ARCA biopharma, Inc.
Form POS AM
October 16, 2015
Table of Contents

As filed with the Securities and Exchange Commission on October 16, 2015

Registration No. 333-187508

UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

Post-Effective Amendment No. 1

To

Form S-1

on

FORM S-3

REGISTRATION STATEMENT

UNDER

THE SECURITIES ACT OF 1933

ARCA BIOPHARMA, INC.

(Exact name of registrant as specified in its charter)

Delaware	2835	36-3855489
(State or other jurisdiction of incorporation or organization)	(Primary Standard Industrial Classification Code Number)	(I.R.S. Employer Identification Number)

11080 CirclePoint Road, Suite 140

Westminster, CO 80020

720-940-2200

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

Michael R. Bristow

President and Chief Executive Officer

11080 CirclePoint Road, Suite 140

Westminster, CO 80020

720-940-2200

(Name, address, including zip code, and telephone number, including area code, of agent for service)

Copies to:

Brent D. Fassett

Cooley LLP

380 Interlocken Crescent, Suite 900

Broomfield, Colorado 80021

(720) 566-4000

Approximate date of commencement of proposed sale to the public: From time to time following the effectiveness of this Registration Statement.

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

If any of the securities being registered on this form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, check the following box. x

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

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

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

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

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

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

Table of Contents

EXPLANATORY NOTE

On March 25, 2013, ARCA biopharma, Inc., or the Company, filed a registration statement with the Securities and Exchange Commission, or the SEC, on Form S-1 (Registration No. 333-187508), as subsequently amended by amendments one through three thereto, or, as amended, the Registration Statement or the Form S-1. The Registration Statement was declared effective by the SEC on May 29, 2013 to register the sale by the Company of (i) 125,000 shares of the Company s Series A Convertible Preferred Stock, or the Series A Preferred Stock, convertible into 1,785,714 shares of the Company s common stock, or the Conversion Shares, and (ii) warrants, or the May 2013Warrants, to purchase up to 892,857 shares of the Company s common stock, or the Warrant Shares, in a public offering. All of the Series A Preferred Stock and May 2013 Warrants, offered pursuant to the Registration Statement were sold on June 4, 2013, and all of the shares of the Series A Preferred Stock sold in connection therewith have been converted into the Conversion Shares. 28,557 Warrant Shares have been issued as a result of exercises of the May 2013 Warrants, and 864,300 Warrant Shares remain issuable upon exercise of outstanding May 2013 Warrants. This Post-Effective Amendment to Form S-1 on Form S-3 is being filed by the Company to convert the Form S-1 into a registration statement on Form S-3 and contains an updated prospectus relating solely to the offering and sale of the Warrant Shares that were registered for sale by the Company on the Form S-1.

No additional securities are being registered under this Post-Effective Amendment. All filing fees payable in connection with the registration of the Series A Preferred Stock, the Conversion Shares, the May 2013 Warrants and the Warrant Shares covered by the Registration Statement were paid by the Company either at the time of the initial filing of the Form S-1, upon the filing with the SEC of any amendment to the Form S-1 or upon the filing with the SEC of that certain prospectus filed pursuant to Rule 424(b)(4) on May 30, 2013.

Table of Contents

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

SUBJECT TO COMPLETION, DATED OCTOBER 16, 2015

PROSPECTUS

864,300 Shares of Common Stock Issuable Upon Exercise of Outstanding Warrants

This prospectus relates to 864,300 shares of our common stock issuable upon the exercise of our outstanding warrants issued in May 2013, or the May 2013 Warrants. The May 2013 Warrants were offered and sold by us pursuant to a prospectus dated May 30, 2013, which prospectus also covered the offer and sale by us of the shares of our common stock underlying the May 2013 Warrants. The ongoing offer and sale by us of the shares of our common stock issuable upon exercise of the May 2013 Warrants is being made pursuant to this prospectus. The May 2013 Warrants are exercisable until June 4, 2018 at a current exercise price of $11.20 per share of our common stock, subject to adjustment upon events specified in the May 2013 Warrants.

For a more detailed description of our common stock, see the section entitled Description of Capital Stock Common Stock beginning on page 9 of this prospectus. For a more detailed description of our warrants, see the section entitled Description of Capital Stock Warrants beginning on page 11 of this prospectus. For a more detailed description of the securities we are offering, see the section entitled Description of Securities We Are Offering beginning on page 12 of this prospectus. We refer to the warrants offered and sold by us pursuant to a prospectus dated May 30, 2013 as the May 2013 Warrants. We refer to the shares of common stock issuable upon exercise of the May 2013 Warrants as the securities. We provide more information about how the holders of the May 2013 Warrants may purchase their securities in the section entitled Plan of Distribution on page 8 of this prospectus.

Our common stock is listed on The NASDAQ Capital Market under the symbol ABIO. On October 15, 2015, the last reported sale price of our common stock on The NASDAQ Capital Market was $5.16 per share.

AN INVESTMENT IN OUR COMMON STOCK INVOLVES A HIGH DEGREE OF RISK. YOU SHOULD CAREFULLY REVIEW THE RISKS AND UNCERTAINTIES REFERRED TO UNDER THE HEADING

RISK FACTORS BEGINNING ON PAGE 5 OF THIS PROSPECTUS AND UNDER ANY SIMILAR HEADINGS IN ANY AMENDMENT OR SUPPLEMENT TO THIS PROSPECTUS OR IN ANY FILING WITH THE SECURITIES AND EXCHANGE COMMISSION THAT IS INCORPORATED BY REFERENCE HEREIN.

NEITHER THE SECURITIES AND EXCHANGE COMMISSION NOR ANY STATE SECURITIES COMMISSION HAS APPROVED OR DISAPPROVED OF THESE SECURITIES OR PASSED UPON THE ACCURACY OR ADEQUACY OF THIS PROSPECTUS. ANY REPRESENTATION TO THE CONTRARY IS A CRIMINAL OFFENSE.

The date of this Prospectus is October 16, 2015

Table of Contents

Table of Contents

ABOUT THIS PROSPECTUS

You should rely only on the information contained or incorporated by reference in this prospectus and any related prospectus supplement. We have not, and the selling stockholders have not, authorized anyone to provide you with different information. No one is making offers to sell or seeking offers to buy these securities in any jurisdiction where the offer or sale is not permitted. You should assume that the information contained in this prospectus and any prospectus supplement is accurate only as of the date on the front of this prospectus or the prospectus supplement, as applicable, and that any information incorporated by reference in this prospectus or any prospectus supplement is accurate only as of the date given in the document incorporated by reference, regardless of the time of delivery of this prospectus, any applicable prospectus supplement or any sale of our common stock. Our business, financial condition, results of operations and prospects may have changed since that date.

This prospectus contains summaries of certain provisions contained in some of the documents described herein, but reference is made to the actual documents for complete information. All of the summaries are qualified in their entirety by the actual documents. Copies of some of the documents referred to herein have been filed, will be filed or will be incorporated by reference as exhibits to the registration statement of which this prospectus is a part, and you may obtain copies of those documents as described below under the section entitled Where You Can Find More Information.

