Actinium Pharmaceuticals, Inc.
Form 424B3
October 24, 2017

Filed Pursuant to Rule 424(b)(3)

under the Securities Act of 1933

in connection with

Registration Statement No. 333-216748

PROSPECTUS

ACTINIUM PHARMACEUTICALS, INC.

$75,000,000

Common Stock

In accordance with the terms of the At Market Issuance Sales Agreement entered into with FBR Capital Markets & Co., or FBR, dated March 16, 2017, which we refer to as the sales agreement, we may offer and sell shares of our common stock, par value $0.001 per share, having an aggregate offering price of up to $75,000,000 from time to time through FBR, acting as agent.

Our common stock is presently traded on the NYSE American under the symbol “ATNM.” On October 23, 2017, the last reported sale price of our common stock was $0.72 per share.

Sales of our common stock, if any, under this prospectus will be made by any method permitted that is deemed an “at the market offering” as defined in Rule 415 under the Securities Act of 1933, as amended. FBR will act as our sales agent using commercially reasonable efforts consistent with its normal trading and sales practices. There is no arrangement for funds to be received in any escrow, trust or similar arrangement.

FBR will be entitled to compensation at a commission rate of 3% of the gross sales price per share sold. In connection with the sale of the common stock on our behalf, FBR may be deemed to be an "underwriter" within the meaning of the Securities Act of 1933, as amended, and the compensation of FBR may be deemed to be underwriting commissions or discounts. We have also agreed to provide indemnification and contribution to FBR with respect to certain liabilities, including liabilities under the Securities Act of 1933, as amended.

Investing in our securities involves a high degree of risk. These risks are discussed in this prospectus under "Risk Factors" beginning on page S-9 and in the documents incorporated by reference into this prospectus.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or passed upon the adequacy or accuracy of this prospectus. Any representation to the contrary is a criminal offense.

FBR

The date of this prospectus is October 24, 2017

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ABOUT THIS PROSPECTUS

This prospectus is part of a registration statement on Form S-3 that we filed with the Securities and Exchange Commission using a "shelf" registration process. This prospectus relates to the offering of our common stock. Before buying any of the common stock that we are offering, we urge you to carefully read this prospectus, together with the information incorporated by reference as described under the heading "Where You Can Find More Information" and "Incorporation of Certain Information by Reference." These documents contain important information that you should consider when making your investment decision.

This prospectus describes the specific terms of the common stock we are offering and also adds to and updates information contained in the documents incorporated by reference into this prospectus. To the extent there is a conflict between the information contained in this prospectus, on the one hand, and the information contained in any document incorporated by reference in this prospectus, on the other hand, you should rely on the information in this prospectus. 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 into this prospectus—the statement in the document having the later date modifies or supersedes the earlier statement.

You should only rely on the information contained or incorporated by reference in this prospectus and any issuer free writing prospectus that we may authorize for use in connection with this offering. No person has been authorized to give any information or make any representations in connection with this offering other than those contained or incorporated by reference in this prospectus and any related issuer free writing prospectus in connection with the offering described herein and therein, and, if given or made, such information or representations must not be relied upon as having been authorized by us. Neither this prospectus nor any related issuer free writing prospectus shall constitute an offer to sell or a solicitation of an offer to buy offered securities in any jurisdiction in which it is unlawful for such person to make such an offering or solicitation. This prospectus does not contain all of the information included in the registration statement. For a more complete understanding of the offering of the securities, you should refer to the registration statement, including its exhibits.

You should read the entire prospectus and any related issuer free writing prospectus, as well as the documents incorporated by reference into this prospectus or any related issuer free writing prospectus, before making an investment decision. Neither the delivery of this prospectus or any issuer free writing prospectus nor any sale made hereunder shall under any circumstances imply that the information contained or incorporated by reference herein or in any issuer free writing prospectus is correct as of any date subsequent to the date hereof or of such issuer free writing prospectus. You should assume that the information appearing in this prospectus or any document incorporated by reference is accurate only as of the date of the applicable documents, regardless of the time of delivery of this prospectus or any sale of securities. Our business, financial condition, results of operations and prospects may have changed since that date.

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PROSPECTUS SUMMARY

This summary provides an overview of selected information contained elsewhere or incorporated by reference in this prospectus and does not contain all of the information you should consider before investing in our common stock. You should carefully read the prospectus, the information incorporated by reference and the registration statement of which this prospectus is a part in their entirety before investing in our common stock, including the information discussed under "Risk Factors" in this prospectus and the documents incorporated by reference and our financial statements and notes thereto that are incorporated by reference in this prospectus. As used in this prospectus, unless the context otherwise indicates, the terms "we," "our," "us," or "the Company" refer to Actinium Pharmaceuticals, Inc., a Delaware corporation, and its subsidiaries taken as a whole.

The Company

Business Overview

We are a clinical-stage biopharmaceutical company focused on developing and commercializing targeted therapies for safer myeloablation and conditioning of the bone marrow prior to a bone marrow transplant (BMT) and for the targeting and killing of cancer cells. We are currently conducting clinical trials for our three product candidates, Iomab-B, Actimab-A and Actimab-M, as well as performing research on other potential drug candidates utilizing our proprietary alpha-particle technology platform. Our most advanced product candidate, Iomab-B, is comprised of an anti-CD45 monoclonal antibody labeled with iodine-131 (I-131). We are currently conducting a pivotal Phase 3 trial of Iomab-B for myeloablation and conditioning of the bone marrow prior to a bone marrow transplant for patients with relapsed or refractory acute myeloid leukemia (AML) age 55 and older. A bone marrow transplant is a potentially curative treatment option for patients with AML and other blood cancers including leukemias, lymphomas and multiple myeloma as well as certain blood disorders. Upon successful completion of our Phase 3 clinical trial for Iomab-B we intend to submit for marketing approval in the U.S. and European Union. Our most advanced alpha-particle based therapy, Actimab-A, is an anti-CD33 monoclonal antibody conjugated with the alpha-particle actinium-225 (Ac-225). Actimab-A is currently in a Phase 2 clinical trial for patients over the age of 60 who are newly diagnosed with AML and ineligible for standard induction chemotherapy. Actimab-M, our third product candidate, is the same anti-CD33 monoclonal antibody conjugated to Ac-225 but a different dose and dosing regimen. Actimab-M, is being studied in a Phase 1 trial for patients with refractory multiple myeloma. We expect our alpha-particle technology platform will generate additional drug candidates that we will progress in clinical trials ourselves and or out-license. We intend to develop a number of products for numerous types of cancer and derive revenue from partnering relationships worldwide and/or direct sales of our products primarily in the United States.

In December 2015, we announced that the U.S. Food and Drug Administration, or FDA, cleared our IND filing for Iomab-B. In June 2016, we announced the pivotal Phase 3 clinical trial for Iomab-B was initiated, and assuming that

the trial meets its end points, it will form the basis for a Biologics Licensing Application (BLA). We established an agreement with the FDA that the path to a BLA submission would include a single, pivotal Phase 3 clinical study if it is successful. The population in this two arm, randomized, controlled, multicenter trial will be patients with relapsed or refractory AML over the age of 55. The trial size was set at 150 patients with 75 patients per arm. The primary endpoint in the pivotal Phase 3 trial is durable complete remission, defined as a complete remission lasting at least six months and the secondary endpoint will be overall survival at one year. We believe there are currently no effective treatments approved by the FDA for AML in this patient population and there is no defined standard of care. Iomab-B has completed several physicians-sponsored clinical trials examining its potential as a myeloconditioning regimen prior to BMT in various blood cancers, including the Phase 1/2 study in relapsed and/or refractory AML patients. The results of these studies in over 300 patients have demonstrated the potential of Iomab-B to create a new treatment paradigm for bone marrow transplants by: expanding the pool to ineligible patients who do not have any viable treatment options currently; enabling a shorter and safer preparatory interval for BMT; reducing post-transplant complications; and showing a clear survival benefit including curative potential.

