ARCA biopharma, Inc. Form 424B4 September 03, 2015

Prospectus Supplement No. 42

Filed pursuant to Rule 424(b)(4) Registration No. 333-187508

(to Prospectus dated May 30, 2013)

125,000 Shares of Series A Convertible Preferred Stock

12,500,000 Shares of Common Stock Underlying the Preferred Stock

Warrants to Purchase up to 6,250,000 Shares of Common Stock and

6,250,000 Shares of Common Stock Underlying the Warrants

ARCA biopharma, Inc.

This prospectus supplement supplements the prospectus dated May 30, 2013 (the "Prospectus"), as supplemented by that certain Prospectus Supplement No. 1 dated July 17, 2013 ("Supplement No. 1"), by that certain Prospectus Supplement No. 2 dated July 19, 2013 ("Supplement No. 2"), by that certain Prospectus Supplement No. 3 dated July 24, 2013 ("Supplement No. 3"), by that certain Prospectus Supplement No. 4 dated July 30, 2013 ("Supplement No. 4"), by that certain Prospectus Supplement No. 5 dated August 6, 2013 ("Supplement No. 5"), by that certain Prospectus Supplement No. 6 dated September 4, 2013 ("Supplement No. 6"), by that certain Prospectus Supplement No. 7 dated September 23, 2013 ("Supplement No. 7"), by that certain Prospectus Supplement No. 8 dated October 29, 2013 ("Supplement No. 8"), by that certain Prospectus Supplement No. 9 dated November 6, 2013 ("Supplement No. 9"), by that certain Prospectus Supplement No. 10 dated November 13, 2013 ("Supplement No. 10"), by that certain Prospectus Supplement No. 11 dated November 21, 2013 ("Supplement No. 11"), by that certain Prospectus Supplement No. 12 dated December 5, 2013 ("Supplement No. 12"), by that certain Prospectus Supplement No. 13 dated January 8, 2014 ("Supplement No. 13"), by that certain Prospectus Supplement No. 14 dated February 10, 2014 ("Supplement No. 14"), by that certain Prospectus Supplement No. 15 dated February 12, 2014 ("Supplement No. 15"), by that certain Prospectus Supplement No. 16 dated February 18, 2014 ("Supplement No. 16"), by that certain Prospectus Supplement No. 17 dated March 3, 2014 ("Supplement No. 17"), by that certain Prospectus Supplement No. 18 dated March 20, 2014 ("Supplement No. 18"), by that certain Prospectus Supplement No. 19 dated May 13, 2014 ("Supplement No. 19"), by that certain Prospectus Supplement No. 20 dated June 9, 2014 ("Supplement No. 20"), by that certain Prospectus Supplement No. 21 dated August 13, 2014 ("Supplement No. 21"), by that certain Prospectus Supplement No. 22 dated August 18, 2014 ("Supplement No. 22"), by that certain Prospectus Supplement No. 23 dated November 12, 2014 ("Supplement No. 23"), by that certain Prospectus Supplement No. 24 dated December 1, 2014 ("Supplement No. 24"), by

that certain Prospectus Supplement No. 25 dated December 10, 2014 ("Supplement No. 25"), by that certain Prospectus Supplement No. 26 dated December 11, 2014 ("Supplement No. 26"), by that certain Prospectus Supplement No. 27 dated December 30, 2014 ("Supplement No. 27"), by that certain Prospectus Supplement No. 28 dated February 4, 2015 ("Supplement No. 28"), by that certain Prospectus Supplement No. 29 dated February 17, 2015 ("Supplement No. 29"), by that certain Prospectus Supplement No. 30 dated February 23, 2015 ("Supplement No. 30"), by that certain Prospectus Supplement No. 31 dated March 16, 2015 ("Supplement No. 31"), by that certain Prospectus Supplement No. 32 dated March 19, 2015 ("Supplement No. 32"), by that certain Prospectus Supplement No. 33 dated April 13, 2015 ("Supplement No. 33"), by that certain Prospectus Supplement No. 34 dated April 14, 2015 ("Supplement No. 34"), by that certain Prospectus Supplement No. 35 dated May 12, 2015 ("Supplement No. 35"), by that certain Prospectus Supplement No. 36 dated June 5, 2015 ("Supplement No. 36"), by that certain Prospectus Supplement No. 37 dated June 11, 2015 ("Supplement No. 37"), and by that certain Prospectus Supplement No. 38 dated June 11, 2015 ("Supplement No. 38), by that certain Prospectus Supplement No. 39 dated June 23, 2015 ("Supplement No. 39"), by that certain Prospectus Supplement No. 40 dated July 16, 2015 ("Supplement No. 40"), and by that certain Prospectus Supplement No. 41 dated August 11, 2015 ("Supplement No. 41, and together with Supplement No. 1, Supplement No. 2, Supplement No. 3, Supplement No. 4, Supplement No. 5, Supplement No. 6, Supplement No. 7, Supplement No. 8, Supplement No. 9, Supplement No. 10, Supplement No. 11, Supplement No. 12, Supplement No. 13, Supplement No. 14, Supplement No. 15, Supplement No. 16, Supplement No. 17, Supplement No. 18, Supplement No. 19, Supplemen No. 20, Supplement No. 21, Supplement No. 22, Supplement No. 23, Supplement No. 24, Supplement No. 25, Supplement No. 26, Supplement No. 27, Supplement No. 28, Supplement No. 29, Supplement No. 30, Supplement No. 31, Supplement No. 32, Supplement No. 33, Supplement No. 34, Supplement No. 35, Supplement No. 36, Supplement No. 37, Supplement No. 38, Supplement No. 39, and Supplement No. 40, the "Supplements"), which form a part of our Registration Statement on Form S-1 (Registration No. 333-187508). This prospectus supplement is being filed to update and supplement the information in the Prospectus and the Supplements with the information contained in our current report on Form 8-K, filed with the Securities and Exchange Commission (the "Commission") on September 3, 2015 (the "Current Report"). Accordingly, we have attached the Current Report to this prospectus supplement.

The Prospectus, the Supplements and this prospectus supplement relate to the offer and sale of up to 125,000 shares of Series A Convertible Preferred Stock ("Preferred Stock") which are convertible into 12,500,000 shares of Common Stock, warrants to purchase up to 6,250,000 shares of our Common Stock and 6,250,000 shares of Common Stock underlying the warrants.

This prospectus supplement should be read in conjunction with the Prospectus and the Supplements. This prospectus supplement updates and supplements the information in the Prospectus and the Supplements. If there is any inconsistency between the information in the Prospectus, the Supplements and this prospectus supplement, you should rely on the information in this prospectus supplement.

Our common stock is traded on the Nasdaq Global Market under the trading symbol "ABIO." On September 3, 2015, the last reported sale price of our common stock was \$0.90 per share.

Investing in our securities involves a high degree of risk. You should review carefully the risks and uncertainties described under the heading "Risk Factors" beginning on page 5 of the Prospectus and beginning on page 21 of our quarterly report on Form 10-Q for the period ended June 30, 2015 before you decide whether to invest in shares of our common stock.

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

The date of this prospectus supplement is September 3, 2015

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549
FORM 8-K
CURRENT REPORT
Pursuant to Section 13 or 15(d) of the
Securities Exchange Act of 1934
Date of Report (Date of earliest event reported): September 3, 2015 (September 3, 2015)
ARCA biopharma, Inc.
(Exact Name of Registrant as Specified in Charter)
Delaware 000-22873 36-3855489 (State or Other Jurisdiction (Commission File Number) (I.R.S. Employer
of Incorporation) Identification No.) 11080 CirclePoint Road, Suite 140, Westminster, CO 80020
(Address of Principal Executive Offices) (Zip Code)
(720) 940-2200
(Registrant's telephone number, including area code)
Not Applicable

(Former Name or Former Address, if Changed Since Last Report)

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrant under any of the following provisions (see General Instruction A.2. below):

- £Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)
- £Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)
- £Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))
- £Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

Section 5 — Corporate Governance and Management

Item 5.03. Amendments to Articles of Incorporation or Bylaws; Change in Fiscal Year.

On September 3, 2015, ARCA biopharma, Inc. (the "Company") filed a Certificate of Amendment to the Amended and Restated Certificate of Incorporation of the Company, as amended (the "Amendment"), to implement a seven-for-one reverse split of its common stock (the "Reverse Split"), as previously authorized and approved at the Company's annual meeting of stockholders on June 22, 2015. The Reverse Split will be effective as of 5:01 p.m. (Eastern Time) on September 3, 2015, and the Company's common stock will continue trading on the Nasdaq Capital Market on a post-split basis on September 4, 2015.

As a result of the Reverse Split, every seven shares of issued and outstanding common stock will be combined into one share of issued and outstanding common stock. In addition, the Reverse Split will effect a proportionate adjustment to the per share exercise price and the number of shares issuable upon the exercise or settlement of all outstanding options and warrants to purchase shares of the Company's common stock, and the number of shares reserved for issuance pursuant to the Company's existing stock option plans will be reduced proportionately. No fractional shares will be issued as a result of the Reverse Split, and stockholders who otherwise would be entitled to a fractional share will receive, in lieu thereof, a cash payment based on the closing sale price of the Company's common stock as reported on the Nasdaq Capital Market on September 3, 2015. Because the Amendment does not reduce the number of authorized shares of the Company's common stock, the effect of the Amendment will be to increase the number of shares of common stock available for issuance relative to the number of shares issued and outstanding. The Reverse Split will not alter the par value of the Company's common stock or modify any voting rights or other terms of the common stock.

