents with the SEC under the U.S. Securities Exchange Act of 1934, as amended (the "Exchange Act"). The SEC maintains a website that contains reports, proxy and information statements and other information regarding issuers, including Progenics, that file electronically with the SEC. You may obtain documents that we file with the SEC at www.sec.gov and read and copy them at the SEC's Public Reference Room at 100 F Street NE, Washington, DC 20549 (information on operation of the Public Reference Room is available by calling the SEC at 1-800-SEC-0330).

We also make these documents available on our website at www.progenics.com. Our website and the information contained or connected to our website is not incorporated by reference in this prospectus or any prospectus supplement, and you should not consider it part of this prospectus or any prospectus supplement.

INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

SEC rules permit us to incorporate by reference information in this prospectus and the accompanying prospectus supplement. This means that we can disclose important information to you by referring you to another document filed separately with the SEC. The information incorporated by reference is considered to be part of this prospectus and the accompanying prospectus supplement, except for information superseded by information contained in this prospectus and/or the accompanying prospectus supplement itself or in any subsequently filed incorporated document. This prospectus and the accompanying prospectus supplement incorporate by reference the documents set forth below that we have previously filed with the SEC (Commission File No. 0-23143), other than information in such documents that is deemed to be furnished and not filed. These documents contain important information about Progenics and its business and financial condition.

Annual Report on Form 10-K for the year ended December 31, 2015;

Quarterly Reports on Form 10-Q for the periods ended March 31, June 30 and September 30, 2016;

the information specifically incorporated by reference into our Annual Report on Form 10-K for the year ended December 31, 2015 from our definitive proxy statement on Schedule 14A (other than information furnished rather than filed) filed on April 28, 2016;

Current Reports on Form 8-K filed on January 5, 2016, April 4, 2016, May 4, 2016, May 10, 2016, June 9, 2016, July 20, 2016, August 31, 2016, October 28, 2016 and November 7, 2016 (other than information furnished rather than filed and related exhibits); and

the description of our common stock contained in our Registration Statement on Form 8-A, dated September 29, 1997, including any amendments or reports filed for the purpose of updating such description.

All documents filed by us pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act (other than current reports furnished under Item 2.02 or Item 7.01 of Form 8-K and exhibits filed on such form that are related to such items) after the date of the initial registration statement and prior to the effectiveness of the registration statement and subsequent to the date of this prospectus and prior to the termination of the offering covered by this prospectus shall be deemed to be incorporated by reference in this prospectus and the accompanying prospectus supplement and to be a part hereof from the date of filing of such documents.

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Any statement contained herein or in a document incorporated or deemed to be incorporated by reference in this prospectus or the accompanying prospectus supplement shall be deemed to be modified or superseded for purposes of this prospectus and such supplement to the extent that a statement contained in this prospectus or such supplement, or in any other subsequently filed document which also is or is deemed to be incorporated by reference in this prospectus and such supplement, modifies or supersedes such earlier statement. Any statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this prospectus or such supplement.

Documents incorporated by reference are available from us without charge, excluding all exhibits unless specifically incorporated by reference as an exhibit to this prospectus and the accompanying prospectus supplement. Prospective investors may obtain documents incorporated by reference in this prospectus and the accompanying prospectus supplement by requesting them in writing or by telephone from us at our executive offices at:

Progenics Pharmaceuticals, Inc.

One World Trade Center

New York, New York 10007

(646) 975-2500

Attention: Investor Relations and Corporate Communications

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

Certain statements contained or incorporated by reference in this prospectus, any accompanying prospectus supplement and any related free writing prospectus constitute "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995. Statements contained in this communication that refer to our estimated or anticipated future results or other non-historical facts are forward-looking statements that reflect our current perception of existing trends and information as of the date of this communication. Forward looking statements generally will be accompanied by words such as "anticipate," "believe," "plan," "could," "should, "estimate," "expect" "forecast," "outlook," "guidance," "intend," "may," "might," "will," "possible," "potential," "predict," "project," or other similar words, phrases or expressions. Such statements are predictions only, and are subject to risks and uncertainties that could cause actual events or results to differ materially.

Forward-looking statements involve known and unknown risks and uncertainties which may cause our actual results, performance or achievements to be materially different from those expressed or implied by forward-looking statements. While it is impossible to identify or predict all such matters, these differences between forward-looking statements and our actual results, performance or achievement may result from, among other things, the inherent uncertainty of the timing and success of, and expense associated with, research, development, regulatory approval and commercialization of our products and product candidates, including the risks that clinical trials will not commence or proceed as planned; products which appear to be promising in early trials will not demonstrate efficacy or safety in larger-scale trials; the sales of *RELISTOR*[®] and other products currently on the market or in development might reduce the commercial potential of our products; we, our collaborators or others might identify side effects after the product is on the market; or efficacy or safety concerns regarding marketed products, whether or not originating from subsequent testing or other activities by us, governmental regulators, other entities or organizations or otherwise, and whether or not scientifically justified, may lead to product recalls, withdrawals of marketing approval, reformulation of the product, additional pre-clinical testing or clinical trials, changes in labeling of the product, the need for additional marketing applications, declining sales or other adverse events.

We are also subject to risks and uncertainties associated with the actions of our corporate, academic and other collaborators and government regulatory agencies, including risks from market forces and trends; potential product liability; intellectual property, litigation and other dispute resolution, environmental and other risks; the risk that we may not be able to obtain sufficient capital, recruit and retain employees, enter into favorable collaborations or transactions or other relationships or that existing or future relationships or transactions may not proceed as planned; the risk that current and pending patent protection for our products may be invalid, unenforceable or challenged, or fail to provide adequate market exclusivity, or that our rights to in-licensed intellectual property may be terminated for our failure to satisfy performance milestones; the risk of difficulties in, and regulatory compliance relating to, manufacturing products; and the uncertainty of our future profitability.