In September 2016, we initiated a Phase 2 clinical trial for Actimab-A. This Phase 2 clinical trial is a multicenter, open-label study that will enroll 53 patients. Patients will receive 2.0 μCi/kg/fractionated dose of Actimab-A via two injections given at day 1 and day 7. The Phase 2 trial is designed to evaluate complete response rates at up to day 42 after Actimab-A administration, including complete remission (CR), complete remission with incomplete platelet recovery (CRp) or complete remission with incomplete blood count recovery (CRi) A formal interim analysis is scheduled for 31 patients, which is expected by the end of 2017. The Phase 2 clinical trial includes peripheral blast burden as an inclusion criteria and in patients with high peripheral blast (PB) burden, the use of Hydroxyurea will be mandated with the goal of bringing peripheral blasts below 200/μL, which we identified from two previously complete Phase 1 clinical trials totaling 38 patients. In addition, the use of granulocyte colony-stimulating factors (GCSF) will be mandated. Low dose cytarabine has been eliminated from the protocol and the Phase 2 clinical trial will evaluate Actimab-A as a monotherapy. The secondary endpoint of the Phase 2 clinical trial will be overall survival.

In February 2017, we initiated a Phase 1 investigator initiated clinical trial to study Actimab-M in multiple myeloma. Multiple myeloma is a cancer of plasma cells that is currently incurable. The Phase 1 trial will enroll up to 12 patients with relapsed or refractory multiple myeloma who have positive CD33 expression. This Phase 1 study is designed as a dose escalation study intended to assess safety, establish maximum tolerable dose (MTD) and assess efficacy. Patients will be administered Actimab-M on day 1 at an initial dose of 0.5 μCi/kg and then assessed at day 42 for safety and efficacy. The dose can be increased to 1.0 μCi/kg or reduced to 0.25 μCi/kg based on safety assessment that will evaluate dose limiting toxicities (DLTs). Patients may receive up to 8 cycles of therapy but in no event will cumulative administration exceed 4.0 μCi/kg of Actimab-M.

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Business Strategy

We intend to develop our most advanced clinical stage candidate, Iomab-B, through approval and if these efforts are successful, we may elect to commercialize Iomab-B on our own or with a partner in the United States and/or outside of the United States to out-license the rights to develop and commercialize the product to a strategic partner. We intend to develop Actimab-A and Actimab-M through Phase 2 proof of concept human clinical trial (a trial designed to provide data on the drug's efficacy) and we will most likely seek to enter into strategic partnerships whereby the strategic partner(s) co-fund(s) further human clinical trials of the drug that are needed to obtain regulatory approvals for commercial sale within and outside of the United States. In parallel, we intend to identify and begin initial human trials with additional actinium-225 based product candidates in other cancer indications. We intend to retain marketing rights for our products in the United States whenever possible and out-license marketing rights to our partners for the rest of the world. We may also seek to in-license other applicable opportunities should such technology become available.

Market Opportunity

We compete in the marketplace for cancer treatments estimated to reach over $83 billion in 2016 sales, according to "The Global Use of Medicines: Outlook Through 2016 Report by the IMS Institute for Healthcare Informatics, July 2012." While surgery, radiation and chemotherapy remain staple treatments for cancer, their use is limited by the fact that they often cause substantial damage to normal cells. On the other hand, targeted monoclonal antibody therapies exert most or all of their effect directly on cancer cells, but often lack sufficient killing power to eradicate all cancer cells with just the antibody. A new approach for treating cancer is to combine the precision of antibody-based targeting agents with the killing power of radiation or chemotherapy by attaching powerful killing agents to precise molecular carriers called monoclonal antibodies (mAb). We use mAbs labeled with radioisotopes to deliver potent doses of radiation directly to cancer cells while sparing healthy tissues. The radioisotopes we use are the alpha emitter Ac-225 and the beta emitter I-131. I-131 is among the best known and well characterized radioisotopes. It is used very successfully in treatment of papillary and follicular thyroid cancer as well as other thyroid conditions. It is also attached to a monoclonal antibody in treatment of Non-Hodgkin's Lymphoma ("NHL") and is also used experimentally with different carriers in other cancers. Ac-225 has many unique properties and we believe we are a leader in developing this alpha emitter for clinical applications using our proprietary alpha particle technology.

Our most advanced products are Iomab-B, I-131 labeled anti-CD45 mAb for myeloablation of relapsed or refractory AML patients pripr to a BMT and Actimab-A, Ac-225 conjugated to an anti-CD33 mAb for treatment of newly diagnosed AML, in patients ineligible for currently approved therapies. We recently began clinical development of Actimab-M, Ac-225 conjugated to an anti-CD33 mAb for the treatment of patients with refractory multiple myeloma. Iomab-B offers a potentially curative treatment for these patients, most of whom do not survive beyond one year after being diagnosed with this condition. Iomab-B has also demonstrated efficacy in BMT preparation for other blood cancer indications, including myelodysplastic syndrome ("MDS"), acute lymphoblastic leukemia ("ALL"), Hodgkin's Lymphoma, multiple myeloma and NHL. These are all follow-on indications for which Iomab-B can be developed

and it is our intention to explore these opportunities at a future date. We believe the aggregate worldwide market potential for the treatment of AML, MDS, ALL, Hodgkin's Lymphoma, multiple myeloma and NHL is approximately $4.1 billion.

In December 2015, we announced that the FDA cleared our IND filing for Iomab-B, and that we proceeded with a pivotal, Phase 3 clinical trial. We anticipate the Phase 3, controlled, randomized, pivotal trial will complete enrollment of patients by 2018 and assuming that the trial meets its endpoints, it will form the basis for a BLA. We, in our recently approved IND filing, established an agreement with the FDA that the path to a BLA submission would include a single, pivotal Phase 3 clinical study if it is successful. The population in this two arm, randomized, controlled, multicenter trial will be refractory and relapsed AML patients over the age of 55. The trial size was set at 150 patients with 75 patients per arm. The primary endpoint in the pivotal Phase 3 trial is durable complete remission, defined as a complete remission lasting at least six months and the secondary endpoint will be overall survival at one year. There are currently no effective treatments approved by the FDA for AML in this patient population and there is no defined standard of care. Iomab-B has completed several physicians sponsored clinical trials examining its potential as a conditioning regimen prior to BMT in various blood cancers, including the Phase 1/2 clinical trial in relapsed and/or refractory AML patients. The results of these clinical trials in over 300 patients have demonstrated the potential of Iomab-B to create a new treatment paradigm for bone marrow transplants by: expanding the pool to ineligible patients who do not have any viable treatment options currently; enabling a shorter and safer preparatory interval for BMT; reducing post-transplant complications; and showing a clear survival benefit including curative potential.

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Other potential product opportunities in which significant preclinical work is being undertaken include metastatic colorectal cancer, metastatic prostate cancer and antiangiogenesis which reduces the blood supply to solid tumors. We believe the worldwide market potential for the treatment of metastatic colorectal cancer is approximately $4.8 billion, and we believe the worldwide market potential for the treatment of metastatic prostate cancer is approximately $6.0 billion. We also believe the worldwide market potential for the treatment of Glioblastoma Multiforme, a potential indication based on an antiangiogenesis approach, is approximately $1.1 billion. We estimate the market potential for these indications based on company research, published rates of disease incidence and company calculations based on costs of currently used therapies.

We believe that our biggest market opportunity lies in the applicability of our alpha particle technology platform to a wide variety of cancer indications. A broad range of solid and blood borne cancers can be potentially targeted by mAbs to enable treatment with the alpha-particle technology. We believe that our alpha-particle technology could potentially be applied to mAbs that are already approved by the FDA to create more efficacious and/or safer drugs (“biobetters”).

In March 2016, the FDA granted orphan drug designation for Iomab-B and in October 2016 the European Medicines Agency (EMA) granted orphan designation in the European Union (EU) for Iomab-B. In November 2014, the FDA granted orphan-drug designation for Actimab-A and in May 2017 the EMA granted orphan designation in the EU for Actimab-A. The FDA, through its Office of Orphan Products Development, grants orphan status to drugs and biologic products that are intended for the safe and effective treatment, diagnosis, or prevention of rare diseases or disorders that affect fewer than 200,000 people in the United States. Orphan drug designation provides a drug developer with certain benefits and incentives, including a period of marketing exclusivity if regulatory approval is ultimately received for the designated indication; potential tax credits on United States clinical trials; eligibility for orphan drug grants; and waiver of certain administrative fees. The EMA, through its Committee for Orphan Medicinal Products (COMP), examines applications for orphan designation. To qualify for orphan designation, the prevalence of the condition must be less than 5 in 10,000, it must be life-threatening or chronically debilitating and there must be no satisfactory method of treating the condition. Sponsors who obtain orphan designation receive numerous incentives including protocol assistance, a reduction or waving of fees and 10 years of market exclusivity should the therapy be approved.

Clinical Trials

Iomab-B

Iomab-B is our lead product candidate currently in a pivotal Phase 3 multicenter clinical trial. It consists of the anti-CD45 monoclonal antibody BC8 and beta emitting radioisotope iodine 131 (I-131). The indication for that trial is bone marrow conditioning for BMT in patients with relapsed and refractory AML over the age of 55.

Previous Iomab-B clinical trials leading to the Phase 3 trial included:

Indications	**N**	**Key Findings**
AML, MDS, ALL (adult)	34	–7/34 patients with median disease free state (DFS) of 17 years. –18/34 patients in remission at day 80
AML >1st remission (adult)	23	–15/23 in remission at day 28
AML 1st remission (age 16-50)	43	–23/43 DFS from 5-16 years –30/43 in remission at day 28 –33/43 in remission at day 80
High-risk MDS, advanced AML (age 50+)	68 in dose escalation study 31 treated at MTD	–CR (complete remission) in all patients –1 yr survival ~40% for all patients –1 yr survival ~45% for pts treated at MTD maximum tolerated dose)
High-risk MDS, AML (age 18–50)	14 in dose escalation	All patients achieved full donor chimerism by day 28 post-transplant
High-risk MDS, AML –haploidentical donors (adult)	8 in dose escalation	–6/8 treated patients achieved CR by day 28 –8/8 patients 100% donor chimerism by day 28

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Ongoing Iomab-B clinical trials include:

Indications	**Phase**
Relapsed and refractory Hodgkin Lymphoma and NHL (adult)	Phase 1
Advanced AML, ALL and MDS (adult)	Phase 2
AML 1st remission (age 16-50)	Phase 2
High-risk MDS, advanced AML (age 16-50)	Phase 2

There are additional ongoing clinical trials with BC8 antibody labeled with yttrium 90 (Y-90).

Phase 3 Iomab-B clinical trial:

We obtained FDA's comment and guidance on the Iomab-B Phase 3 clinical trial design, and the FDA identified the following design features as generally acceptable, dependent on the results of the trial:

- Single pivotal study, pending trial results;
- Patient population: refractory AML patients age of 55 and older, where refractory is defined as either primary failure to achieve a complete remission after 2 cycles of induction therapy; relapsed after 6 months in complete remission; second or higher relapse; or relapsed disease not responding to intensive salvage therapy;
- Trial arms: study arm and control arm with physician's choice of conventional care with curative intent; and
- Trial size: 150 patients total (75 patients per arm).

Actimab-A

Actimab-A is currently in the Phase 2 portion of a multicenter Phase 1/2 clinical trial in AML. It consists of the anti-CD33 monoclonal antibody Lintuzumab and alpha emitting radioisotope actinium 225 (Ac-225). The indication in the ongoing trial is patients newly diagnosed with AML over the age of 60 that are ineligible for standard induction chemotherapy.

Previous clinical trials leading to this trial included:

- Phase 1 clinical trial with Bismab-A, the first generation product consisting of the same anti-CD33 monoclonal antibody Lintuzumab and Bi-213 alpha emitter, a daughter of Ac-225;
- Phase 1/2 clinical trial with Bismab-A, the first generation product consisting of the same monoclonal antibody Lintuzumab and Bi-213 alpha emitter, a daughter of Ac-225; and
- Dose escalating pilot Phase 1 clinical trial with Actimab-A, the current product consisting of the Lintuzumab monoclonal antibody and Ac-225 alpha emitter.

Completed Actimab-A related clinical trials outcomes:

The Phase 2 arm of the Bismab-A drug study has shown signs of the drug's efficacy and safety, including reduction in peripheral blast counts and complete responses in some patients. Bi-213 is a daughter, i.e., product of the degradation of Ac-225, with cancer cell killing properties similar to Ac-225 but is less potent. The Phase 1 Actimab-A trial at MSKCC with a single-dose administration of Actimab-A showed elimination of leukemia cells from blood in 67% of all evaluable patients who received a full dose and in 83% of those treated at dose levels above 0.5 microcuries per kilogram (μCi/kg), and eradication of leukemia cells in both blood and bone marrow in 20% of all evaluable patients and 25% of those treated at dose levels above 0.5 μCi/kg. Maximum tolerated single dose in this trial was established at 3 μCi/kg.

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High potency means that a relatively low amount of drug is needed to produce a given effect. In preclinical and Phase 1 clinical studies, Actimab-A (^{225}Ac-lintuzumab) has demonstrated at least 500-1000 times higher potency than the first-generation predecessor (^{213}Bi-lintuzumab) upon which it is based. This difference is due to intrinsic physicochemical properties of Actimab-A that were first established *in vitro*, in which Actimab-A killed multiple cell lines at doses at least 1000 times lower (based on LD50 values) than Bismab-A analogs. Key factors in Actimab-A's higher potency are the yield of 4 alpha-emitting isotopes per ^{225}Ac (compared to 1 alpha decay for bismuth 213) and much longer half-life (10 day for ^{225}Ac vs 46 minutes for ^{213}Bi).

In preclinical animal models, doses in the nanocurie range prolonged survival. In humans, Actimab-A was previously studied in a Phase I monotherapy trial of relapsed or refractory AML patients at MSKCC. Dose levels in that study re-confirmed the substantially higher potency of Actimab-A, as compared to equivalent dosing of the first-generation Bismab-A (^{213}Bi-lintuzumab) construct, which had nevertheless established safety and efficacy in a Phase 1/2 trial in high-risk AML with cytoreduction.

Sources: Jurcic JG. Targeted Alpha-Particle Immunotherapy with Bismuth-213 and Actinium-225 for Acute Myeloid Leukemia. J. Postgrad Med Edu Res 2013, 47(1):14-17; ; JG Jurcic et al, Phase 1 Trial of the Targeted Alpha- Particle Nano-Generator Actinium-225 (225Ac)-Lintuzumab in Acute Myeloid Leukemia (AML) J Clin Oncol 29:2011 (suppl, abstr 6516); McDevitt MR et al, "Tumor Therapy with Targeted Atomic Nanogenerators" Science 2001, 294:1537—1540; Rosenblat TL et al, "Sequential cytarabine and alpha-particle immunotherapy with bismuth-213-lintuzumab (HuM195) for acute myeloid leukemia" Clin Cancer Res. 2010, 16(21):5303-5311; Jurcic JG et al. "Phase I Trial of the Targeted Alpha-Particle Nano-Generator Actinium-225 (225Ac)-Lintuzumab in Acute Myeloid Leukemia (AML)" Blood (ASH Meeting Abstracts) 2012.

Ongoing Actimab-A trial:

We have completed the Phase 1 portion of our first company sponsored Phase 1/2 multi-center trial with fractionated (two) doses of Actimab-A, for the treatment of patients newly diagnosed with AML over the age of 60. Actimab-A consists of an anti-CD33 monoclonal antibody (HuM195, also known as Lintuzumab) and the actinium 225 radioactive isotope attached to it. Results from the Phase 1 portion of the trial showed that 28% (5 of 18) of patients had objective responses (2CR, 1CRp and 2 CRi (complete remission with incomplete blood count recovery)) with median response duration of 9.1 months. Mean bone marrow blast reduction amongst evaluable patients (14 of 18) was 67% with 57% of patients having bone marrow blast reduction of 50% or greater and 79% (11 of 14) of patients having bone marrow blast reductions after Cycle 1 of therapy. Maximum tolerated dose (MTD) was not reached in this trial. We have elected to progress to the Phase 2 portion of the trial at 2.0 μCi/kg/fraction, the highest dose level from the Phase 1 portion of the clinical trial.

The Phase 2 portion of the trial will enroll 53 patients and will study Actimab-A as a monotherapy. We received agreement from the FDA for multiple revisions to the protocol for the Phase 2 portion of the clinical trial that include:

- Removing the use of low dose cytarabine from the Phase 2 protocol;
- Stipulating Peripheral blast burden as an inclusion criteria with blasts of 200/ML being the threshold;
- Mandating the use of hydroxyurea in patients with peripheral blast count above 200/ML to lower their peripheral blasts below 200ML/ prior to Actimab-A administration; and
- Mandating the use of granulocyte colony-stimulating factor (GCSF) support.