This prospectus and the information incorporated herein by reference includes trademarks, service marks and trade names owned by us or others. All trademarks, service marks and trade names included or incorporated by reference into this prospectus or any applicable prospectus supplement are the property of their respective owners.

All information contained herein relating to shares and per share data has been adjusted to reflect a one-for-seven reverse stock split effected on September 3, 2015.

Table of Contents

PROSPECTUS SUMMARY

This summary highlights selected information contained elsewhere or incorporated by reference in this prospectus. This summary does not contain all the information you should consider before investing in our common stock. You should read and consider carefully the more detailed information in this prospectus, including the factors described under the heading Risk Factors in this prospectus beginning on page 5, any prospectus supplement and the documents incorporated by reference herein, before making an investment decision.

Unless we have indicated otherwise, or the context otherwise requires, references in this to ARCA, the Company, we, us and our refer to ARCA biopharma, Inc.

Overview

We are a biopharmaceutical company principally focused on developing genetically-targeted therapies for cardiovascular diseases. Our lead product candidate, Gencaro (bucindolol hydrochloride), is a pharmacologically unique beta-blocker and mild vasodilator that we are evaluating in a clinical trial for the treatment of atrial fibrillation, or AF, in patients with heart failure and left ventricular systolic dysfunction, or HFREF. We have identified common genetic variations in receptors in the cardiovascular system that we believe interact with Gencaro s pharmacology and may predict patient response to the drug.

We are testing this hypothesis in a Phase 2B/3 clinical trial of Gencaro, known as GENETIC-AF. We are pursuing this indication for Gencaro because data from a prior Phase 3 HF trial of Gencaro in 2,708 heart failure, or HF, patients, or the BEST trial, which suggested that Gencaro may be successful in reducing or preventing AF.

In April 2015, the U.S. Food and Drug Administration, or FDA, designated as a Fast Track development program the investigation of Gencaro for the prevention of atrial fibrillation/atrial flutter in a genetically targeted heart failure population (heart failure patients with reduced left ventricular ejection fraction).

Fast Track drug development designation was included in the FDA Modernization Act of 1997, or FDAMA, as a formal process to enhance interactions with the FDA during drug development. A drug development program with Fast Track designation is eligible for consideration for some or all of the following programs for expediting development and review: scheduled meetings to seek FDA input into development plans, priority review of the New Drug Application, or NDA, the option of submitting portions of an NDA for review prior to submission of the complete application and potential accelerated approval.

AF is a disorder in which the normally regular and coordinated contraction pattern of the heart s two small upper chambers, or the atria, becomes irregular and uncoordinated. The irregular contraction pattern associated with AF causes blood to pool in the atria, predisposing the formation of clots potentially resulting in stroke.

AF is considered an epidemic cardiovascular disease. The estimated number of individuals with AF globally in 2010 was 33.5 million. According to the 2015 American Heart Association report on Heart Disease and Stroke Statistics, the estimated number of individuals with AF in the United States in 2010 ranged from 2.7 million to 6.1 million people. AF increases the risk of stroke and may also contribute to worsening heart failure. The approved therapies for the treatment or prevention AF have certain disadvantages in HFREF patients, such as toxic or cardiovascular adverse effects, and most of the approved drugs for AF are contra indicated or have warnings in their prescribing information for such patients. We believe there is an unmet medical need for new AF treatments that have fewer side effects than currently available therapies and are more effective, particularly in HFREF patients.

GENETIC-AF is a Phase 2B/3 multi-center, randomized, double-blind clinical trial comparing the safety and efficacy of Gencaro to an active comparator, the beta-blocker Toprol XL (metoprolol succinate), in HFREF patients with a current or recent history of paroxysmal (AF episodes lasting 7 days or less) or persistent AF who have a beta-1 389 arginine homozygous genotype, the genotype we believe responds most favorably to Gencaro. The primary endpoint of GENETIC-AF, time to recurrent symptomatic AF/atrial flutter, or AFL, or all-cause mortality, will be measured over a twenty-four week period after a patient has established a normal heart rhythm.

We believe data from the BEST trial indicate that Gencaro may have a genetically regulated effect in reducing or preventing AF, whereas we believe the therapeutic benefit of Toprol XL does not appear to be enhanced in patients with this genotype. A retrospective analysis of data from the BEST trial shows that the entire cohort of patients in the BEST trial treated with Gencaro had a 41% reduction in the risk of new onset AF (time-to-event) compared to placebo ($p = 0.0004$). In the BEST DNA substudy, patients with the beta-1 389 arginine homozygous genotype experienced a 74% ($p = 0.0003$) reduction in risk of AF when receiving Gencaro, based on the same analysis. The beta-1 389 arginine homozygous genotype was present in about 47% of the patients in the BEST pharmacogenetic substudy, and we estimate it is present in about 50% of the U.S. general population.

Table of Contents

We have created an adaptive design for GENETIC-AF and are seeking to enroll approximately 200 HFREF patients in the Phase 2B portion of the study who have recently experienced at least one episode of paroxysmal or persistent AF and who have the beta-1 389 arginine homozygous genotype that we believe responds most favorably to Gencaro. In addition to measuring the primary endpoint of recurrent symptomatic AF/AFL or all-cause mortality, an additional efficacy measure in the Phase 2B portion of GENETIC-AF will be AF burden, defined as a patient s percentage of time in AF per day, regardless of symptoms. At least 150 patients in the Phase 2B portion of the trial will have either a newly or previously implanted Medtronic device that measures and records AF burden. The GENETIC-AF Data Safety Monitoring Board, or DSMB, will analyze certain data from the Phase 2B portion of the trial and recommend, based on a comparison to our pre-trial statistical assumptions, whether the trial should proceed to Phase 3 and seek to enroll an additional 420 patients. The DSMB will make their recommendation based on analysis of certain trial data after 200 patients have completed 24 weeks of follow-up, the period for measuring the primary end-point of the trial. The DSMB interim analysis will focus on available data regarding the primary end point, AF/AFL event rates, AF burden, and safety. Should the DSMB interim analysis conclude that the interim data is consistent with pre-trial statistical assumptions and indicates potential for achieving statistical significance for the Phase 3 endpoint, the DSMB may recommend that the study proceed to Phase 3. The DSMB may also recommend changes to the study design before the trial proceeds to Phase 3, or it may recommend that the study not proceed to Phase 3. Based on the DSMB recommendation, and other factors, including input from the trial s Steering Committee, the Company will make the final determination on the trial s development steps. The full Phase 2B/3 trial is designed for 90 percent power at a p-value of less than 0.01 significance level to detect a 25 percent reduction in the risk of AF recurrence or death in patients in the Gencaro arm compared to patients in the Toprol XL arm.