Risks and uncertainties to which we are subject also include general economic conditions, including interest and currency exchange-rate fluctuations and the availability of capital; changes in generally accepted accounting

principles; the impact of legislation and regulatory compliance; the highly regulated nature of our business, including government cost-containment initiatives and restrictions on third-party payments for our products; trade buying patterns; the competitive climate of our industry; and other factors set forth in this document and other reports filed with the SEC. In particular, we cannot assure you that *RELISTOR*[®] will be commercially successful or be approved in the future in other formulations, indications or jurisdictions, that any of our other programs will result in a commercial product or that we will be able to successfully complete our integration of EXINI Diagnostics AB ("EXINI") and to develop and commercialize its products.

We do not have a policy of updating or revising forward-looking statements and, except as expressly required by law, we disclaim any intent or obligation to update or revise any statements as a result of new information or future events or developments. It should not be assumed that our silence over time means that actual events are bearing out as expressed or implied in forward-looking statements.

THE COMPANY

This summary contains a general summary of the information contained in this prospectus. It may not include all the information that is important to you. You should read the entire prospectus, any prospectus supplement delivered with the prospectus and the documents incorporated by reference before making an investment decision.

Overview

We develop innovative medicines and other products for targeting and treating cancer, with a pipeline that includes several product candidates in later-stage clinical development. These products in development include therapeutic agents designed to precisely target cancer (AZEDRA[®] and 1095), and imaging agents (1404 and PyLTM) intended to enable clinicians and patients to accurately visualize and manage their disease. In April 2016, we entered into an agreement with a subsidiary of Bayer AG ("Bayer") granting Bayer exclusive worldwide rights to develop and commercialize products using our prostate specific membrane antigen antibody technology in combination with Bayer's alpha-emitting radionuclides. In addition, as part of our acquisition of EXINI in late 2015, we acquired the EXINI Bone BSI bone scan index product, which is approved for use in Europe, Japan, and the U.S. (though not yet available in the U.S.).

Our Corporate Information

Progenics, which has been listed on NASDAQ since 1997, was incorporated in Delaware in 1986, commenced principal operations in 1988, and throughout has been engaged primarily in research and development efforts, establishing corporate collaborations and related activities. Additional information concerning the Company is contained in the documents we file with the SEC, as described above. We maintain a website at *www.progenics.com* which contains information about Progenics and our subsidiaries. Information contained in or accessed through our website is not part of or incorporated into this prospectus and should not be considered part of any offering documents.

Our mailing address is One World Trade Center, New York, New York 10007 (telephone number (646) 975-2500), where our principal executive offices are located.

RISK FACTORS

An investment in Progenics securities is speculative in nature and involves a high degree of risk. You should carefully consider the discussion of the material risks of investing in our securities contained in our filings with the SEC, including those identified under "Where You Can Find More Information," as well as in any applicable prospectus supplement, in evaluating Progenics and its business and prospects. You should also be aware that this document and other public statements we make may contain statements that do not relate strictly to historical fact, any of which may be forward-looking statements within the meaning of the U.S. Private Securities Litigation Reform Act of 1995, and should take into account the considerations relating to such statements referred to in Part I, Item 1A of our Annual Report on Form 10-K for the fiscal year ended December 31, 2015, filed with the SEC on March 11, 2016, and Part II, Item 1A of our most recent Quarterly Report on Form 10-Q filed with the SEC, and other documents and public statements that we have filed or will file, in each case, that are incorporated by reference in the prospectus or accompanying prospectus supplement. Any of the risks and uncertainties set forth therein could materially and adversely affect our business, results of operations and financial condition, which in turn could materially and adversely affect the trading price or value of our securities. As a result, you could lose all or part of your investment.

USE OF PROCEEDS

Unless we indicate otherwise in an accompanying prospectus supplement, we currently intend to use net proceeds from sales of securities to fund:

research and development activities, including clinical trials, for product candidates;

in-licensing of technology, establishment of research and development collaborations, and/or merger or acquisition opportunities; and/or

general corporate purposes, including working capital.

We may set forth additional information concerning our expected use of net proceeds from sales of securities in a prospectus supplement relating to the specific offering. Pending use of net proceeds as described above, we intend to invest net proceeds in interest-bearing, investment-grade securities.

An accompanying prospectus supplement may not identify precisely the amounts we plan to spend on each of the uses of proceeds listed above or any other uses of proceeds that we may identify in the prospectus supplement. In addition,

the amounts actually expended for each purpose may vary significantly depending upon numerous factors, including:

the costs and results of research, development and product candidate testing, including clinical trials;

costs and results of the regulatory approval process;

costs and structure of potential acquisitions, collaborations or other transactions;

the structure of and changes in our relationships with Salix, Ono and other licensors, licensees and collaborators;

the costs of filing, prosecuting, defending and enforcing patent claims;

manufacturing, marketing and other costs associated with commercialization of products; and

changes in the focus and direction of our research and development programs.

DIVIDEND POLICY

We have never paid any dividends, and we currently anticipate that all earnings, if any, will be retained for development of our business and no dividends will be declared in the foreseeable future. Payment of cash dividends, if any, in the future will be at the discretion of our board of directors and will depend on then-existing conditions, including our financial condition, operating results, contractual restrictions, capital requirements, business prospects and other factors our board of directors may deem relevant.

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RATIO OF EARNINGS (LOSS) TO COMBINED FIXED CHARGES AND PREFERRED STOCK DIVIDENDS

The following table sets forth our ratios of earnings (loss) to combined fixed charges and preferred stock dividends for the periods indicated (in thousands). For these ratios, "loss" is computed adding loss from operations and fixed charges. Fixed charges consist of an estimate of the interest within rental expense. We do not have any preferred stock outstanding as of the date of this prospectus, and therefore there are no preferred dividends included in our calculation of these ratios.