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Bismab-A trials and the Phase 1 Actimab-A trial were focused on relapsed, refractory and other difficult to treat acute myeloid leukemia patients. The current Actimab-A multicenter Phase 1/2 trial is focused on patients newly diagnosed AML who have historically had better outcomes.

Intellectual Property

We have developed or in-licensed numerous patents and patent applications and possess substantial know-how and trade secrets relating to the development and manufacturing of our products. As of October 12, 2017, our patent portfolio includes: 68 issued and pending patent applications, of which 10 are issued in the United States, 15 are pending in the United States, and 53 are issued internationally and pending internationally. Additionally, several non-provisional patent applications are expected to be filed in 2018 based on provisional patent applications filed in 2017. This is part of an ongoing strategy to continue to strengthen our intellectual property position. About one quarter of our patents are in-licensed from third parties and the remainder are Actinium-owned. These patents cover key areas of our business, including use of the actinium-225 and other alpha emitting isotopes attached to cancer specific carriers like monoclonal antibodies, methods for manufacturing key components of our product candidates including actinium-225, the alpha emitting radioisotope and carrier antibodies, and methods for manufacturing finished product candidates for use in cancer treatment.

We have licensed the rights to two issued patents in the area of drug preparation for methods of making humanized antibodies for our product Actimab-A that will expire in 2018 and 2019, respectively. We own three issued patents and one pending patent in the United States and thirty-two patents outside of the United States related to the manufacturing of actinium in a cyclotron that will expire in 2027. We own or have licensed the rights to four issued patents and 1 pending patent in the United States and twenty-one patents outside of the United States related to the generation of radioimmunoconjugates that will expire in 2021, 2030 and 2032, respectively. We own or have licensed the rights to use one issued patent, one pending patent and two provisional patents for methods of treatment with our product Actimab-A that will expire in 2019. For Iomab-B we own one pending patent for anti-CD45 immunoglobulin composition and one pending patent the administration of a conjugated antibody.

A patent whose claims address methods of treating hematopoietic malignancies with Iomab-B is pending; still, we have developed a proprietary strategy based on trade secret protection and the potential for orphan drug and data exclusivities. The BC8 antibody, cell line and related know-how has been exclusively licensed by us from the Fred Hutchinson Cancer Research Center (FHCRC) in exchange for milestone payments, royalties and research support.

Patents related to the antibody component of Actimab-A have been exclusively licensed by us from AbbVie Biotherapeutics Corp. for use with alpha-emitting radioisotopes in exchange for future development and commercialization milestones, a royalty on net sales for a period of 12.5 years from first commercial sale, a negotiation right to be our clinical and/or commercial antibody supplier, a negotiation right to co-promote Actimab-A

in the United States on terms to be negotiated, and the grant-back of intellectual property (IP) rights covering improvements to the antibody for use other than with an alpha-emitting isotope. Patents covering actinium-225 conjugated to antibodies have been exclusively licensed by us from MSKCC in exchange for license fees, research support payments, development milestone payments, 2% royalties on net sales for the term of the licensed patents or, if later, 10 years from first commercial sale, and 15% of any sublicense income we may receive. We source actinium-225 under an agreement with the Oak Ridge National Laboratory (ORNL) that expires at the end of 2017. We believe, but cannot guarantee, that we will be able to renew this contract for additional annual periods.

Corporate and Other Information

We were organized in the State of Nevada on October 6, 1997 and reorganized in the State of Delaware on March 20, 2013. Our principal executive offices are located at 275 Madison, 7th Floor, New York, New York 10016. Our telephone number is (646) 677-3875. Our website address is www.actiniumpharma.com. Information accessed through our website is not incorporated into this prospectus and is not a part of this prospectus.

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THE OFFERING

Common stock offered by us pursuant to this prospectus	Shares of our common stock having an aggregate offering price of up to $75,000,000.
Manner of offering	"At the market offering" that may be made from time to time on a U.S national securities exchange or other market for our common stock in the U.S. through our agent, FBR. See the section entitled "Plan of Distribution" below.
Use of proceeds	We currently intend to use the net proceeds from the sale of securities offered by this prospectus for general corporate purposes, including the advancement of our drug candidates in clinical trials, such as Iomab-B and Actimab-A, preclinical trials, and to meet working capital needs. See the section entitled "Use of Proceeds" below.
Risk factors	See "Risk Factors" beginning on page S-9 and the other information included in, or incorporated by reference into, this prospectus for a discussion of certain factors you should carefully consider before deciding to invest in shares of our common stock.
NYSE American symbol	ATNM.

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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 carefully consider the risks and uncertainties described below, together with the information under the heading "Risk Factors" in our most recent Annual Report on Form 10-K for the fiscal year ended December 31, 2016, all of which are incorporated herein by reference, as updated or superseded by the risks and uncertainties described under similar headings in the other documents that are filed after the date hereof and incorporated by reference into this prospectus, together with all of the other information contained or incorporated by reference in this prospectus. The risks and uncertainties we have described are not the only ones we face. Additional risks and uncertainties not presently known to us or that we currently deem immaterial may also affect our operations. Past financial performance may not be a reliable indicator of future performance, and historical trends should not be used to anticipate results or trends in future periods. If any of these risks actually occurs, our business, business prospects, financial condition or results of operations could be seriously harmed. This could cause the trading price of our common stock to decline, resulting in a loss of all or part of your investment. Please also read carefully the section below entitled "Special Note Regarding Forward-Looking Statements."

Additional Risks Relating to this Offering

Our management team may invest or spend the proceeds of this offering in ways with which you may not agree or in ways which may not yield a significant return.

Our management will have broad discretion over the use of proceeds from this offering. We intend to use the net proceeds of this offering for the advancement of our drug candidates in clinical trials, such as Iomab-B and Actimab-A, preclinical trials and for general corporate purposes. However, our management will have broad discretion in the application 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 common stock. The failure by management to apply these funds effectively could result in financial losses that could have a material adverse effect on our business, cause the price of our common stock to decline and delay the development of our product candidates.

Purchasers in this offering will likely experience immediate and substantial dilution in the book value of their investment.

Because the price per share at which shares of our common stock are sold in this offering may be substantially higher than the book value per share of our common stock, you may suffer immediate and substantial dilution in the net tangible book value of the common stock you purchase in this offering. The shares sold in this offering, if any, will be

sold from time to time at various prices. After giving effect to the sale of our common stock in the maximum aggregate offering amount of $75,000,000 at an assumed offering price of $1.40 per share, the last reported sale price of our common stock on the NYSE American on February 27, 2017, and after deducting estimated offering commissions payable by us, our net tangible book value as of December 31, 2016 would have been $90.8 million, or $0.87 per share of common stock. This represents an immediate increase in the net tangible book value of $0.51 per share to our existing stockholders and an immediate and substantial dilution in net tangible book value of $0.57 per share to new investors who purchase our common stock in the offering.

Sales of a substantial number of shares of our common stock, or the perception that such sales may occur, may adversely impact the price of our common stock.

Almost all of our 79,380,158 outstanding shares of common stock as of October 11, 2017, as well as a substantial number of shares of our common stock underlying outstanding options and warrants, are available for sale in the public market, either pursuant to Rule 144 under the Securities Act of 1933, as amended, or an effective registration statement. Pursuant to this shelf registration statement on Form S-3, we may sell up to $200,000,000 of our equity securities over the next several years. Sales of a substantial number of shares of our common stock, or the perception that such sales may occur, may adversely impact the price of our common stock.

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Risks Related to Our Organization and Our Common Stock

Our corporate charter and bylaws and Delaware law contain anti-takeover provisions that could delay or discourage takeover attempts that stockholders may consider favorable.

Our board of directors is authorized to issue shares of preferred stock in one or more series and to fix the voting powers, preferences and other rights and limitations of the preferred stock. Accordingly, we may issue shares of preferred stock with a preference over our common stock with respect to dividends or distributions on liquidation or dissolution, or that may otherwise adversely affect the voting or other rights of the holders of common stock. Issuances of preferred stock, depending upon the rights, preferences and designations of the preferred stock, may have the effect of delaying, deterring or preventing a change of control, even if that change of control might benefit our stockholders.

In addition, we are subject to Section 203 of the Delaware General Corporation Law. Section 203 generally prohibits a public 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 (i) prior to the date of the transaction, the board of directors of the corporation approved either the business combination or the transaction which resulted in the stockholder becoming an interested stockholder; (ii) the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced, excluding for purposes of determining the number of shares outstanding (a) shares owned by persons who are directors and also officers and (b) shares owned by employee stock plans in which employee participants do not have the right to determine confidentially whether shares held subject to the plan will be tendered in a tender or exchange offer; or (iii) on or subsequent to the date of the transaction, the business combination is approved by the board and authorized at an annual or special meeting of stockholders, and not by written consent, by the affirmative vote of at least 66 2/3% of the outstanding voting stock which is not owned by the interested stockholder.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus and the information incorporated by reference in this prospectus contain "forward-looking statements," which include information relating to future events, future financial performance, strategies, expectations, competitive environment and regulation. Words such as "may," "should," "could," "would," "predicts," "potential," "continue," "expects," "anticipates," "future," "intends," "plans," "believes," "estimates," and similar expressions, as well as statements in future tens identify forward-looking statements. Forward-looking statements should not be read as a guarantee of future performance or results and will probably not be accurate indications of when such performance or results will be achieved. Forward-looking statements are based on information we have when those statements are made or our management's good faith belief as of that time with respect to future events, and are subject to risks and uncertainties that could cause actual performance or results to differ materially from those expressed in or suggested by the

forward-looking statements. Important factors that could cause such differences include, but are not limited to:

- our history of recurring losses and negative cash flows from operating activities, significant future commitments and the uncertainty regarding the adequacy of our liquidity to pursue our complete business objectives;
- our ability to complete clinical trials as anticipated and obtain and maintain regulatory approvals for our products;
- our ability to adequately protect our intellectual property;
- disputes over ownership of intellectual property;

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our dependence on an outside single manufacturing facility and our ability to comply with stringent manufacturing quality standards and to increase production as necessary;

the risk that the data collected from our current and planned clinical trials may not be sufficient to demonstrate that our products are an attractive alternative to other procedures and products;

intense competition in our industry, with competitors having substantially greater financial, technological, research and development, regulatory and clinical, manufacturing, marketing and sales, distribution and personnel resources than we do;

entry of new competitors and products and potential technological obsolescence of our products;

loss of a key supplier;

adverse economic conditions;

adverse federal, state and local government regulation, in the United States;

price increases for supplies and components;

inability to carry out research, development and commercialization plans; and

loss or retirement of key executives and research scientists.

You should review carefully the section entitled “Risk Factors” beginning on page S-9 of this prospectus for a discussion of these and other risks that relate to our business and investing in our common stock. The forward-looking statements contained or incorporated by reference in this prospectus are expressly qualified in their entirety by this cautionary statement. We do not undertake any obligation to publicly update any forward-looking statement to reflect events or circumstances after the date on which any such statement is made or to reflect the occurrence of unanticipated events.

USE OF PROCEEDS

The amount of proceeds from this offering will depend upon the number of shares of our common stock sold and the market price at which they are sold. There can be no assurance that we will be able to sell any shares under or fully utilize the sales agreement with FBR as a source of financing.

Unless otherwise indicated in the prospectus supplement, we currently intend to use the net proceeds from the sale of securities offered by this prospectus for general corporate purposes, including, the advancement of our drug candidates in clinical trials, such as Iomab-B, Actimab-A and Actimab-M, research and development of our alpha

particle technology platform, preclinical trials, and to meet working capital needs.

Investors are cautioned, however, that expenditures may vary substantially from these uses. Investors will be relying on the judgment of our management, who will have broad discretion regarding the application of the proceeds of this offering. The amounts and timing of our actual expenditures will depend upon numerous factors, including the amount of cash generated by our operations, the amount of competition and other operational factors. We may find it necessary or advisable to use portions of the proceeds from this offering for other purposes.

From time to time, we evaluate these and other factors and we anticipate continuing to make such evaluations to determine if the existing allocation of resources, including the proceeds of this offering, is being optimized. Circumstances that may give rise to a change in the use of proceeds include:

- a change in development plan or strategy;
- the addition of new products or applications;
- technical delays;
- delays or difficulties with our clinical trials;
- negative results from our clinical trials;
- difficulty obtaining U.S. Food and Drug Administration approval;
- failure to achieve sales as anticipated; and
- the availability of other sources of cash including cash flow from operations and new bank debt financing arrangements, if any.

Pending other uses, we intend to invest the proceeds to us in investment-grade, interest-bearing securities such as money market funds, certificates of deposit, or direct or guaranteed obligations of the U.S. government, or hold as cash. We cannot predict whether the proceeds invested will yield a favorable, or any, return.

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DESCRIPTION OF CAPITAL STOCK

The following description of common stock and preferred stock summarizes the material terms and provisions of the common stock and preferred stock that we may offer under this prospectus, but is not complete. For the complete terms of our common stock and preferred stock, please refer to our certificate of incorporation, as amended and our bylaws, as may be amended from time to time. While the terms we have summarized below will apply generally to any future common stock or preferred stock that we may offer, we will describe the specific terms of any series of preferred stock in more detail in the applicable prospectus supplement. If we so indicate in a prospectus supplement, the terms of any preferred stock we offer under that prospectus supplement may differ from the terms we describe below.

We have authorized 250,000,000 shares of capital stock, par value $0.001 per share, of which 200,000,000 are shares of common stock and 50,000,000 are shares of preferred stock. On October 11, 2017, there were 79,380,158 shares of common stock issued and outstanding and no shares of preferred stock issued and outstanding. The authorized and unissued shares of common stock and the authorized and undesignated shares of preferred stock are available for issuance without further action by our stockholders, unless such action is required by applicable law or the rules of any stock exchange on which our securities may be listed. Unless approval of our stockholders is so required, our board of directors does not intend to seek stockholder approval for the issuance and sale of our common stock or preferred stock.

We also have warrants that are outstanding, which are described below.

Common Stock

The holders of our common stock are entitled to one vote per share. Our certificate of incorporation does not provide for cumulative voting. Our directors are divided into three classes. At each annual meeting of stockholders, directors elected to succeed those directors whose terms expire are elected for a term of office to expire at the third succeeding annual meeting of stockholders after their election. The holders of our common stock are entitled to receive ratably such dividends, if any, as may be declared by our board of directors out of legally available funds; however, the current policy of our board of directors is to retain earnings, if any, for operations and growth. Upon liquidation, dissolution or wind-up, the holders of our common stock are entitled to share ratably in all assets that are legally available for distribution. The holders of our common stock have no preemptive, subscription, redemption or conversion rights. The rights, preferences and privileges of holders of our common stock are subject to, and may be adversely affected by, the rights of the holders of any series of preferred stock, which may be designated solely by action of our board of directors and issued in the future.

Our common stock is listed on the NYSE American under the symbol “ATNM.”

Preferred Stock

The board of directors is authorized, subject to any limitations prescribed by law, without further vote or action by the stockholders, to issue from time to time shares of preferred stock in one or more series. Each such series of preferred stock shall have such number of shares, designations, preferences, voting powers, qualifications, and special or relative rights or privileges as shall be determined by the board of directors, which may include, among others, dividend rights, voting rights, liquidation preferences, conversion rights and preemptive rights. Issuance of preferred stock by our board of directors may result in such shares having dividend and/or liquidation preferences senior to the rights of the holders of our common stock and could dilute the voting rights of the holders of our common stock.

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Prior to the issuance of shares of each series of preferred stock, the board of directors is required by the Delaware General Corporation Law and our certificate of incorporation to adopt resolutions and file a certificate of designation with the Secretary of State of the State of Delaware. The certificate of designation fixes for each class or series the designations, powers, preferences, rights, qualifications, limitations and restrictions, including, but not limited to, some or all of the following:

- the number of shares constituting that series and the distinctive designation of that series, which number may be increased or decreased (but not below the number of shares then outstanding) from time to time by action of the board of directors;
- the dividend rate and the manner and frequency of payment of dividends on the shares of that series, whether dividends will be cumulative, and, if so, from which date;
- whether that series will have voting rights, in addition to any voting rights provided by law, and, if so, the terms of such voting rights;
- whether that series will have conversion privileges, and, if so, the terms and conditions of such conversion, including provision for adjustment of the conversion rate in such events as the board of directors may determine;
- whether or not the shares of that series will be redeemable, and, if so, the terms and conditions of such redemption;
- whether that series will have a sinking fund for the redemption or purchase of shares of that series, and, if so, the terms and amount of such sinking fund;
- whether or not the shares of the series will have priority over or be on a parity with or be junior to the shares of any other series or class in any respect;
- the rights of the shares of that series in the event of voluntary or involuntary liquidation, dissolution or winding up of the corporation, and the relative rights or priority, if any, of payment of shares of that series; and
- any other relative rights, preferences and limitations of that series.

Once designated by our board of directors, each series of preferred stock may have specific financial and other terms that will be described in a prospectus supplement. The description of the preferred stock that is set forth in any prospectus supplement is not complete without reference to the documents that govern the preferred stock. These include our certificate of incorporation and any certificates of designation that our board of directors may adopt.

All shares of preferred stock offered hereby will, when issued, be fully paid and non-assessable, including shares of preferred stock issued upon the exercise of preferred stock warrants or subscription rights, if any.

Although our board of directors has no intention at the present time of doing so, it could authorize the issuance of a series of preferred stock that could, depending on the terms of such series, impede the completion of a merger, tender offer or other takeover attempt.

Warrants

Common Stock Warrants

On December 27, 2013 and January 10, 2014, we issued common stock warrants to certain investors in a private placement of common stock and warrants (the "Common Stock Warrants"). The Common Stock Warrants have a five year term from each closing that occurred on December 27, 2013 and January 10, 2014, and are exercisable for an aggregate of up to 276,529 shares of our common stock at an initial per share exercise price of $9.00, subject to adjustments as set forth below. As of October 11, 2017 we have 193,197 shares of Common Stock Warrants outstanding. We may also call this warrant for redemption upon written notice to all warrant holders at any time the closing price of the common stock exceeds $15.00 (as may be adjusted pursuant to warrant agreement) for 20 consecutive trading days, as reported by Bloomberg, provided at such time there is an effective registration statement covering the resale of the shares underlying the warrants. In the 60 business days following the date the redemption notice is deemed given in accordance with the agreement, investors may choose to exercise this warrant or a portion of the warrant by paying the then applicable exercise price per share for every share exercised. Any shares not exercised on the last day of the exercise period will be redeemed by us at $0.001 per share.

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The exercise prices of the Common Stock Warrants are subject to adjustment upon certain events. If we at any time while the warrants remain outstanding and unexpired shall declare a dividend or make a distribution on the outstanding Common Stock payable in shares of its capital stock, or split, subdivide or combine the securities as to which purchase rights under this warrant exist into a different number of securities of the same class, the exercise price for such securities shall be proportionately decreased in the case of a dividend, split or subdivision or proportionately increased in the case of a combination.

Series B Warrants

The Series B Warrants have a five year term from December 19, 2012 and are exercisable for an aggregate of up to 1,559,505 shares of our common stock at an initial per share exercise price of $2.48, subject to adjustment as set forth below. As of October 11, 2017, there were 1,317,195 warrants outstanding. These warrants have a cashless exercise provision. We also have a right of first refusal on the holder's sale of the warrant shares. We may also call this warrant for redemption upon written notice to all warrant holders at any time the closing price of the common stock exceeds $1.50 (as may be adjusted pursuant to warrant agreement) for 20 consecutive trading days, as reported by Bloomberg, provided at such time there is an effective registration statement covering the resale of the shares underlying the warrants. In the 60 business days following the date the redemption notice is deemed given in accordance with the agreement, investors may choose to exercise this warrant or a portion of the warrant by paying the then applicable exercise price per share for every share exercised. Any shares not exercised on the last day of the exercise period will be redeemed by us at $0.001 per share.

The exercise price of the Series B Warrants is subject to adjustment upon certain events. If we at any time while the warrants remain outstanding and unexpired shall declare a dividend or make a distribution on the outstanding Common Stock payable in shares of its capital stock, or split, subdivide or combine the securities as to which purchase rights under this warrant exist into a different number of securities of the same class, the exercise price for such securities shall be proportionately decreased in the case of a dividend, split or subdivision or proportionately increased in the case of a combination.

In addition, for so long as there are any warrants outstanding, if and whenever at any time and from time to time after the warrant issue date, as applicable, we shall issue any shares of common stock for no consideration or a consideration per share less than the exercise price, as applicable, then, forthwith upon such issue or sale, the warrants shall be subject to a proportional adjustment determined by multiplying such warrant exercise price by the following fraction:

$$\frac{N(0) + N(1)}{N(0) + N(2)}$$

Where:

N(0) = the number of shares of common stock outstanding (calculated on a Fully Diluted Basis) immediately prior to the issuance of such additional shares of common stock or common stock Equivalents;

N(1) = the number of shares of common stock which the aggregate consideration, if any (including the aggregate Net Consideration Per Share with respect to the issuance of common stock equivalents), received or receivable by us for the total number of such additional shares of common stock so issued or deemed to be issued would purchase at the warrant exercise price, as applicable, in effect immediately prior to such issuance; and

N(2) = the number of such additional shares of common stock so issued or deemed to be issued.

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Stock Offering Warrants

The Stock Offering Warrants have a term ending on January 31, 2019 and are exercisable for an aggregate of up to 2,682,155 shares of our common stock at an initial per share exercise price of $0.78, subject to adjustment as set forth below (anti-dilution). As of October 11, 2017, there were 1,239,997 warrants outstanding. These warrants have a cashless exercise provision. We also have a right of first refusal on the holder's sale of the warrant shares.

These warrants have a cashless exercise provision. We also have a right of first refusal on the holder's sale of the warrant shares. The exercise prices of the Stock Offering Warrants are subject to adjustment upon certain events. If we at any time while the warrants remain outstanding and unexpired shall declare a dividend or make a distribution on the outstanding Common Stock payable in shares of its capital stock, or split, subdivide or combine the securities as to which purchase rights under this warrant exist into a different number of securities of the same class, the exercise price for such securities shall be proportionately decreased in the case of a dividend, split or subdivision or proportionately increased in the case of a combination.

Consulting Firm Warrants

The Consulting Firm Warrants have a term ending on December 17, 2019 and are exercisable for an aggregate of up to 3,755,560 shares of our common stock. As of October 11, 2017, there were 1,502,223 warrants outstanding. These warrants may not be exercised by the Holder upon less than 90 days prior written notice of such exercise and provided further that that the Holder may elect, in its sole discretion, to waive the Prior Notice Requirement, in whole or in part, upon 65 days prior written notice of such waiver. These warrants have a cashless exercise provision and were issued at an initial per share exercise price of $0.001, subject to adjustment as if we at any time while the warrants remain outstanding and unexpired shall declare a dividend or make a distribution on the outstanding Common Stock payable in shares of its capital stock, or split, subdivide or combine the securities as to which purchase rights under this warrant exist into a different number of securities of the same class, the exercise price for such securities shall be proportionately decreased in the case of a dividend, split or subdivision or proportionately increased in the case of a combination. The warrants are also subject to piggy-back registration rights.

2015 Offering Warrants

The 2015 Offering Warrants have a term ending February 11, 2019 and are exercisable for an aggregate of up to 3,333,333 shares of our common stock at $6.50 per share. As of October 11, 2017, there were 3,333,333 warrants outstanding. The exercise price and the number of warrant shares shall be adjusted from time to time if we at any time on or after the issuance date subdivides (by any stock split, stock dividend, recapitalization or otherwise) one or more

classes of its outstanding shares of common stock into a greater number of shares, the exercise price in effect immediately prior to such subdivision will be proportionately reduced and the number of warrant shares will be proportionately increased. If we at any time on or after the issuance date combines (by combination, reverse stock split or otherwise) one or more classes of its outstanding shares of Common Stock into a smaller number of shares, the exercise price in effect immediately prior to such combination will be proportionately increased and the number of warrant shares will be proportionately decreased.