In consultation with the GENETIC-AF Steering Committee, we implemented amendments to the trial protocol in March 2015 which we believe may expand the eligible target population, increase the patient screening and enrollment rate, and simplify trial procedures. We have undertaken these protocol amendments because patient enrollment in the trial has not met our original projections. Under the revised protocol, patients in sinus rhythm who have experienced symptomatic AF in the past 120 days are now eligible for inclusion in the trial, as are patients with AF episodes lasting 7 days or less, or paroxysmal AF. Previously, these patients were not eligible to be enrolled in the trial. We believe this expanded target population has the potential to improve trial screening and enrollment rates and could broaden the potential commercial market for Gencaro, should it achieve regulatory approval in the future. The amendments to the protocol do not fundamentally alter or impact the original endpoints of the clinical trial. Based on the projected impact of the expanded patient population and the current enrollment rate, we now project that the enrollment of 200 patients for the Phase 2B portion of the trial may be completed by the end of 2016, with the DSMB interim analysis finishing in the first half of 2017. We do not yet know how these protocol changes will impact enrollment or if our new enrollment projections will prove to be accurate. We met with the FDA, prior to implementation, to confirm the acceptability of the amendments to the protocol and received no objections.

Our GENETIC-AF clinical trial of Gencaro requires a companion diagnostic test to identify the patient s receptor genotype. We have an agreement with Laboratory Corporation of America, or LabCorp, to provide the companion diagnostic test and services to support our GENETIC-AF trial. LabCorp has developed the genetic test and obtained an Investigational Device Exemption, or IDE, from the FDA for the companion diagnostic test which is being used in our GENETIC-AF clinical trial.

Medtronic, Inc., or Medtronic, a leader in medical technologies to improve the treatment of chronic diseases, including cardiac rhythm disorders, is collaborating with us on the GENETIC-AF trial. Under the collaboration with Medtronic, ARCA is conducting a substudy that includes continuous monitoring of the cardiac rhythms of at least 150 patients enrolled during the Phase 2B portion of the trial. The collaboration is administered by a joint ARCA-Medtronic committee. Medtronic uses its proprietary CareLink System to collect and analyze the cardiac rhythm data from the implanted Medtronic devices and the data will be used by the DSMB as part of the interim

analysis. Medtronic will support the reimbursement process for U.S. patients enrolled in the Phase 2B portion, and will provide financial support of unreimbursed costs for a certain number of U.S. patients in the Phase 2B portion up to a certain maximum amount per patient. If GENETIC-AF proceeds to Phase 3, we will seek to enroll an additional 100 patients, with Medtronic devices for monitoring and recording AF burden, in the substudy. Medtronic will provide the agreed upon CareLink System cardiac rhythm data collection and analysis for the Phase 3 portion of the substudy and support the reimbursement process.

We have been granted patents in the United States, Europe, and other jurisdictions for methods of treating AF and HF patients with Gencaro based on genetic testing, which, if we are granted patent term extension, may provide market exclusivity for these uses of Gencaro into approximately 2030 in the United States and Europe.

To support the continued development of Gencaro, in June 2015, we completed a private placement that raised approximately

Table of Contents

$34 million of net proceeds as additional funds for the Phase 2B portion of the GENETIC-AF trial and to support our ongoing operations. We are seeking to enroll approximately 200 HFREF patients in the Phase 2B portion of the GENETIC-AF trial, and we anticipate that our current cash and cash equivalents will be sufficient to fund our operations, at our projected cost structure, through the end of 2017. However, in light of the significant uncertainties regarding clinical development timelines and costs for developing drugs such as Gencaro, we may need to raise a significant amount of additional capital due to changing circumstances that may cause us to consume capital significantly faster or slower than we currently anticipate. We have based these estimates on assumptions that may prove to be wrong, and we could exhaust our available financial resources sooner than we currently anticipate. If GENETIC-AF proceeds to Phase 3, we will be required to raise additional funds prior to completion of the Phase 3 portion.

Corporate Information

On January 27, 2009, we completed a business combination, or the Merger, with Nuvelo, Inc. Immediately following the Merger, we changed our name from Nuvelo, Inc. to ARCA biopharma, Inc. Our principal offices are located in Westminster, Colorado, and our telephone number is (720) 940-2200. Our website address is www.arcabiopharma.com. We do not incorporate the information on our website into this prospectus, and you should not consider it part of this prospectus. For further information regarding us and our financial information, you should refer to our recent filings with the Securities and Exchange Commission, or the SEC. See Where You Can Find More Information and Incorporation of Certain Documents by Reference.

Each of ARCA, ARCA biopharma, Gencaro and Gencaro Test is a registered trademark of ARCA biopharma, Inc. Each of the other trademarks, trade names or service marks appearing in this prospectus belongs to its respective holder.

Table of Contents

THE OFFERING

Securities offered by us	864,300 shares of our common stock issuable upon exercise of outstanding May 2013 Warrants.
Exercise Price of May 2013 Warrants	$11.20 per share.
Common stock outstanding before this offering	9,049,789(1)
Common stock outstanding after this offering	9,914,089(2)
Use of proceeds	We intend to use the net proceeds from any exercises of the May 2013 Warrants to fund the ongoing Phase 2B/3 trial for the prevention of atrial fibrillation and for other working capital and general corporate purposes. See Use of Proceeds below.
Limitations on beneficial ownership	The exercise of the May 2013 Warrants is subject to certain exercise limitations, such that the holder may not exercise the warrants if such exercise results in the holder (or any of its affiliates) becoming the beneficial owner of more than 9.99% of the number of shares of common stock outstanding immediately after giving effect to such exercise.
NASDAQ Capital Market trading symbol for our common stock	ABIO
Risk Factors	You should read the Risk Factors section of this prospectus for a discussion of factors to consider before deciding to purchase our securities.

(1) The number of shares of common stock to be outstanding after this offering as reflected in the table above is based on the actual number of shares outstanding as of September 30, 2015, which was 9,049,789, and does not include, as of that date:

170,545 shares of common stock issuable upon the exercise of outstanding stock options, at a weighted average exercise price of $18.37 per share;

71,780 shares of common stock reserved for issuance upon the vesting of outstanding restricted stock units;

48,044 shares of common stock reserved for future issuance under our 2013 Equity Incentive Plan; and

3,739,948 shares of common stock issuable upon exercise of outstanding warrants, including the May 2013 Warrants, at a weighted average exercise price of $9.70 per share.

Unless otherwise stated, outstanding share information throughout this prospectus excludes such outstanding options and warrants to purchase shares of our common stock.

(2) Assumes the exercise of all outstanding May 2013 Warrants upon the completion of this offering.

Except as otherwise indicated, all information in this prospectus reflects the 1-for-7 reverse stock split of our capital stock that became effective on September 3, 2015.

Table of Contents

RISK FACTORS

An investment in our common stock involves a high degree of risk. Prior to making a decision about investing in our common stock, you should consider carefully the specific risk factors discussed in the sections entitled Risk Factors contained in our most recent Annual Report on Form 10-K for the fiscal year ending December 31, 2014 and subsequent Quarterly Reports on Form 10-Q for the quarters ending March 31, 2015 and June 30, 2015, each as filed with the SEC, and which are incorporated in this prospectus by reference in their entirety, as well as any amendment or updates to our risk factors reflected in subsequent filings with the SEC, including any prospectus supplement hereto. These risks and uncertainties are not the only risks and uncertainties we face. Additional risks and uncertainties not presently known to us, or that we currently view as immaterial, may also impair our business. If any of the risks or uncertainties described in our SEC filings or any additional risks and uncertainties actually occur, our business, financial condition, results of operations and cash flow could be materially and adversely affected. In that case, the trading price of our common stock could decline and you might lose all or part of your investment.

Table of Contents

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus and the documents that we have filed with the SEC that are incorporated by reference in this prospectus contain forward-looking statements within the meaning of Section 27A of the Securities Act, and Section 21E of the Securities Exchange Act of 1934, as amended, or the Exchange Act, or the safe harbor created by those sections. In some cases, you can identify forward-looking statements by the following words: may, will, could, would, should, expect, intend, plan, anticipate, believe, estimate, predict, project, potential, c negative of these terms or other comparable terminology, although not all forward-looking statements contain these words. Discussions containing these forward-looking statements may be found, among other places, in Business and Management s Discussion and Analysis of Financial Condition and Results of Operations incorporated by reference from our most recent Annual Report on Form 10-K for the fiscal year ending December 31, 2014 and our Quarterly Reports on Form 10-Q for the quarters ending March 31, 2015 and June 30, 2015, as well as any amendments thereto reflected in subsequent filings with the SEC. These forward-looking statements involve known and unknown risks, uncertainties and other factors that may cause our actual results, levels of activity, performance or achievements to be materially different from the information expressed or implied by these forward-looking statements. While we believe that we have a reasonable basis for each forward-looking statement contained in this prospectus, we caution you that these statements are based on a combination of facts and factors currently known by us and our projections of the future, about which we cannot be certain. As a result of these factors, we cannot assure you that the forward-looking statements in this prospectus or documents incorporated by reference will prove to be accurate. Furthermore, if our forward-looking statements prove to be inaccurate, the inaccuracy may be material. In light of the significant uncertainties in these forward-looking statements, you should not regard these statements as a representation or warranty by us or any other person that we will achieve our objectives and plans in any specified time frame, or at all. You should not place undue reliance on these forward-looking statements, which apply only as of the date of this prospectus. You should read this prospectus, any accompanying prospectus supplement and the documents incorporated by reference completely and with the understanding that our actual future results may be materially different from what we expect.

Examples of these statements include, but are not limited to, statements regarding the following: the timing and results of any clinical trials, including GENETIC-AF, any potential future GENETIC-AF trials, the ongoing Gencaro trial for the prevention of atrial fibrillation, the potential for genetic variations to predict individual patient response to Gencaro, Gencaro s potential to treat atrial fibrillation, future treatment options for patients with atrial fibrillation, and the potential for Gencaro to be the first genetically-targeted atrial fibrillation prevention treatment, the potential for rNAPc2 to be developed for, or to effectively treat hemorrhagic fever viruses, including the Ebola virus, our ability to obtain additional funding or enter into a strategic or other transaction, the extent to which our issued and pending patents may protect our products and technology, the potential of such product candidates to lead to the development of safe or effective therapies, our ability to enter into collaborations, our ability to maintain listing of our common stock on a national exchange, our future operating expenses, our future losses, our future expenditures, and the sufficiency of our cash resources to maintain operations. These statements involve known and unknown risks, uncertainties and other factors that may cause our actual results, levels of activity, performance or achievements to be materially different from the information expressed or implied by these forward-looking statements. While we believe that we have a reasonable basis for each forward-looking statement contained in this prospectus and the SEC filings incorporated herein by reference, we caution you that these statements are based on a combination of facts and factors currently known by us and our projections of the future, about which we cannot be certain.

We undertake no obligation to publicly update any forward-looking statements, whether as a result of new information, future events or otherwise. You are advised, however, to consult any further disclosures we make on related subjects in our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K and our website.

USE OF PROCEEDS

We expect to receive net proceeds from the sale of the common stock upon exercise of the May 2013 Warrants of approximately $9.7 million, assuming all May 2013 Warrants are exercised for cash. We intend to use the net proceeds generated by warrant cash exercises, if any, to fund the ongoing Phase 2B/3 trial for the prevention of atrial fibrillation, and for other working capital and general corporate purposes. We cannot estimate how many, if any, of the May 2013 Warrants will be exercised as a result of this offering. The amounts and timing of our actual expenditures will depend on numerous factors. We may find it necessary or advisable to use portions of the net proceeds for other purposes, and we will have broad discretion in the application and allocation of the net proceeds from this offering.

It is possible that the May 2013 Warrants may expire and may never be exercised. The May 2013 Warrants also contain a net exercise provision, if utilized we would not receive any proceeds from their exercise.

Table of Contents

DILUTION

An investor that acquires additional shares of our common stock upon the exercise of the May 2013 warrants may experience additional dilution depending on our net tangible book value at the time of exercise. Our pro forma net tangible book value as of June 30, 2015 was approximately $43.8 million, or $4.845 per share of our common stock. Pro forma net tangible book value per share as of June 30, 2015 is equal to our total tangible assets minus total liabilities, all divided by the number of shares of common stock outstanding as of June 30, 2015.

Assuming that we issue all 864,300 shares of common stock upon exercise of the May 2013 Warrants at an exercise price of $11.20 per share, and after deducting the estimated offering expenses payable by us, our pro forma net tangible book value as of June 30, 2015 would have been approximately $53.4 million, or $5.398 per share of our common stock. This amount represents an immediate increase in net tangible book value of $0.553 per share to our existing stockholders and an immediate dilution in net tangible book value of $5.802 per share to new investors acquiring common stock upon the exercise of the May 2013 Warrants.

We determine dilution by subtracting the adjusted net tangible book value per share after this offering from the conversion price per share of our common stock. The following table illustrates the dilution in net tangible book value per share to new investors.

Public offering price per share		$ 11.20
Net tangible book value per share as of June 30, 2015	$ 4.845	
Increase per share attributable to investors purchasing our common stock in this offering	$ 0.553	
As adjusted net tangible book value per share after this offering		$ 5.398
Dilution per share to investors purchasing our common stock in this offering		$ 5.802

The above discussion as reflected in the table above is based on the actual number of shares outstanding as of June 30, 2015, which was 9,031,427, and does not include, as of that date:

- 171,225 shares of common stock issuable upon the exercise of outstanding stock options, at a weighted average exercise price of $18.49 per share;
- 89,896 shares of common stock reserved for issuance upon the vesting of outstanding restricted stock units;
- 47,922 shares of common stock reserved for future issuance under our 2013 Equity Incentive Plan; and
- 3,739,948 shares of common stock issuable upon exercise of outstanding warrants, including the May 2013 Warrants, at a weighted average exercise price of $9.70 per share.

To the extent that options or warrants outstanding as of June 30, 2015 have been or are exercised, or other shares are issued, investors purchasing shares upon exercise of the May 2013 Warrants could 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. 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.

Table of Contents

PLAN OF DISTRIBUTION

This prospectus relates to 864,300 shares of our common stock issuable upon the exercise of our outstanding May 2013 Warrants. The May 2013 Warrants were offered and sold by us in a public offering pursuant to a prospectus dated May 30, 2013, which prospectus also covered the offer and sale by us of the shares of our common stock underlying the May 2013 Warrants. The ongoing offer and sale by us of the shares of our common stock issuable upon exercise of the May 30, 2013 warrants is being made pursuant to this prospectus. The May 30, 2013 warrants are exercisable until June 4, 2018 at a current exercise price of $11.20 per share of our common stock, subject to adjustment upon events specified in the May 2013 Warrants.

The exercise price per share of the May 2013 Warrants was negotiated between us and the placement agent in our May 2013 public offering based on the trading of our common stock prior to that offering. Other factors considered in determining the exercise price of the May 2013 Warrants included our history and prospects, the stage of development of our business, our business plans for the future and the extent to which they have been implemented, an assessment of our management, general conditions of the securities markets at the time of the public offering and such other factors as were deemed relevant.

May 2013 Warrants exercisable for 864,300 shares of our common stock are outstanding, and no additional May 2013 Warrants will be issued. We will deliver shares of our common stock upon exercise of a May 2013 Warrant, in whole or in part. We will not issue fractional shares. Each May 2013 Warrant contains instructions for exercise. In order to exercise a May 2013 Warrant, the holder must deliver to us, or our transfer agent, the information required by the May 2013 Warrants, along with payment of the exercise price for the shares to be purchased. We will then deliver shares of our common stock in the manner described below in the section titled Description of Capital Stock Warrants May 2013 Warrants .

Table of Contents

DESCRIPTION OF CAPITAL STOCK

General

As of the date of this prospectus, our amended and restated certificate of incorporation, as amended, or the Restated Certificate, authorizes us to issue 100,000,000 shares of common stock, par value $0.001 per share, and 5,000,000 shares of preferred stock, $0.001 par value per share. As of September 30, 2015, 9,049,789 shares of our common stock were outstanding and no shares of preferred stock were outstanding. On September 3, 2015, we effected a reverse stock split of our common stock, whereby each seven outstanding shares of our common stock were combined into one share of our common stock. Unless otherwise stated herein, all share numbers and prices per share in this prospectus reflect the consummation of such reverse stock split.

The following summary description of our capital stock is based on the provisions of our Restated Certificate, our second amended and restated bylaws, or the Bylaws, and applicable provisions of the Delaware General Corporation Law. This information may not be complete in all respects and is qualified entirely by reference to the applicable provisions of our Restated Certificate, our Bylaws and the Delaware General Corporation Law. For information on how to obtain copies of our Restated Certificate and Bylaws, which are exhibits to the registration statement of which this prospectus is a part, see Where You Can Find More Information.

Common Stock

Voting Rights. Each holder of our common stock is entitled to one vote for each share on all matters submitted to a vote of the stockholders, including the election of directors; provided, however, holders of our common stock may not, unless otherwise required by law, vote on any amendment to our Restated Certificate that relates solely to the terms of one or more series of preferred stock that we may issue if the holders of such preferred stock are entitled to vote on such amendment. In all such matters, other than the election of directors, the affirmative vote of the majority of shares present in person, by remote communication, or represented by proxy at a meeting of the stockholders and entitled to vote generally on the subject matter shall be the act of the stockholders. Directors shall be elected by a plurality of the votes of the shares present in person, by remote communication, or represented by proxy at a meeting of the stockholders and entitled to vote generally on the election of directors. Our stockholders do not have cumulative voting rights in the election of directors. Accordingly, holders of a majority of the voting shares are able to elect all of the directors to be elected at any particular time.

Dividends. Subject to preferences that may be applicable to any then outstanding preferred stock, holders of our common stock are entitled to receive dividends, if any, as may be declared from time to time by our board of directors out of legally available funds.

Liquidation. In the event of our liquidation, dissolution or winding up, holders of our common stock will be entitled to share ratably in the net assets legally available for distribution to stockholders after the payment of all of our debts and other liabilities and the satisfaction of any liquidation preference granted to the holders of any then outstanding shares of preferred stock.

Rights and Preferences. Holders of our common stock have no preemptive, conversion, subscription or other rights, and there are no redemption provisions applicable to our common stock. The rights, preferences and privileges of the holders of our common stock are subject to and may be adversely affected by the rights of the holders of shares of any series of our preferred stock that we may designate in the future.

Fully Paid and Nonassessable. All of our outstanding shares of common stock are, and the shares of common stock to be issued upon exercise of the May 2013 Warrants hereunder will be, upon our receipt of the purchase price for such shares, fully paid and nonassessable.

Preferred Stock

Pursuant to our Restated Certificate, our board of directors has the authority, without further action by our stockholders, to issue up to 5,000,000 shares of preferred stock, $0.001 par value per share, in one or more series, to establish from time to time the number of shares to be included in each such series, and to fix the designations, powers, preferences, privileges and relative participating, optional or special rights and the qualifications, limitations or restrictions thereof, including dividend rights, conversion rights, preemptive rights, voting rights, terms of redemption and repurchase, liquidation preferences and sinking fund terms, any or all of which may be greater than the rights of the common stock. Preferred stock may be convertible into our common stock or other securities of ours, or may be exchangeable for debt securities. Conversion may be mandatory or at the holder s option and would be at prescribed conversion rates. Because our board of directors, without stockholder approval, can issue preferred stock with voting, conversion or other rights, preferred stock could be issued quickly with terms calculated to

Table of Contents

delay or prevent a change in control of our company or make removal of management more difficult. Additionally, the issuance of preferred stock may have the effect of decreasing the market price of the common stock and may adversely affect the voting power of holders of common stock and reduce the likelihood that common stockholders will receive dividend payments and payments upon liquidation.

The Delaware General Corporation Law provides that the holders of any class or series of preferred stock will have the right to vote separately as a class on any proposed amendment to the Restated Certificate that would alter or change the powers, preferences or special rights of the holders of such class or series of preferred stock so as to affect them adversely. This right is in addition to any voting rights that may be provided for in the applicable certificate of designation.

Stock Options and Restricted Stock Units

As of September 30, 2015, there were 276,234 shares of common stock reserved for issuance under our 2013 Equity Incentive Plan. Of this number, 156,410 shares were reserved for issuance upon exercise of outstanding options and 71,780 shares were reserved for issuance upon the vesting of outstanding restricted stock units. We have also reserved 14,135 shares of our common stock for issuance upon exercise of outstanding options previously issued under our 2004 stock incentive plan and other stock plans that were assumed by ARCA in the Merger, but no new options can be granted under these plans, as the plans have expired.

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

Certificate of Incorporation and Bylaws

Our Restated Certificate and Bylaws include a number of provisions that may deter or impede hostile takeovers or changes of control or management. These provisions include:

Issuance of Undesignated Preferred Stock. Under our Restated Certificate, our board of directors has the authority, without further action by the stockholders, to issue up to 5,000,000 shares of undesignated preferred stock with rights and preferences, including voting rights, designated from time to time by the board of directors. The existence of authorized but unissued shares of preferred stock enables our board of directors to make it more difficult or to discourage an attempt to obtain control of us by means of a merger, tender offer, proxy contest or otherwise.

Classified Board. Our Restated Certificate provides for a classified board of directors consisting of three classes of directors, with staggered three-year terms. Only one class of directors will be elected at each annual meeting of our stockholders, with the other classes continuing for the remainder of their respective three-year terms. This provision may have the effect of delaying a change in control of the board.

Board of Directors Vacancies. Our Restated Certificate and Bylaws authorize only our board of directors to fill vacant directorships, unless our board of directors determines by resolution that the stockholders shall fill such vacant directorships. In addition, the number of directors constituting our board of directors may be set only by resolution adopted by a majority vote of our entire board of directors. These provisions prevent a stockholder from increasing the size of our board of directors and gaining control of our board of directors by filling the resulting vacancies with its own nominees.

Stockholder Action; Special Meetings of Stockholders. Our Restated Certificate provides that our stockholders may not take action by written consent, but may only take action at annual or special meetings of our stockholders. Stockholders will not be permitted to cumulate their votes for the election of directors. Our Bylaws further provide

that special meetings of the stockholders may be called by the chief executive officer, president, the board of directors, or by holders of common stock who hold, in the aggregate, not less than fifty percent (50%) of the outstanding shares of common stock for the purpose or purposes stated in the call of the meeting. These provisions may prevent stockholders from taking corporate actions as stockholders at times when they otherwise would like to do so.

Advance Notice Requirements for Stockholder Proposals and Director Nominations. Our Bylaws provide advance notice procedures for stockholders seeking to bring business before our annual meeting of stockholders or to nominate candidates for election as directors at our annual meeting of stockholders. Our bylaws also specify certain requirements as to the form and content of a stockholder s notice. These provisions may make it more difficult for our stockholders to bring matters before our annual meeting of stockholders or to nominate directors at our annual meeting of stockholders.

These provisions are intended to enhance the likelihood of continued stability in the composition of our board of directors and its policies and to discourage certain types of transactions that may involve an actual or threatened acquisition of us. These

Table of Contents

provisions are designed to reduce our vulnerability to an unsolicited acquisition proposal. The provisions also are intended to discourage certain tactics that may be used in proxy fights. However, these provisions could have the effect of discouraging others from making tender offers for our shares and, as a consequence, they may also reduce fluctuations in the market price of our shares that could result from actual or rumored takeover attempts.

Section 203 of the Delaware General Corporation Law

We are subject to Section 203 of the Delaware General Corporation Law. Section 203 generally prohibits certain Delaware corporations from engaging, under certain circumstances, in a business combination with any interested stockholder for a period of three years following the time that such stockholder became an interested stockholder, unless:

- prior to such time the board of directors approved either the business combination or transaction which resulted in the stockholder becoming an interested stockholder;
- upon consummation of the transaction which resulted in the stockholder becoming an interested stockholder, 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) 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
- at or subsequent to such time the business combination is approved by the board of directors 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.

Section 203 defines a business combination to include:

- any merger or consolidation involving the corporation and the interested stockholder;
- any sale, lease, exchange, mortgage, pledge, transfer or other disposition (in one transaction or a series of transactions) involving the interested stockholder of 10% or more of the assets of the corporation (or its majority-owned subsidiary);
- subject to exceptions, any transaction that results in the issuance or transfer by the corporation of any stock of the corporation to the interested stockholder;
- subject to exceptions, any transaction involving the corporation that has the effect, directly or indirectly, of increasing the proportionate share of the stock or any class or series of the corporation beneficially owned by the interested stockholder; and

the receipt by the interested stockholder of the benefit, directly or indirectly (except proportionately as a stockholder of such corporation), of any loans, advances, guarantees, pledges or other financial benefits, other than certain benefits set forth in Section 203, provided by or through the corporation.

In general, Section 203 defines an interested stockholder as any entity or person beneficially owning 15% or more of the outstanding voting stock of the corporation and any entity or person that is an affiliate or associate of such entity or person.

A Delaware corporation may opt out of these provisions with an express provision in its original certificate of incorporation or an express provision in its certificate of incorporation or bylaws resulting from a stockholders amendment approved by a majority of the outstanding voting shares. We have not opted out of these provisions and do not plan to do so. The statute could prohibit or delay mergers or other takeover or change in control attempts and, accordingly, may discourage attempts to acquire us.

Warrants

Outstanding Warrants. As of September 30, 2015, there were outstanding warrants, including the May 2013 Warrants, to purchase 3,739,948 shares of our common stock, having an exercise price ranging from $6.10 to $818.23, with a weighted average exercise price per share of $9.70. Any of the outstanding warrants may be exercised by applying the value of a portion of the warrant, which is equal to the number of shares issuable under the warrant being exercised multiplied by the fair market value of the security receivable upon the exercise of the warrant, less the per share price, in lieu of payment of the exercise price per share. The warrants will expire at various times between April 2016 and January 2022.

Table of Contents

May 2013 Warrants. The following summary of certain terms and provisions of the May 2013 Warrants is subject to, and qualified in its entirety by reference to, the terms and provisions set forth in the warrants.

As of September 30, 2015, there are warrants outstanding to purchase 864,300 shares of our common stock at an exercise price of $11.20 per share issued pursuant to a prospectus dated May 30, 2013 in connection with the public offering that we closed on June 4, 2013, or the 2013 Public Offering. These May 2013 Warrants have an exercise term equal to 5 years. The exercise of the May 2013 Warrants is subject to certain exercise limitations, such that the holder may not exercise the warrants if such exercise results in the holder (or any of its affiliates) becoming the beneficial owner of more than 9.99% of the number of shares of common stock outstanding immediately after giving effect to such exercise.

The May 2013 Warrants provide for the adjustment of the exercise price and number of shares issuable upon exercise of the May 2013 Warrants in connection with stock dividends and splits, such that the number of shares issuable upon exercise of the warrant is adjusted in proportion to the change in the number of the number of shares outstanding and the aggregate exercise price of the warrant remains unchanged. In addition, if we distribute to all holders of common stock (and not the holder of the warrant) evidences of our indebtedness or assets (including cash and cash dividends) or rights or warrants to purchase any security (other than with respect to stock dividends and splits), the exercise price of the warrant will be adjusted downward in proportion to the fair market value of such distributions and the number of shares issuable upon exercise of the warrant will be adjusted such that the aggregate exercise price of the warrant remains unchanged. Other than as described above, the May 2013 Warrants do not contain anti-dilution provisions.

If we merge or consolidate with or into another entity, sell or otherwise dispose of substantially all of our assets, consummate any stock purchase offer, tender offer or exchange offer pursuant to which the holders of our common stock are permitted to sell, tender or exchange their shares for other securities, cash or property and which has been accepted by at least 50% of our outstanding common stock, or if we effect any reclassification, reorganization or recapitalization of our common stock, or upon the consummation of a stock purchase agreement whereby more than 50% of the outstanding shares of our common stock are acquired by another person or entity, then, upon any subsequent exercise of a May 2013 Warrant, the holder of such warrant will have the right to receive, for each share of common stock underlying such warrant that would have been issuable upon such exercise immediately prior to the transaction, the number of shares of the common stock of our successor or acquirer, and any additional consideration receivable as a result of such transaction by a holder of the number of shares of common stock for which the warrant is exercisable immediately prior to such transaction.

If the holders of common stock are given any choice as to the securities, cash or property to be received in such a fundamental transaction, the holders of the May 2013 Warrants shall be given the same choice as to any alternate consideration they are to receive upon any exercise of the May 2013 Warrants following such fundamental transaction. The terms of any agreement pursuant to which a fundamental transaction of the type described above is to be effected must include terms requiring any successor or surviving entity to comply with the provisions summarized above such that the warrants will be similarly adjusted upon any subsequent transaction analogous to a fundamental transaction of the types described above. The May 2013 Warrants provide for settlement of such warrants in unregistered shares should an effective registration statement not be in place at the time a warrant is exercised.

The May 2013 Warrants are issued in book-entry form under a warrant agency agreement between Computershare Trust Company, N.A., as warrant agent, and us, and are represented by one or more book-entry certificates deposited with The Depository Trust Company, or DTC, and registered in the name of Cede & Co., a nominee of DTC, or as otherwise directed by DTC.

Transfer Agent and Registrar

The transfer agent and registrar for our common stock is Computershare Trust Company N.A.

Listing on the NASDAQ Capital Market

Our common stock is listed on the NASDAQ Capital Market under the symbol ABIO.

DESCRIPTION OF SECURITIES WE ARE OFFERING

We are offering 864,300 shares of our common stock issuable upon the exercise of our outstanding May 2013 Warrants. The May 2013 Warrants were offered and sold by us pursuant to a prospectus dated May 30, 2013, which prospectus also covered the offer and sale by us of the shares of our common stock underlying the May 2013 Warrants. The material terms of our common stock are described in the section of this prospectus entitled Description of Capital Stock beginning on page 9 of this prospectus. The material terms of the May 2013 Warrants for which the common stock offered by this prospectus will be issued when exercised are described in the section of this prospectus entitled Description of Capital Stock Warrants May 2013 Warrants beginning on page 11 of this prospectus.

Table of Contents

LEGAL MATTERS

The validity of our common stock being offered hereby has been passed upon for us by Cooley LLP, Broomfield, Colorado.

EXPERTS

The financial statements of ARCA biopharma, Inc. (the Company) as of December 31, 2014 and 2013, and for each of the years in the two year period ended December 31, 2014, have been incorporated by reference herein and in the registration statement in reliance upon the report of KPMG LLP, independent registered public accounting firm, incorporated by reference herein, and upon the authority of said firm as experts in accounting and auditing.

The audit report covering the December 31, 2014 financial statements contains an explanatory paragraph that states that the Company s recurring losses from operations and its dependence upon raising additional funds from strategic transactions, sales of equity, and/or issuance of debt raise substantial doubt about the entity s ability to continue as a going concern. The financial statements do not include any adjustments that might result from the outcome of that uncertainty.

WHERE YOU CAN FIND ADDITIONAL INFORMATION

We are a reporting company and file our annual, quarterly and current reports, proxy statements and other information with the SEC. You may read and obtain copies of our reports, proxy statements and other information we file with the SEC, at the SEC s public reference room at 100 F Street, N.E., Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for more information about the operation of the public reference room. Our SEC filings are also available at the SEC s web site at http://www.sec.gov.

INCORPORATION OF CERTAIN INFORMATION BY REFERENCE

The SEC allows us to incorporate by reference information from other documents that we file with it, which means that we can disclose important information to you by referring you to those documents. The information incorporated by reference is considered to be part of this prospectus. Information in this prospectus supersedes information incorporated by reference that we filed with the SEC prior to the date of this prospectus. We incorporate by reference into this prospectus and the registration statement of which this prospectus is a part the information or documents listed below that we have filed with the SEC (Commission File No.000-22873):

- our Annual Report on Form 10-K for the year ended December 31, 2014, filed with the SEC on March 19, 2015;
- our Quarterly Reports on Form 10-Q for the quarterly periods ended March 31, 2015 and June 30, 2015, filed with the SEC on May 12, 2015 and August 11, 2015, respectively;
- our Current Reports on Form 8-K and Form 8-K/A filed with the SEC on February 4, 2015, February 17, 2015, February 23, 2015, March 16, 2015, April 13, 2015, June 5, 2015, June 11, 2015, June 23, 2015, July 16, 2015, September 3, 2015 and September 9, 2015; and

the description of our securities contained in our Registration Statement on Form S-1 filed with the SEC on March 25, 2013.

We also incorporate by reference into this prospectus all documents (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) that are subsequently filed by us with the SEC pursuant to Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act prior to the termination of the offering of the securities made by this prospectus (including documents filed after the date of the initial registration statement and prior to the effectiveness of the registration statement). These documents include periodic reports, such as Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q and Current Reports on Form 8-K, as well as proxy statements.

Any statement contained in this prospectus or in a document incorporated or deemed to be incorporated by reference into this prospectus will be deemed to be modified or superseded to the extent that a statement contained in this prospectus or any subsequently filed document that is deemed to be incorporated by reference into this prospectus modifies or supersedes the statement

Table of Contents

We will furnish without charge to you, on written or oral request, a copy of any or all of the documents incorporated by reference, including exhibits to these documents. You should direct any requests for documents to Brian L. Selby, Vice President, Finance, ARCA biopharma, Inc., 11080 CirclePoint Road, Suite 140, Westminster, Colorado 80020; telephone: (720) 940-2200. In addition, all of the documents incorporated by reference into this prospectus may be accessed via the Internet at our website: http://www.arcabiopharma.com.

Table of Contents

864,300 Shares of Common Stock

Issuable Upon Exercise of Outstanding Warrants

PROSPECTUS

October 16, 2015

Table of Contents

PART II

INFORMATION NOT REQUIRED IN PROSPECTUS

Item 14. Other Expenses of Issuance and Distribution

The following table sets forth the estimated costs and expenses payable by us, other than the placement agent fees and expenses payable by the Registrant, in connection with the sale of the common stock being registered. All amounts shown are estimates except for the SEC registration fee.

	Amount Paid or to be Paid
SEC registration fee (previously paid)	$ 4,774
Legal fees and expenses	10,000
Accounting fees and expenses	10,000
Miscellaneous expenses	3,000
Total	$ 27,774

Item 15. Indemnification of Directors and Officers

Section 145 of the Delaware General Corporation Law permits indemnification of officers, directors and other corporate agents under certain circumstances and subject to certain limitations. Our amended and restated certificate of incorporation and amended and restated bylaws provide that we will indemnify our directors, officers, employees and agents to the full extent permitted by the Delaware General Corporation Law, including in circumstances in which indemnification is otherwise discretionary under Delaware law. In addition, we have entered into indemnification agreements with our directors and officers that require us, among other things, to indemnify them against certain liabilities that may arise by reason of their status or service (other than liabilities arising from willful misconduct of a culpable nature). The indemnification provisions in our amended and restated certificate of incorporation and amended and restated bylaws and the indemnification agreements entered into between us and our directors may be sufficiently broad to permit indemnification of our officers and directors for liabilities (including reimbursement of expenses incurred) arising under the Securities Act of 1933, as amended, or the Securities Act. We also maintain director and officer liability insurance to insure our directors and officers against the cost of defense, settlement or payment of a judgment under certain circumstances. Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers or persons controlling us pursuant to the foregoing provisions, we have been informed that in the opinion of the SEC such indemnification is against public policy as expressed in the Securities Act and is therefore unenforceable.

Item 16. Exhibits

The exhibits to this registration statement are listed in the Exhibit Index attached hereto and are incorporated by reference herein.

Item 17. Undertakings

The undersigned Registrant hereby undertakes:

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

(i) To include any prospectus required by Section 10(a)(3) of the Securities Act of 1933, as amended, or the Securities Act;

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

Table of Contents

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

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

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

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

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

(i) If the Registrant is relying on Rule 430B:

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

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

(ii) If the Registrant is subject to Rule 430C, each prospectus filed pursuant to Rule 424(b) as part of a registration statement relating to an offering, other than registration statements relying on Rule 430B or other than prospectuses filed in reliance on Rule 430A, shall be deemed to be part of and included in the

registration statement as of the date it is first used after effectiveness. Provided, however, that no statement made in a registration statement or prospectus that is part of the registration statement or made in a document incorporated or deemed incorporated by reference into the registration statement or prospectus that is part of the registration statement will, as to a purchaser with a time of contract of sale prior to such first use, supersede or modify any statement that was made in the registration statement or prospectus that was part of the registration statement or made in any such document immediately prior to such date of first use.

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

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the Registrant pursuant to the provisions of Item 15 above, or otherwise, the Registrant has been advised that in the opinion of the SEC such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the Registrant of expenses incurred or paid by a director, officer or controlling person of the Registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered,

Table of Contents

the Registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue.

Table of Contents

SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing this Post-Effective Amendment No. 1 to Form S-1 on Form S-3 and has duly caused this Post-Effective Amendment No. 1 to Form S-1 on Form S-3 to be signed on its behalf by the undersigned, thereunto duly authorized, in the city of Westminster, State of Colorado, on October 16, 2015.

ARCA biopharma, Inc.

By: /s/ Michael R. Bristow
Michael R. Bristow
President and Chief Executive Officer

(Principal Executive Officer)

POWER OF ATTORNEY

Each person whose signature appears below constitutes and appoints Michael R. Bristow and Brian L. Selby, and each of them, as his or her true and lawful attorney-in-fact and agent, each acting alone, with full power of substitution and resubstitution, for him or her and in his or her name, place and stead, in any and all capacities, to sign any or all amendments (including post-effective amendments) to the Post-Effective Amendment No. 1 to Form S-1 on Form S-3 and to file the same, with all exhibits thereto, and all documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorney-in-fact and agent, full power and authority to do and perform each and every act and thing requisite and necessary to be done in and about the premises, as fully to all intents and purposes as he or she might or could do in person, hereby ratifying and confirming all that said attorney-in-fact and agent, or his or her substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1933, this Post-Effective Amendment No. 1 to Form S-1 on Form S-3 has been signed by the following persons in the capacities and on the dates indicated.

Signature	Title	Date
/s/ Michael R. Bristow	President and Chief Executive Officer and	October 16, 2015
Michael R. Bristow	Director	
	(Principal Executive Officer)	
/s/ Brian L. Selby	Vice President, Finance	October 16, 2015
Brian L. Selby	*(Principal Financial Officer and Principal*	
	Accounting Officer)	

/s/ Linda Grais	Director	October 16, 2015
Linda Grais		
/s/ Raymond Woosley	Director	October 16, 2015
Raymond Woosley		
/s/ Robert Conway	Director	October 16, 2015
Robert Conway		
/s/ Daniel Mitchell	Director	October 16, 2015
Daniel Mitchell		

Table of Contents

EXHIBIT INDEX

Exhibit No.	Description	Incorporated by Reference Filing Form	Date	Number	Filed Herewith
2.1	Agreement and Plan of Merger and Reorganization, dated September 24, 2008, among Nuvelo, Inc., Dawn Acquisition Sub, Inc. and ARCA biopharma, Inc.	8-K*	9/25/2008	2.1	
2.2	Amendment No. 1 to Agreement and Plan of Merger and Reorganization, dated October 28, 2008, by and among Nuvelo, Inc., Dawn Acquisition Sub, Inc. and ARCA biopharma, Inc.	8-K*	10/29/2008	2.5	
4.1	Form of Common Stock Certificate.	8-K	1/28/2009	4.1	
4.2	Amended and Restated Certificate of Incorporation of Registrant, as amended.	10-K	3/27/2009	3.1	
4.3	Certificate of Amendment to Restated Certificate of Incorporation.	8-K	3/15/2013	5.1	
4.4	Certificate of Amendment to Restated Certificate of Incorporation	8-K	9/3/2015	3.1	
4.5	Second Amended and Restated Bylaws of the Registrant, as amended.	10-Q	11/16/2009	3.2	
4.6	Form of Warrant Agency Agreement by and between ARCA biopharma, Inc. and Computershare Trust Company, N.A. dated May 31, 2013.	S-1/A	5/15/2013	4.1	
4.7	Form of Common Stock Purchase Warrant.	S-1/A	5/24/2013	4.3	
5.1	Opinion of Cooley LLP as to legality	S-1/A	5/24/2013	5.1	
23.1	Consent of KPMG LLP, Independent Registered Public Accounting Firm.				X
23.2	Consent of Cooley LLP (included in Exhibit 5.1).	S-1/A	5/24/2013	5.1	
24.1	Power of Attorney (included in the signature page hereto).				X

* Previously filed with the SEC as an Exhibit to and incorporated herein by reference from Nuvelo, Inc. s Form 8-K, File No. 000-22873.