

ARCA biopharma, Inc.
Form 424B4
April 14, 2015

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

Prospectus Supplement No. 34

(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), and by that certain Prospectus Supplement No. 33 dated April 13, 2015 (Supplement No. 33), 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, and Supplement No. 32, 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 Definitive Proxy Statement on Schedule 14A, filed with the Securities and Exchange Commission (the Commission) on April 14, 2015 (the Definitive Proxy). Accordingly, we have attached the Definitive Proxy 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 April 14, 2015, the last reported sale price of our common stock was \$0.91 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 15 of our annual report on Form 10-K for the period ended December 31, 2014 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 April 14, 2015

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

SCHEDULE 14A
(Rule 14a-101)
INFORMATION REQUIRED IN PROXY STATEMENT
SCHEDULE 14A INFORMATION
Proxy Statement Pursuant to Section 14(a) of the
Securities Exchange Act of 1934

Filed by the Registrant

Filed by a Party other than the Registrant

Check the appropriate box:

- Preliminary Proxy Statement
- Confidential, for Use of the Commission Only (as permitted by Rule 14a-6(e)(2))**
- Definitive Proxy Statement
- Definitive Additional Materials
- