

ARCA biopharma, Inc.  
Form 424B4  
June 23, 2015

Prospectus Supplement No. 39      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, 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, Supplement 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 and Supplement No. 37, 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 June 23, 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.

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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 June 23, 2015, the last reported sale price of our common stock was \$0.96 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 22 of our quarterly report on Form 10-Q for the period ended March 31, 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 June 23, 2015

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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))

Item 5.07. Submission of Matters to a Vote of Security Holders.

On June 22, 2015, ARCA biopharma, Inc. (the “Company”) held its 2015 Annual Meeting of Stockholders at which the Company’s stockholders voted upon (i) the election of Company nominees Dr. Raymond L. Woosley and Mr. Dan J. Mitchell, to the Company’s Board of Directors (the “Board”), each for a three-year term ending at the 2018 Annual Meeting of Stockholders, (ii) the ratification of the selection of KPMG LLP as the Company’s independent registered public accounting firm for the fiscal year ending December 31, 2015 and (iii) the authorization of the Company’s Board of Directors to, for a period of up to one-year, file an amendment to the Company’s restated certificate of incorporation to effect a reverse split of the Company’s Common Stock at a ratio in the range of 3:1 to 20:1, if, in the Board’s judgment, it is deemed necessary.

The stockholders elected both director nominees, ratified the selection of KPMG LLP as the Company’s independent registered public accounting firm for the fiscal year ending December 31, 2015 and approved the reverse split of the Company’s Common Stock. The tabulation of votes cast with respect to each matter voted upon, as applicable, was as follows:

1. Election of Directors:

Nominee	For	Withheld	Broker Non-Votes
Raymond L. Woosley, M.D.	4,376,739	760,164	8,673,293
Dan J. Mitchell	4,392,953	743,950	8,673,293

2. Ratification of the selection of KPMG LLP as the Company’s independent registered public accounting firm for the fiscal year ending December 31, 2015:

For	Against	Abstentions	Broker Non-Votes
13,416,737	270,533	122,926	—

3. Approval of a series of certificates of amendment to the Company's Restated Certificate of Incorporation, as amended, to effect a reverse split of the Company's outstanding common stock, pursuant to which any whole number of outstanding shares between, and including, three and twenty would be combined into one share of common stock and to authorize the Company's Board of Directors to select and file one such certificate of amendment and abandon the other certificates of amendment, or to abandon all such certificates of amendment as permitted under Section 242(c) of the Delaware General Corporation Law, to be determined by the Board of Directors within one year of approval:

For	Against	Abstentions	Broker Non-Votes
10,756,399	2,851,719	202,078	—



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: June 23, 2015

ARCA biopharma, Inc.  
(Registrant)

By: /s/ Christopher D. Ozeroff  
Name: Christopher D. Ozeroff  
Title: Senior Vice President and General Counsel