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If at any time prior to the expiration date we grant, issue or sell any Options, Convertible Securities or rights to purchase stock, warrants, securities or other property pro rata to the record holders of any class of shares of Common Stock (the "Purchase Rights"), then the Holder will be entitled to acquire, upon the terms applicable to such Purchase Rights, the aggregate Purchase Rights which the Holder could have acquired if the Holder had held the number of shares of Common Stock acquirable upon complete exercise of this warrant (without regard to any limitations on the exercise of this warrant) immediately before the date on which a record is taken for the grant, issuance or sale of such Purchase Rights, or, if no such record is taken, the date as of which the record holders of shares of common stock are to be determined for the grant, issue or sale of such Purchase Rights (provided, however, that to the extent that the Holder's right to participate in any such Purchase Right would result in the holder exceeding the Maximum Percentage, then the holder shall not be entitled to participate in such Purchase Right to such extent (or beneficial ownership of such shares of Common Stock as a result of such Purchase Right to such extent) and such Purchase Right to such extent shall be held in abeyance for the Holder until such time, if ever, as its right thereto would not result in the Holder exceeding the Maximum Percentage (as defined in the warrant), at which time the Holder shall be granted such right to the same extent as if there had been no such limitation).

Placement Agent Warrants

We issued three types of warrants to the Placement Agent, Placement Agent Stock Offering Warrants, Placement Agent Common Stock Warrants, and Placement Agent December 2013 Offering Warrants.

Placement Agent Stock Offering Warrants

The Placement Agent Stock Offering Warrants have a term ending on January 31, 2019 and are exercisable for an aggregate of up to 1,251,022 shares of our common stock at an initial per share exercise price of $0.78, subject to adjustment as set forth below (anti dilution). As of October 11, 2017, there were 355,293 warrants outstanding. These warrants have a cashless exercise provision. The exercise prices of the warrants are subject to adjustment upon certain events. If we at any time while the warrants remain outstanding and unexpired shall declare a dividend or make a distribution on the outstanding Common Stock payable in shares of its capital stock, or split, subdivide or combine the securities as to which purchase rights under this warrant exist into a different number of securities of the same class, the exercise price for such securities shall be proportionately decreased in the case of a dividend, split or subdivision or proportionately increased in the case of a combination.

Placement Agent Common Stock Warrants

The Placement Agent Common Stock Warrants have a five year term from January 28, 2013 and are exercisable for an aggregate of up to 467,845 shares of our common stock at an initial per share exercise price of $2.48, subject to adjustment as set forth below. As of October 11, 2017, there were 298,065 warrants outstanding. These warrants have a cashless exercise provision. We may also call this warrant for redemption upon written notice to all warrant holders at any time the closing price of the common stock exceeds $1.50 (as may be adjusted pursuant to warrant agreement) for 20 consecutive trading days, as reported by Bloomberg, provided at such time there is an effective registration statement covering the resale of the shares underlying the warrants. In the 60 business days following the date the redemption notice is deemed given in accordance with the agreement, investors may choose to exercise this warrant or a portion of the warrant by paying the then applicable exercise price per share for every share exercised. Any shares not exercised on the last day of the exercise period will be redeemed by us at $0.001 per share.

The exercise prices of the warrants are subject to adjustment upon certain events. If we at any time while the warrants remain outstanding and unexpired shall declare a dividend or make a distribution on the outstanding Common Stock payable in shares of its capital stock, or split, subdivide or combine the securities as to which purchase rights under this warrant exist into a different number of securities of the same class, the exercise price for such securities shall be proportionately decreased in the case of a dividend, split or subdivision or proportionately increased in the case of a combination.

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In addition, for so long as there are any warrants outstanding, if and whenever at any time and from time to time after the warrant issue date, as applicable, we shall issue any shares of common stock for no consideration or a consideration per share less than the exercise price, as applicable, then, forthwith upon such issue or sale, the warrants shall be subject to a proportional adjustment determined by multiplying such warrant exercise price by the following fraction:

$$\frac{N(0) + N(1)}{N(0) + N(2)}$$

Where:

N(0) = the number of shares of common stock outstanding (calculated on a Fully Diluted Basis) immediately prior to the issuance of such additional shares of common stock or common stock Equivalents;

N(1) = the number of shares of common stock which the aggregate consideration, if any (including the aggregate Net Consideration Per Share with respect to the issuance of common stock equivalents), received or receivable by us for the total number of such additional shares of common stock so issued or deemed to be issued would purchase at the warrant exercise price, as applicable, in effect immediately prior to such issuance; and

N(2) = the number of such additional shares of common stock so issued or deemed to be issued.

Placement Agent December 2013 Offering Warrants

The Placement Agent December 2013 Offering Warrants have a five year term from January 10, 2014 and are exercisable for an aggregate of up to 138,265 shares of our common stock at an initial per share exercise price of $9.00, subject to adjustment as set forth below. As of October 11, 2017, there were 124,997 warrants outstanding. These warrants have a cashless exercise provision. We may also call this warrant for redemption upon written notice to all warrant holders at any time the closing price of the common stock exceeds $15.00 (as may be adjusted pursuant to warrant agreement) for 20 consecutive trading days, as reported by Bloomberg, provided at such time there is an effective registration statement covering the resale of the shares underlying the warrants. In the 60 business days following the date the redemption notice is deemed given in accordance with the agreement, investors may choose to exercise this warrant or a portion of the warrant by paying the then applicable exercise price per share for every share exercised. Any shares not exercised on the last day of the exercise period will be redeemed by us at $0.001 per share.

The exercise prices of the warrants are subject to adjustment upon certain events. If the Company at any time while the warrants remain outstanding and unexpired shall declare a dividend or make a distribution on the outstanding Common Stock payable in shares of its capital stock, or split, subdivide or combine the securities as to which purchase rights under this warrant exist into a different number of securities of the same class, the exercise price for such securities shall be proportionately decreased in the case of a dividend, split or subdivision or proportionately increased in the case of a combination.

Consultant Warrants

As of October 11, 2017, we had outstanding warrants exercisable for 507,833 shares of common stock issued to various consultants in consideration for services. The exercise prices range from $0.98 to $11.66 per share. These warrants do not have a cashless exercise provision.

2017 Warrants

In July 2017 in connection with an offering, we issued warrants to purchase 18,275,000 shares of Common Stock. The warrants are exercisable commencing on the issuance date at an exercise price equal to $1.05 per share of common stock, subject to adjustments as provided under the terms of the warrants. The warrants are exercisable for five years from the date of issuance. These warrants do have a cashless exercise provision.

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DILUTION

If you invest in our common stock, your interest will be diluted to the extent of the difference between the price per share you pay in this offering and the net tangible book value per share of our common stock immediately after this offering. Our net tangible book value of our common stock as of December 31, 2016 was approximately $18.0 million, or approximately $0.32 per share of common stock based upon 55,801,742 shares outstanding at that time. “Net tangible book value” is total assets minus the sum of liabilities and intangible assets. “Net tangible book value per share” is net tangible book value divided by the total number of shares outstanding.

After giving effect to the sale of our common stock at $0.001 par value in the aggregate amount of $75,000,000 at an assumed offering price of $1.40 per share, the last reported sale price of our common stock on the NYSE American on February 27, 2017, and after deducting estimated offering expenses payable by us, our net tangible book value as of December 31, 2016 would have been $90.8 million, or $0.83 per share of common stock. This represents an immediate increase in net tangible book value of $0.51 per share to our existing stockholders and an immediate dilution in net tangible book value of $0.57 per share to new investors in this offering.

The following table illustrates this calculation on a per share basis as of December 31, 2016:

Assumed Public offering price per share of common stock	$1.40
Net tangible book value per share of common stock	$0.32
Increase in net tangible book value per share of common stock attributable to the offering	$0.51
Pro forma net tangible book value per share of common stock after giving effect to the offering	$0.83
Dilution in net tangible book value per share of common stock to new investors in the offering	$0.57

The foregoing table and calculations are based on the number of shares of our common stock outstanding as of December 31, 2016.

DIVIDENDS

In the past, we have not declared or paid cash dividends on our common stock, and we do not intend to pay any cash dividends on our common stock. Rather, we intend to retain future earnings, if any, to fund the operation and expansion of our business and for general corporate purposes.

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PLAN OF DISTRIBUTION

We have entered into an At Market Issuance Sales Agreement, or sales agreement, with FBR to issue and sell up to $75,000,000 worth of our common stock from time to time under this prospectus. FBR will act as agent in the offering, subject to certain limitations, including the number of shares registered under the registration statement to which the offering relates.