A copy of the Amendment, as filed with the Secretary of State of the State of Delaware on September 3, 2015, is attached hereto as Exhibit 3.1.

Section 9 — Financial Statements and Exhibits

Item 9.01. Financial Statements and Exhibits.

(d) Exhibits.

Exhibit Number Description

3.1 Certificate of Amendment to Restated Certificate of Incorporation.

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned hereunto duly authorized.

Dated: September 3, 2015

ARCA biopharma, Inc. (Registrant)

By:/s/ Christopher D. Ozeroff Name: Christopher D. Ozeroff

Title: Senior Vice President and General Counsel

INDEX TO EXHIBITS

Exhibit Number Description

3.1 Certificate of Amendment to Restated Certificate of Incorporation.

Exhibit 3.1

CERTIFICATE OF AMENDMENT

OF

AMENDED AND RESTATED CERTIFICATE OF INCORPORATION

OF

ARCA BIOPHARMA, INC.

ARCA biopharma, Inc., a corporation organized and existing under and by virtue of the General Corporation Law of the State of Delaware (the "DGCL"), does hereby certify:

First: The name of the corporation is ARCA biopharma, Inc. (the "Corporation").

Second: The date of filing of its original Certificate of Incorporation with the Secretary of State of the State of Delaware was March 16, 2004 under the name "Nuvelo Merger Sub, Inc."

Third:The Board of Directors (the "Board") of the Corporation, acting in accordance with the provisions of Sections 141 and 242 of the DGCL, adopted resolutions amending its Amended and Restated Certificate of Incorporation, as amended, as follows:

1.Article IV of the Amended and Restated Certificate of Incorporation of the Corporation is hereby amended to add the following provisions in their entirety to the existing provisions of Article IV:

"Effective at 5:01 p.m. Eastern time, on the date of the filing of this Certificate of Amendment to the Amended and Restated Certificate of Incorporation with the Secretary of State of the State of Delaware (the "Effective Time"), the shares of the Corporation's Common Stock, par value \$0.001 per share, issued and outstanding immediately prior to the Effective Time and the shares of Common Stock issued and held in the treasury of the Corporation immediately prior to the Effective Time shall be combined into a smaller number of shares such that each 7 shares of issued and outstanding Common Stock immediately prior to the Effective Time are combined into one validly issued, fully paid and nonassessable share of Common Stock, par value \$0.001 per share. Notwithstanding the immediately preceding sentence, no fractional shares shall be issued and, in lieu thereof, upon surrender after the Effective Time of a certificate which formerly represented shares of Common Stock that were issued and outstanding immediately prior to the Effective Time, any person who would otherwise be entitled to a fractional share of Common Stock as a result of the combination, following the Effective Time (after taking into account all fractional shares of Common Stock otherwise issuable to such holder), shall be entitled to receive a cash payment equal to the fraction to which such holder would otherwise be entitled multiplied by the fair value of the Common Stock on the date of the Effective Time, as determined by the Board of Directors.

Each stock certificate that, immediately prior to the Effective Time, represented shares of Common Stock that were issued and outstanding immediately prior to the Effective Time shall, from and after the Effective Time, automatically and without the necessity of presenting the same for exchange, represent that number of whole shares of Common Stock after the Effective Time into which the shares of Common Stock formerly represented by such certificate shall have been combined (as well as the right to receive cash in lieu of fractional shares of Common Stock after the

Effective Time), provided however, that each person of record holding a certificate that represented shares of Common Stock that were issued and outstanding immediately prior to the Effective Time shall receive, upon surrender of such certificate, a new certificate evidencing and representing the number of whole shares of Common stock after the Effective Time into which the shares of Common Stock formerly represented by such certificate shall have been combined."

Fourth:Thereafter, pursuant to a resolution by the Board, this Certificate of Amendment was submitted to the stockholders of the Corporation for their approval in accordance with the provisions of Section 211 and 242 of the DGCL. Accordingly, said proposed amendment has been adopted in accordance with Section 242 of the DGCL.

In Witness Whereof, ARCA biopharma, Inc. has caused this Certificate of Amendment to be signed by its duly authorized officer this 3rd day of September, 2015.

ARCA biopharma, Inc.

By: /s/ Christopher D. Ozeroff Christopher D. Ozeroff