	Nine Months Ended September 30, 2016	Years Ended December 31,				
		2015	2014	2013	2012	2011
Ratio of earnings (loss) to fixed charges and preferred stock dividends	105	*	13	*	*	16
Coverage deficiency amount for total fixed charges and preferred stock dividends(1)	\$ —	\$39,119		\$42,934	\$35,431	\$ —

(1) For the years ended 2012, 2013 and 2015, the Company's coverage ratio is less than one-to-one and it must generate additional earnings of these specified amounts to achieve a coverage ratio of 1:1.

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GENERAL DESCRIPTION OF SECURITIES

We may offer shares of common and/or preferred stock, various series of debt securities, warrants and/or other rights to purchase securities, and/or units consisting of combinations of the foregoing from time to time under this prospectus, together with any applicable prospectus supplement, at prices and on terms to be determined by market conditions at the time of offering. This prospectus provides you with a general description of the securities we may offer. At the time we offer a type or series of securities, we will provide a prospectus supplement describing the specific amounts, prices and other important terms of the securities, including, to the extent applicable:

designation or classification;

aggregate principal amount or aggregate offering price;

voting or other rights;

rates and times of payment of interest, dividends or other payments;

original issue discount;

maturity;

ranking;

restrictive covenants;

redemption, conversion, exercise, exchange, settlement or sinking fund terms, including prices or rates, and any provisions or changes to or adjustments in such prices or rates and in the securities or other property receivable upon conversion, exercise, exchange or settlement;

any securities exchange or market listing arrangements; and

important U.S. federal income tax considerations.

This prospectus may not be used to offer or sell securities unless accompanied by a prospectus supplement. The prospectus supplement may add, update or change information contained in this prospectus or in documents incorporated by reference in this prospectus. We urge you to read the prospectus supplement related to any securities being offered.

We may sell the securities directly to or through underwriters, dealers or agents. We and our underwriters, dealers or agents reserve the right to accept or reject all or part of any proposed purchase of securities. If we do offer securities through underwriters or agents, we will include in the applicable prospectus supplement (i) the names of the underwriters or agents and applicable fees, discounts and commissions to be paid to them; (ii) details regarding over-allotment options, if any; and (iii) net proceeds to us.

The following descriptions are not complete and may not contain all the information you should consider before investing in any securities we may offer hereunder; they are summarized from, and qualified by reference to, Progenics' amended and restated certificate of incorporation, bylaws and the other documents referred to in the descriptions, all of which are or will be publicly filed with the SEC, as applicable. See "Where You Can Find More Information."

Capital Stock

Our authorized capital stock consists of 160 million shares of common stock, par value \$0.0013 per share, and 20 million shares of preferred stock, par value \$0.001 per share. As of November 3, 2016, there were 70,051,441 shares of common stock outstanding, 200,000 shares held in treasury and 4,841,041 shares reserved for issuance upon exercise of stock options granted under Company incentive plans. No shares of preferred stock are issued and outstanding.

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Common Stock. Holders of our common stock are entitled to one vote for each share held of record on all matters submitted to a vote of the stockholders. As described in our proxy statement for each Annual Meeting of Stockholders, our By-Laws require that in order to be elected in uncontested elections, a director nominee must receive a majority of the votes cast with respect to such nominee (the number of shares voted "for" a director nominee must exceed the number of votes cast "against" that nominee); directors are elected by a plurality vote (*i.e.* , candidates receiving the most votes are elected regardless of whether they constitute a majority) in contested elections. Holders of common stock are not entitled to cumulative voting rights with respect to the election of directors, and as a consequence, minority stockholders are not able to elect directors on the basis of their votes alone. Subject to preferences that may be applicable to any shares of preferred stock currently outstanding or issued in the future which could adversely affect common stockholders as described below, holders of common stock are entitled to receive ratably such dividends as may be declared by our board of directors out of funds legally available therefor. In the event of liquidation, dissolution or winding up of the Company, holders of common stock are entitled to share ratably in all assets remaining after payment of liabilities and the liquidation preference of any then-outstanding preferred stock. Holders of common stock have no preemptive rights and no right to convert their common stock into any other securities. There are no redemption or sinking fund provisions applicable to the common stock. All outstanding shares of common stock are fully paid and non-assessable. American Stock Transfer and Trust Company is the transfer agent and registrar for our common stock.

Preferred Stock. Our board of directors has the authority, without further vote or action by the stockholders, to designate and issue shares of preferred stock in one or more series and to designate the rights, preferences and privileges of each series, which may be greater than the rights of the common stock. We will fix in a certificate of designation the number of shares, the designation and the rights, preferences and privileges, including any dividend, conversion, voting or preemptive rights, terms of redemption, liquidation preferences and sinking fund terms, auction and remarketing procedures, and any transfer or other restrictions or limitations of or relating to any series of preferred stock that we sell under this prospectus and applicable prospectus supplements. The Delaware General Corporation Law ("DGCL") provides that in addition to any voting rights that may be provided in the applicable certificate of designation, preferred stock holders have the right to vote separately as a class on a proposed amendment to our charter involving certain fundamental changes in their rights. Preferred stock terms could adversely affect the voting power or other rights of common stock holders and the likelihood that they would receive dividend or liquidation payments, and could have the effect of delaying, deferring or preventing a change in control. You should read the prospectus supplement and the certificate of designation relating to any series of preferred stock we may offer.