The sales, if any, of shares made under the sales agreement will be made by any method that is deemed an “at the market offering” as defined in Rule 415 promulgated under the Securities Act of 1933, as amended. We may instruct FBR not to sell common stock if the sales cannot be effected at or above the price designated by us from time to time. We or FBR may suspend the offering of common stock upon notice and subject to other conditions. As an agent, FBR will not engage in any transactions that stabilize the price of our common stock.

Each time we wish to issue and sell common stock under the sales agreement, we will notify FBR of the number of shares to be issued, the dates on which such sales are anticipated to be made, any minimum price below which sales may not be made and other sales parameters as we deem appropriate. Once we have so instructed FBR, unless FBR declines to accept the terms of the notice, FBR has agreed to use its commercially reasonable efforts consistent with its normal trading and sales practices to sell such shares up to the amount specified on such terms. The obligations of FBR under the sales agreement to sell our common stock are subject to a number of conditions that we must meet.

We will pay FBR commissions for its services in acting as agent in the sale of common stock. FBR will be entitled to a commission of 3% of the gross proceeds from the sale of common stock offered hereby. In addition, we have agreed to reimburse certain expenses of FBR in an amount not to exceed $25,000. FBR may also receive customary brokerage commissions from purchasers of the common stock in compliance with FINRA Rule 2121. FBR may effect sales to or through dealers, and such dealers may receive compensation in the form of discounts, concessions or commissions from FBR and/or purchasers of shares of common stock for whom they may act as agents or to whom they may sell as principal. We estimate that the total expenses for the offering, excluding compensation payable to FBR under the terms of the sales agreement, will be approximately $0.1 million.

Settlement for sales of common stock will occur on the third business day following the date on which any sales are made, or on some other date that is agreed upon by us and FBR in connection with a particular transaction, in return for payment of the net proceeds to us. There is no arrangement for funds to be received in an escrow, trust or similar arrangement.

In connection with the sale of the common stock on our behalf, FBR may, and will with respect to sales effected in an "at the market offering", be deemed to be an "underwriter" within the meaning of the Securities Act of 1933, as amended, and the compensation of FBR may be deemed to be underwriting commissions or discounts. We have agreed to provide indemnification and contribution to FBR against certain civil liabilities, including liabilities under the Securities Act of 1933, as amended. We have also agreed to reimburse FBR for certain other specified expenses.

The offering will terminate as permitted under the sales agreement.

FBR and its affiliates may in the future provide various investment banking and other financial services for us and our affiliates, for which services they may in the future receive customary fees. To the extent required by Regulation M, FBR will not engage in any market making activities involving our common stock while the offering is ongoing under this prospectus.

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LEGAL MATTERS

The validity of the securities offered by this prospectus will be passed upon by The Matt Law Firm, PLLC, Utica, New York. Duane Morris LLP, Newark, New Jersey, is counsel for FBR in connection with this offering.

EXPERTS

The financial statements incorporated in this prospectus by reference to the Annual Report on Form 10-K for the fiscal year ended December 31, 2016 have been so incorporated in reliance on the report of GBH CPAs, PC an independent registered public accounting firm, given on the authority of said firm as experts in auditing and accounting.

WHERE YOU CAN FIND MORE INFORMATION

We are subject to the informational requirements of the Securities Exchange Act of 1934, as amended, and in accordance therewith file annual, quarterly and current reports, proxy statements and other information with the Securities and Exchange Commission. Such reports, proxy statements and other information can be read and copied at the Securities and Exchange Commission's public reference facilities at 100 F Street, N.E., Washington, D.C. 20549, at prescribed rates. Please call the Securities and Exchange Commission at 1-800-732-0330 for further information on the operation of the public reference facilities. In addition, the Securities and Exchange Commission maintains a website that contains reports, proxy and information statements and other information regarding registrants that file electronically with the Securities and Exchange Commission. The address of the Securities and Exchange Commission's website is www.sec.gov.

We make available free of charge on or through our website at www.actiniumpharmceuticals.com, our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and amendments to those reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended, as soon as reasonably practicable after we electronically file such material with or otherwise furnish it to the Securities and Exchange Commission.

We have filed with the Securities and Exchange Commission a registration statement under the Securities Act of 1933, as amended, relating to the offering of these securities. The registration statement, including the attached exhibits, contains additional relevant information about us and the securities. This prospectus does not contain all of the information set forth in the registration statement. You can obtain a copy of the registration statement, at

prescribed rates, from the Securities and Exchange Commission at the address listed above, or for free at www.sec.gov. The registration statement and the documents referred to below under “Incorporation of Certain Information By Reference” are also available on our website, www.actiniumpharmaceuticals.com.

We have not incorporated by reference into this prospectus the information on our website, and you should not consider it to be a part of this prospectus.

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INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The Securities and Exchange Commission allows us to "incorporate by reference" the information we have filed with it, which means that we can disclose important information to you by referring you to those documents. The information we incorporate by reference is an important part of this prospectus, and later information that we file with the Securities and Exchange Commission will automatically update and supersede this information. We incorporate by reference the documents listed below and any future documents (excluding information furnished pursuant to Items 2.02 and 7.01 of Form 8-K) we file with the Securities and Exchange Commission pursuant to Sections l3(a), l3(c), 14 or l5(d) of the Securities Exchange Act of 1934, as amended, subsequent to the date of this prospectus and prior to the termination of the offering:

Our Annual Report on Form 10-K for the fiscal year ended December 31, 2016, filed with the Securities and Exchange Commission on March 16, 2017;

Our Quarterly Report on Form 10-Q for the fiscal quarter ended March 31, 2017, filed with the Securities and Exchange Commission on May 15, 2017;

Our Quarterly Report on Form 10-Q for the fiscal quarter ended June 30, 2017, filed with the Securities and Exchange Commission on August 4, 2017;

Our Current Report on Form 8-K, filed with the Securities and Exchange Commission on March 28, 2017;

Our Current Report on Form 8-K, filed with the Securities and Exchange Commission on May 11, 2017;

Our Current Report on Form 8-K, filed with the Securities and Exchange Commission on May 16, 2017;

Our Current Report on Form 8-K/A, filed with the Securities and Exchange Commission on May 26, 2017;

Our Current Report on Form 8-K, filed with the Securities and Exchange Commission on June 8, 2017;

Our Current Report on Form 8-K, filed with the Securities and Exchange Commission on June 9, 2017;

Our Current Report on Form 8-K, filed with the Securities and Exchange Commission on June 16, 2017;

Our Current Report on Form 8-K, filed with the Securities and Exchange Commission on July 3, 2017;

Our Current Report on Form 8-K, filed with the Securities and Exchange Commission on July 28, 2017;

The description of our common stock, which is contained in our Form 8-K/A, filed with the Securities and Exchange Commission on January 28, 2013.

All filings filed by us pursuant to the Securities Exchange Act of 1934, as amended, after the date of the initial filing of this registration statement and prior to the effectiveness of such registration statement (excluding information furnished pursuant to Items 2.02 and 7.01 of Form 8-K) shall also be deemed to be incorporated by reference into the prospectus.

You should rely only on the information incorporated by reference or provided in this prospectus. We have not authorized anyone else to provide you with different information. You should not assume that the information in this prospectus is accurate as of any date other than the date of this prospectus or the date of the documents incorporated by reference in this prospectus.

We will provide without charge to each person to whom a copy of this prospectus is delivered, upon written or oral request, a copy of any or all of the information that has been incorporated by reference in this prospectus but not delivered with this prospectus (other than an exhibit to these filings, unless we have specifically incorporated that exhibit by reference in this prospectus). Any such request should be addressed to us at: 275 Madison Avenue, 7th Floor, New York, New York 10016, Attention: Steve O'Loughlin, Principal Financial Officer, or made by phone at (646) 677-3875. You may also access the documents incorporated by reference in this prospectus through our website at www.actiniumpharma.com. Except for the specific incorporated documents listed above, no information available on or through our website shall be deemed to be incorporated in this prospectus or the registration statement of which it forms a part.

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$75,000,000

ACTINIUM PHARMACEUTICALS, INC.

Common Stock

PROSPECTUS

FBR

The date of this prospectus is October 24, 2017