

ARCA biopharma, Inc.  
Form 424B4  
July 19, 2013  
Prospects Supplement No. 2

Filed pursuant to Rule 424 (b)(4)

(to Prospectus dated May 30, 2013)

Registration No. 333-187508

**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"), which forms 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 Supplement No. 1 with the information contained in our current reports on Form 8-K, each filed with the Securities and Exchange Commission (the "Commission") on June 18, 2013 and July 1, 2013 (the "Current Reports"). Accordingly, we have attached the Current Reports to this prospectus supplement.

The Prospectus, Supplement No. 1 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 Supplement No. 1. This prospectus supplement updates and supplements the information in the Prospectus and Supplement No. 1. If there is any inconsistency between the information in the Prospectus, Supplement No. 1 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 July 19, 2013, the last reported sale price of our common stock was \$1.41 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 23 of our quarterly report on Form 10-Q for the quarterly period ended March 31, 2013 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 July 19, 2013

**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): June 18, 2013 (June 13, 2013)**

**ARCA biopharma, Inc.**

**(Exact Name of Registrant as Specified in Charter)**

**Delaware**  
**(State or Other Jurisdiction**

**of Incorporation)**

**000-22873**  
**(Commission**

**File Number)**

**8001 Arista Place, Suite 430, Broomfield, CO 80021**

**36-3855489**  
**(I.R.S. Employer**

**Identification No.)**

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(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))

**Item 5.02 Departure of Directors or Certain Officers; Election of Directors; Appointment of Certain Officers; Compensatory Arrangements of Certain Officers.***Bonuses, Base Salaries and Restoration of Severance*

On June 13, 2013, the Board of Directors (the **Board**) of ARCA biopharma, Inc. (the **Company**), upon the recommendation of the Compensation Committee (the **Committee**) of the Board, approved cash bonuses (the **Bonuses**) for each of the executive officers of the Company in the amounts, set forth below, payable on or around June 28, 2013. The Board also approved, upon the recommendation of the Committee, the base salaries for the Company's named executive officers (as defined in Item 402(a)(3) of Regulation S-K promulgated by the Securities and Exchange Commission), in each case as set forth below.

Name and Title	2013	
	Cash Bonus	Base Salary
Michael R. Bristow President and Chief Executive Officer	\$ 70,000	\$ 272,950
Patrick M. Wheeler Chief Financial Officer	\$ 60,000	\$ 265,000
Christopher D. Ozeroff Senior Vice President, General Counsel	\$ 35,000	\$ 266,770

The Board, upon the recommendation of the Committee, determined the Bonuses are to be paid in recognition of the past efforts of each of the executives and, in the case of Dr. Bristow and Mr. Ozeroff, increased the salaries to levels that were in place prior to the executive officers' voluntary salary reductions which were implemented to save the Company's available capital. In the case of Mr. Wheeler, in addition to the increase of his salary to the level that was in place prior to the executive officers' voluntary salary reductions which were implemented to save the Company's available capital, his salary was increased by an additional \$43,550. The new base salaries will become effective on June 24, 2013.

The Board, upon the recommendation of the Committee, also approved the grant of severance packages for Dr. Bristow, Mr. Wheeler and Mr. Ozeroff which would require the Company to make severance payments, in an amount equal to 6 months of their respective base salaries, to each of the foregoing executive officers of the Company in the event their employment is terminated under certain situations.

**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 18, 2013

**ARCA biopharma, Inc.**

(Registrant)

By: /s/ Christopher D. Ozeroff

Name: Christopher D. Ozeroff

Title: Senior Vice President and General Counsel

**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): July 1, 2013 (June 28, 2013)**

**ARCA biopharma, Inc.**

**(Exact Name of Registrant as Specified in Charter)**

**Delaware**  
**(State or Other Jurisdiction**

**of Incorporation)**

**000-22873**  
**(Commission**

**File Number)**

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(720) 940-2200

(Registrant's telephone number, including area code)

**Not Applicable**

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- .. Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

**Section 7 - Regulation FD**

**Item 7.01 - Regulation FD Disclosure**

The information in this report furnished pursuant to Item 7.01 shall not be deemed filed for the purposes of Section 18 of the Securities and Exchange Act of 1934, as amended (the Exchange Act), or otherwise subject to the liabilities of that section. It may be incorporated by reference in another filing under the Exchange Act or the Securities Act of 1933, as amended, only if such subsequent filing specifically references the information furnished pursuant to Item 7.01 of this report.

As previously disclosed, ARCA biopharma, Inc. ( ARCA ) closed its public offering of 125,000 shares of Series A Convertible Preferred Stock ( Preferred Stock ) on June 4, 2013. Each share of Preferred Stock is convertible into 100 shares of the Company's Common Stock at any time at the option of the holder; provided, that the holder will be prohibited from converting to the extent that, as a result of such conversion, the holder, together with its affiliates, would beneficially own more than 9.99% of the total number of shares of the Company's Common Stock then issued and outstanding. As a result of Preferred Stock conversions completed since the close of the financing, as of June 28, 2013, ARCA had 10,096,162 shares of common stock outstanding and 55,894 shares of preferred stock outstanding.

**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: July 1, 2013

**ARCA biopharma, Inc.**

(Registrant)

By: /s/ Patrick Wheeler

Name: Patrick Wheeler

Title: Chief Financial Officer