Anti-Takeover Effects of Provisions of Delaware Law and Our Charter Documents

Delaware Law

We are subject to the provisions of Section 203 of the DGCL, which, subject to certain exceptions, 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 interested stockholder attained such status with the approval of the board of directors or the business combination is

approved in a prescribed manner. A "business combination" includes a merger or asset sale involving or other transaction resulting in a financial benefit to the interested stockholder. Subject to various exceptions, an interested stockholder is a person who, together with affiliates and associates, owns, or within the past three years did own, 15% or more of a corporation's voting stock. This statute could prohibit or delay the accomplishment of mergers or other takeover or change in control attempts and, accordingly, may discourage attempts to acquire the Company.

Charter Documents

Our bylaws provide that we will indemnify our directors and executive officers to the fullest extent permitted by Delaware law and that we may indemnify our other officers, employees and other agents. We may enter into indemnification contracts with our directors and officers and purchase insurance on behalf of any person whom we are required or permitted to indemnify. In addition, our charter provides that the liability of our directors for monetary damages shall be eliminated, except for (i) breach of the directors duty of loyalty to the Company or its stockholders, (ii) acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law, (iii) violating Section 174 of the DGCL, or (iv) any transaction from which the directors shall not be liable for monetary damages for breach of the directors' fiduciary duty of care to the Company and its stockholders. This provision does not eliminate the duty of care: in appropriate circumstances, equitable remedies such as injunctive or other forms of non-monetary relief remain available under Delaware law, and it does not affect a director's responsibilities under any other law, such as U.S. federal securities laws or state or federal environmental or other laws.

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Debt Securities

We may issue debt securities from time to time, in one or more series, as senior, subordinated or junior subordinated, convertible or non-convertible and secured or unsecured debt. Any senior debt securities will rank equally with any unsubordinated debt. Subordinated debt securities will rank equally with any other subordinated debt of the same ranking we may issue. Convertible debt securities will be convertible into or exchangeable for our common stock or other securities at predetermined conversion rates, and conversion may be mandatory or at the holder's option.

Debt securities will be issued under one or more indentures — contracts between us and a national banking association or other eligible party acting as trustee. Following is a summary of certain general features of debt securities we may issue; we will describe the particular terms of any debt securities that we may offer in more detail in the applicable prospectus supplement, which may differ from the terms we describe below. You should read the prospectus supplements, any free writing prospectus we may authorize and the indentures, supplemental indentures and forms of debt securities relating to any series of debt securities we may offer.

General. Except as we may otherwise provide in a prospectus supplement, the relevant indenture will provide that debt securities may be issued from time to time in one or more series. The indenture will not limit the amount of debt securities that may be issued thereunder, and will provide that the specific terms of any series of debt securities shall be set forth in, or determined pursuant to, an authorizing resolution, an officers' certificate and/or a supplemental indenture, if any, relating to such series.

We will describe in each prospectus supplement the following terms relating to any series of debt securities:

the title or designation;

whether they will be secured or unsecured, and the terms of any security;

whether the debt securities will be subject to subordination, and any terms thereof;

any limit upon the aggregate principal amount;

the date or dates on which the debt securities may be issued and on which we will pay the principal;

the interest rate, which may be fixed or variable, or the method for determining the rate, the date interest will begin to accrue, the date or dates interest will be payable and the record dates for interest payment dates or the method for determining them;

the manner in which the amounts of payment of principal of, premium or interest on the debt securities will be determined, if these amounts may be determined by reference to an index based on a currency or currencies other than that in which the debt securities are denominated or designated to be payable or by reference to a commodity, commodity index, stock exchange index or financial index;

the currency of denomination;

if payments of principal of, premium or interest will be made in one or more currencies or currency units other than that or those in which the debt securities are denominated, the manner in which the exchange rate with respect to these payments will be determined;

the place or places where the principal of, premium, and interest will be payable, where debt securities of any series may be presented for registration of transfer, exchange or conversion, and where notices and demands to or upon the Company in respect of the debt securities may be made;

the form of consideration in which principal of, premium or interest will be paid;

the terms and conditions upon which we may redeem the debt securities;

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any obligation we have to redeem or purchase the debt securities pursuant to any sinking fund, amortization or analogous provisions or at the option of a holder;

the dates on which and the price or prices at which we will repurchase the debt securities at the option of holders and other detailed terms and provisions of these obligations;

the denominations in which the debt securities will be issued, if other than denominations of \$1,000 and any integral multiple thereof;

the portion of principal amount payable upon declaration of acceleration of the maturity date, if other than the principal amount;

whether the debt securities are to be issued at any original issuance discount and the amount of discount with which they may be issued;

whether the debt securities will be issued in certificated or global form and, in such case, the depositary and the terms and conditions, if any, upon which interests in such global security or securities may be exchanged in whole or in part for the individual securities represented thereby;

provisions, if any, for defeasance in whole or in part and any addition or change to provisions related to satisfaction and discharge;

the form of the debt securities;

the terms and conditions upon which convertible debt securities will be convertible or exchangeable into securities or property of the Company or another person, if at all, and any additions or changes, if any, to permit or facilitate the same;

provisions, if any, granting special rights to holders upon the occurrence of specified events;

any restriction or condition on transferability;

any addition or change in the provisions related to compensation and reimbursement of the trustee;

any addition to or change in the events of default described in this prospectus or in the indenture and any change in the acceleration provisions so described;

any addition to or change in the covenants described in this prospectus or in the indenture, including terms of any restrictive covenants; and

any other terms which may modify or delete any provision of the indenture.

We may issue debt securities that provide for an amount less than their stated principal amount to be due and payable upon declaration of acceleration of their maturity pursuant to the terms of the indenture. We will provide you with information on the U.S. federal income tax considerations and other special considerations applicable to any debt securities in the applicable prospectus supplement.

Conversion or Exchange Rights. We will set forth in the prospectus supplement the terms, if any, on which a series of debt securities may be convertible into or exchangeable for our common stock or other securities. We will include provisions as to whether conversion or exchange is mandatory, at the option of the holder or at our option. We may include provisions pursuant to which the number of shares of our common stock or other securities that the holders of debt securities receive would be subject to adjustment.

Consolidation, Merger or Sale; No Protection in Event of a Change of Control or Highly Leveraged Transaction. Except as we may otherwise provide in a prospectus supplement, the indenture will provide that we may not merge or consolidate with or into another entity, or sell other than for cash or lease all or substantially all our assets to another entity, or purchase all or substantially all the assets of another entity unless we are the surviving entity or, if we are not the surviving entity, the successor, transferee or lessee entity expressly assumes all of our obligations under the indenture or the debt securities, as appropriate.

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Unless we state otherwise in the applicable prospectus supplement, the debt securities will not contain any provisions that may afford holders additional protection in the event we have a change of control or in the event of a highly leveraged transaction (whether or not such transaction results in a change of control), which could adversely affect them.

Events of Default Under the Indenture. Except as we may otherwise provide in a prospectus supplement, the following will be events of default under the indenture with respect to any series of debt securities that we may issue:

if we fail to pay interest when due and our failure continues for 90 days and the time for payment has not been extended or deferred;

if we fail to pay the principal, or premium, if any, when due whether by maturity or called for redemption;

if we fail to pay a sinking fund installment, if any, when due and our failure continues for 30 days;

if we fail to observe or perform any other covenant relating to the debt securities, other than a covenant specifically relating to and for the benefit of holders of another series of debt securities, and our failure continues for 90 days after we receive written notice from the debenture trustee or holders of not less than a majority in aggregate principal amount of the outstanding series; and

if specified events of bankruptcy, insolvency or reorganization occur as to the Company.

No event of default with respect to a particular series of debt securities (except as to certain events of bankruptcy, insolvency or reorganization) will necessarily constitute an event of default with respect to any other series. The occurrence of an event of default may constitute an event of default under any bank credit agreements we may have in existence from time to time. In addition, the occurrence of certain events of default or an acceleration under the indenture may constitute an event of default under certain of our other indebtedness outstanding from time to time.

Except as we may otherwise provide in a prospectus supplement, if an event of default with respect to debt securities of any series at the time outstanding occurs and is continuing, then the trustee or the holders of not less than a majority in principal amount of the outstanding series may, by a notice in writing to us (and to the debenture trustee if given by the holders), declare to be due and payable immediately the principal (or, if the debt securities are discount securities, that portion of the principal amount as may be specified in the terms of such securities) of and premium and accrued and unpaid interest, if any, on all such debt securities. Before a judgment or decree for payment of the money due has been obtained with respect to any series, the holders of a majority in principal amount of that series (or, at a meeting of holders at which a quorum is present, the holders of a majority in principal amount represented at such meeting) may rescind and annul the acceleration if all events of default, other than the non-payment of accelerated principal,

premium, if any, and interest, if any, have been cured or waived as provided in the applicable indenture (including payments or deposits in respect of principal, premium or interest that had become due other than as a result of such acceleration) and the Company has deposited with the indenture trustee or paying agent a sum sufficient to pay all amounts owed to the indenture trustee under the indenture, all arrears of interest, if any, and the principal and premium, if any, on the debt securities that have become due other than by such acceleration. We refer you to the relevant prospectus supplement relating to any discount securities for the particular provisions relating to acceleration of a portion of the principal amount thereof upon the occurrence of an event of default.

Subject to the terms of the indenture, and except as we may otherwise provide in a prospectus supplement, if an event of default under the indenture shall occur and be continuing, the debenture trustee will be under no obligation to exercise any of its rights or powers under such indenture at the request or direction of any of the holders of the applicable series, unless such holders have offered the debenture trustee reasonable indemnity. The holders of a majority in principal amount of any series will have the right to direct the time, method and place of conducting any proceeding for any remedy available to the debenture trustee, or exercising any trust or power conferred on the debenture trustee, with respect to that series, provided that, subject to the terms of the indenture, the debenture trustee need not take any action that it believes, upon the advice of counsel, might involve it in personal liability or might be unduly prejudicial to holders not involved in the proceeding.

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Except as we may otherwise provide in a prospectus supplement, a holder of the debt securities of any series will only have the right to institute a proceeding under the indenture or to appoint a receiver or trustee, or to seek other remedies if:

the holder previously has given written notice to the debenture trustee of a continuing event of default with respect to that series;

the holders of at least a majority in aggregate principal amount outstanding of that series have made written request, and such holders have offered reasonable indemnity to the debenture trustee to institute the proceeding as trustee; and

the debenture trustee does not institute the proceeding, and does not receive from the holders of a majority in aggregate principal amount outstanding of that series (or at a meeting of holders at which a quorum is present, the holders of a majority in principal amount of such series represented at such meeting) other conflicting directions within 60 days after the notice, request and offer.

Except as we may otherwise provide in a prospectus supplement, these limitations will not apply to a suit instituted by a holder of debt securities if we default in the payment of the principal, premium, if any, or interest on, them.

We will periodically file statements with the applicable debenture trustee regarding our compliance with specified covenants in the applicable indenture.

Modification of Indenture; Waiver. Except as we may otherwise provide in a prospectus supplement, the debenture trustee and the Company may, without the consent of any holders, execute a supplemental indenture to change the applicable indenture with respect to specific matters, including, among other things:

to surrender any right or power conferred upon the Company;

to provide, change or eliminate any restrictions on payment of principal of or premium, if any; provided that any such action shall not adversely affect the interests of the holders of debt securities of any series in any material respect;

to change or eliminate any of the provisions of the indenture; provided that any such change or elimination shall become effective only when there is no outstanding debt security created prior to the execution of such supplemental indenture that is entitled to the benefit of such provision and as to which such supplemental indenture would apply;

to evidence the succession of another entity to the Company;

to evidence and provide for the acceptance of appointment by a successor trustee with respect to one or more series of debt securities and to add or change provisions of the indenture to facilitate the administration of the trusts thereunder by more than one trustee;

to secure any series of debt securities;

to evidence any changes to the indenture regarding removal of the debenture trustee and appointment of a successor debenture trustee;

to cure any ambiguity, mistake, manifest error, omission, defect or inconsistency in the indenture or to conform the text of any provision in the indenture or in any supplemental indenture to any description thereof in the applicable section of a prospectus, prospectus supplement or other offering document that was intended to be a verbatim recitation of a provision of the indenture or of any supplemental indenture;

to add to or change or eliminate any provision of the indenture as shall be necessary or desirable in accordance with any amendments to the U.S. Trust Indenture Act of 1939, as amended;

to add guarantors or co-obligors with respect to any series of debt securities;

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to make any change in any series of debt securities that does not adversely affect in any material respect the interests of the holders thereof;

to provide for uncertificated debt securities in addition to certificated debt securities; and

to supplement any of the provisions of the indenture to such extent as shall be necessary to permit or facilitate the defeasance and discharge of any series of debt securities; provided that any such action shall not adversely affect the interests of holders of any debt securities.

In addition, and except as we may otherwise provide in a prospectus supplement, under the indenture the rights of holders of a series of debt securities may be changed by us and the debenture trustee with the written consent of the holders of at least a majority in aggregate principal amount outstanding (or, at a meeting of holders of such series at which a quorum is present, the holders of a majority in principal amount represented at such meeting) that is affected. The debenture trustee and the Company may, however, make the following changes only with the consent of each holder of any outstanding debt securities affected:

extending the fixed maturity;

reducing the principal amount, reducing the rate of or extending the time of payment of interest, or any premium payable upon redemption;

reducing the principal amount of discount securities payable upon acceleration of maturity;

making the principal of or premium or interest payable in currency other than that stated;

impairing the right to institute suit for the enforcement of any payment on or after the fixed maturity date;

materially adversely affecting the economic terms of any right to convert or exchange; and

reducing the percentage of debt securities, the holders of which are required to consent to any amendment or waiver; or modifying, without the written consent of the trustee, the rights, duties or immunities of the trustee.

Except for certain specified provisions, and except as we may otherwise provide in a prospectus supplement, the holders of at least a majority in principal amount of any series (or, at a meeting of holders of such series at which a quorum is present, the holders of a majority in principal amount represented at such meeting) may, on behalf of the holders of all debt securities of that series, waive our compliance with provisions of the indenture. The holders of a

majority in principal amount of the outstanding debt securities of any series may, on behalf of all such holders, waive any past default under the indenture with respect to that series and its consequences, other than a default in the payment of the principal of, premium or any interest; provided, however, that the holders of a majority in principal amount of the outstanding debt securities of any series may rescind an acceleration and its consequences, including any related payment default that resulted from the acceleration.

Discharge. Except as we may otherwise provide in a prospectus supplement, the indenture will provide that we can elect to be discharged from our obligations with respect to one or more series of debt securities. In order to exercise our rights to be discharged, we must deposit with the trustee money or government obligations sufficient to pay all the principal of, the premium, if any, and interest on, the debt securities of the affected series on the dates payments are due.

Form, Exchange and Transfer. Except as we may otherwise provide in a prospectus supplement, we will issue debt securities only in fully registered form without coupons and, unless we otherwise specify in the applicable prospectus supplement, in denominations of \$1,000 and any integral multiple thereof. Except as we may otherwise provide in a prospectus supplement, the indenture will provide that we may issue debt securities in temporary or permanent global form and as book-entry securities that will be deposited with a depositary named by us and identified in a prospectus supplement with respect to that series.

At the option of the holder, subject to the terms of the indenture and the limitations applicable to global securities described in the applicable prospectus supplement, the holder will be able to exchange the debt securities for other debt securities of the same series, in any authorized denomination and of like tenor and aggregate principal amount.

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Subject to the terms of the indenture and the limitations applicable to global securities set forth in the applicable prospectus supplement, holders may present the debt securities for exchange or for registration of transfer, duly endorsed or with the form of transfer endorsed thereon duly executed if so required by us or the security registrar, at the office of the security registrar or at the office of any transfer agent designated by us for this purpose. Unless otherwise provided in the debt securities or the indenture, we will make no service charge for any registration of transfer or exchange, but we may require payment of any taxes or other governmental charges.

We will name in the applicable prospectus supplement the security registrar, and any transfer agent in addition to the security registrar, that we initially designate for any debt securities. We may at any time designate additional transfer agents or rescind the designation of any transfer agent or approve a change in the office through which any transfer agent acts, except that we will be required to maintain a transfer agent in each place of payment for the debt securities of each series.

Except as we may otherwise provide in a prospectus supplement, if we elect to redeem the debt securities of any series, we will not be required to:

issue, register the transfer of, or exchange any debt securities of that series during a period beginning at the opening of business 15 days before the day of mailing of a notice of redemption of any debt securities that may be selected for redemption and ending at the close of business on the day of the mailing; or

register the transfer of or exchange any debt securities so selected for redemption, in whole or in part, except the unredeemed portion of any debt securities we are redeeming in part.

Information Concerning the Debenture Trustee. The debenture trustee, other than during the occurrence and continuance of an event of default under the indenture, will undertake to perform only those duties as are specifically set forth in the indenture. Upon an event of default, the debenture trustee must use the same degree of care as a prudent person would exercise or use in the conduct of his or her own affairs. Subject to this provision, the debenture trustee will be under no obligation to exercise any of the powers given it by the indenture at the request of any holder unless it is offered reasonable security and indemnity against the costs, expenses and liabilities that it might incur.

Payment and Paying Agents. Unless we otherwise indicate in the applicable prospectus supplement, we will make payment of interest on any interest payment date to the person in whose name the debt securities, or one or more predecessor securities, are registered at the close of business on the regular record date for the interest.

Unless we otherwise indicate in the applicable prospectus supplement, we will pay principal of and any premium and interest at the office of the indenture trustee or, at the option of the Company, by check payable to the holder. Unless

we otherwise indicate in a prospectus supplement, we will designate the corporate trust office of the debenture trustee our sole paying agent for payments. We will name in the applicable prospectus supplement any other paying agents that we initially designate. We will maintain a paying agent in each place of payment.

All money we pay to a paying agent or the debenture trustee for the payment of principal or any premium or interest which remains unclaimed at the end of two years after such principal, premium or interest has become due and payable will be repaid to us, and the holder of the security thereafter may look only to us for payment thereof.

Governing Law. The indenture and the debt securities will be governed and construed in accordance with the laws of the State of New York.

No Personal Liability of Directors, Officers, Employees and Stockholders. No incorporator, stockholder, employee, agent, officer, director or subsidiary of ours will have any liability for any obligations of ours or, due to the creation of any indebtedness under the debt securities, the indentures or supplemental indentures. The indentures provide that all such liability is expressly waived and released as a condition of, and as consideration for, the execution of such indentures and the issuance of the debt securities.

Warrants, Other Rights and Units

We may from time to time issue warrants or other rights (together, Rights), in one or more series, for the purchase of common stock, preferred stock or debt securities. We may issue Rights independently or together with such securities (as such, Units), and such Rights may be attached to or separate from them. Rights will be evidenced by a Rights certificate issued under one or more Rights agreements between us and a Rights agent which will act solely as our agent in connection with the Rights and will not have any obligation or relationship of agency or trust for or with any holders or beneficial owners of Rights. The forms of any such certificates and agreements will be filed as exhibits to the registration statement of which this prospectus is a part by amendment thereof or as exhibits to a Current Report on Form 8-K incorporated herein by reference, and the accompanying prospectus supplement and such forms may add, update or change the terms and conditions of the Rights or Units described in this prospectus. You should read the prospectus supplements, Rights agreements and Rights certificates that contain the terms of the Rights in their entirety.

The particular terms of each issue of Rights or Units will be described in the applicable prospectus supplement, including, as applicable:

the title of the Rights;

any initial offering price;

the title, aggregate principal amount or number and terms of the securities purchasable upon exercise of the Rights;

the principal amount or number of securities purchasable upon exercise of each Right and the price at which that principal amount or number may be purchased upon exercise of each Right;

the currency or currency units in which any offering price and the exercise price are payable;

the title and terms of any related securities with which the Rights are issued and the number of the Rights issued with each security;

any date on and after which the Rights and the related securities will be separately transferable;

any minimum or maximum number of Rights that may be exercised at any one time;

the date on which the right to exercise the Rights will commence and the date on which the right will expire;

a discussion of U.S. federal income tax, accounting or other considerations applicable to the Rights or Units;

whether the Rights represented by the Rights certificates will be issued in registered or bearer form and, if registered, where they may be transferred and registered;

any anti-dilution provisions of the Rights;

any redemption or call provisions applicable to the Rights;

any provisions for changes to or adjustments in the exercise price; and

any additional terms of the Rights, including terms, procedures and limitations relating to exchange and exercise of the Rights.

Rights certificates will be exchangeable for new Rights certificates of different denominations and, if in registered form, may be presented for registration of transfer, and Rights may be exercised, at the corporate trust office of the Rights agent or any other office indicated in the related prospectus supplement. Before the exercise of Rights, holders of Rights will not be entitled to payments of any dividends, principal, premium or interest on securities purchasable upon exercise of the Rights, to vote, consent or receive any notice as a holder of and in respect of any such securities or to enforce any covenants in any indenture, or to exercise any other rights whatsoever as a holder of securities purchasable upon exercise of the Rights.

PLAN OF DISTRIBUTION

We may sell securities through underwriters or dealers, through agents, directly to one or more purchasers, in "at the market offerings," within the meaning of Rule 415(a)(4) under the U.S. Securities Act of 1933, as amended (the "Securities Act"), to or through a market maker or into an existing trading market, or an exchange or otherwise, or by a combination of these methods. The accompanying prospectus supplement will describe the terms of any offering of securities, including:

the name or names of any underwriters;

the purchase price of the securities and the proceeds we will receive from the sale;

any over-allotment options pursuant to which underwriters may purchase additional securities from us;

any agency fees or underwriting discounts and other items constituting agents' or underwriters' compensation;

any initial public offering price; and

any discounts or concessions allowed or reallowed or paid to dealers.

If underwriters are used in the sale, they will acquire the securities for their own account and may resell the securities from time to time in one or more transactions, at a fixed public offering price or at varying prices determined at the time of the sale. The obligations of the underwriters to purchase the securities will be subject to the conditions set forth in the applicable underwriting agreement. We may offer the securities to the public through underwriting syndicates represented by managing underwriters or by underwriters without a syndicate. Subject to certain conditions, the underwriters will be obligated to purchase all the securities offered by the prospectus supplement if any such securities are purchased. The underwriters may change from time to time the public offering price and any discounts or concessions allowed or reallowed or paid to dealers. We may use underwriters with whom we have a material relationship, and will describe any such relationships in the prospectus supplement naming such underwriter(s).

We may sell securities directly or through agents we designate from time to time. We will name any agent involved in the offering and sale of securities, and we will describe in the prospectus supplement any commissions that must be paid to the agent. Unless the prospectus supplement states otherwise, our agent will act on a best-efforts basis for the period of its appointment.

We may authorize agents, underwriters or dealers to solicit offers by certain purchasers to purchase securities at the public offering price set forth in the prospectus supplement pursuant to delayed delivery contracts providing for payment and delivery on a specified date in the future. The relevant prospectus supplement will set forth the conditions to these contracts and any commissions we must pay for solicitation of these contracts.

We may provide agents and underwriters with indemnification against civil liabilities related to this offering, including liabilities under the Securities Act, or contribution with respect to payments that the agents or underwriters may make with respect to these liabilities. Agents and underwriters may engage in transactions with, or perform services for, us in the ordinary course of business.

All securities we may offer, other than common stock, will be new issues of securities with no established trading market. We may elect to list any series of securities on an exchange, and, in the case of our common stock, on any additional exchange, but, unless otherwise specified in the applicable prospectus supplement, we shall not be obligated to do so. Any underwriters may make a market in these securities, but will not be obligated to do so and may discontinue any market making at any time without notice. We cannot guarantee the liquidity of the trading markets for any securities.

Rules of the SEC may limit the ability of any underwriters to bid for or purchase securities before the distribution of the securities is completed. Underwriters may, however, engage in the following activities in accordance with the rules:

Stabilizing transactions — Underwriters may make bids or purchases for the purpose of pegging, fixing or maintaining the price of the securities, so long as stabilizing bids do not exceed a specified maximum.

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Over-allotments and syndicate covering transactions — Underwriters may sell more securities than those they have committed to purchase in an underwritten offering. This over-allotment creates a short position for the underwriters which may involve either "covered" short sales or "naked" short sales. Covered short sales are short sales made in an amount not greater than the underwriters' over-allotment option to purchase additional securities in the offering, and may be closed out either by exercising the underwriter's over-allotment option or by purchasing securities in the open market. In determining how they will close the covered short position, the underwriters will consider, among other things, the price of securities available for purchase in the open market as compared to the over-allotment option price. Naked short sales are short sales in excess of the over-allotment option, which the underwriters must close out by purchasing securities in the open market. A naked short position is more likely to be created if the underwriters are concerned that, in the open market after pricing, there may be downward pressure on the price of the securities that could adversely affect investors who purchase securities in the offering.

Penalty bids — If underwriters purchase securities in the open market in a stabilizing transaction or syndicate covering transaction, they may reclaim a selling concession from other underwriters and selling group members who sold those securities as part of the offering.

Similar to other purchase transactions, an underwriter's purchases to cover the syndicate short sales or to stabilize the market price of securities may have the effect of raising or maintaining the market price of securities or preventing or mitigating a decline in the market price. As a result, the price of the securities may be higher than the price that might otherwise exist in the open market. The imposition of a penalty bid might also have an effect on the price of securities if it discourages resales of the securities.

If commenced, the underwriters may discontinue at any time any of the activities described above.

Any underwriters who are qualified market makers on The NASDAQ Global Select Market may engage in passive market making transactions in our common stock on The NASDAQ Global Select Market in accordance with Rule 103 of Regulation M, during the business day prior to the pricing of the offering, before the commencement of offers or sales of the common stock. Passive market makers must be identified as such and must comply with applicable volume and price limitations. In general, a passive market maker must display its bid at a price not in excess of the highest independent bid for such security; if all independent bids are lowered below the passive market maker's bid, however, the passive market maker's bid must then be lowered when certain purchase limits are exceeded.

In connection with the sale of our securities, underwriters or agents may receive compensation from us or from purchasers of the securities, for whom they may act as agents, in the form of discounts, concessions or commissions. Underwriters may sell securities to or through dealers, and these dealers may receive compensation in the form of discounts, concessions or commissions from the underwriters or commissions from the purchasers for whom they may act as agents. Underwriters, dealers and agents that participate in the distribution of securities may be deemed to be underwriters under the Securities Act, and any discounts or commissions they receive from us and any profit on the

resale of securities they realize may be deemed to be underwriting discounts and commissions under the Securities Act.

In compliance with guidelines of the Financial Industry Regulatory Authority, Inc., the consideration or discount to be received by any FINRA member or independent broker dealer may not exceed eight percent of the aggregate amount of the securities offered pursuant to this prospectus and any applicable prospectus supplement.

To comply with applicable state securities laws, the securities offered by this prospectus will be sold, if necessary, in such jurisdictions only through registered or licensed brokers or dealers. In addition, securities may not be sold in some states unless they have been registered or qualified for sale in the applicable state or an exemption from the registration or qualification requirement is available and is complied with.

LEGAL MATTERS

The legality of the securities being offered hereby is being passed upon for the Company by O'Melveny & Myers LLP, New York, New York. Any underwriters will also be advised on legal matters by their own counsel, who will be identified in an applicable prospectus supplement.

EXPERTS

The consolidated financial statements of Progenics appearing in Progenics' Annual Report on Form 10-K for the year ended December 31, 2015 (including schedule appearing therein), and the effectiveness of Progenics' internal control over financial reporting as of December 31, 2015, have been audited by Ernst & Young LLP, independent registered public accounting firm, as set forth in their reports thereon, including therein, and incorporated herein by reference. Such consolidated financial statements are incorporated herein by reference in reliance upon such reports given on the authority of such firm as experts in accounting and auditing.

9,090,909 Shares

Progenics Pharmaceuticals, Inc.

Common Stock

PROSPECTUS SUPPLEMENT

Joint Book-Running Managers

Jefferies

Credit Suisse

Lead Manager

Cantor

Co-Managers

Needham & Company

BTIG

CIM Securities, LLC

August 7, 2018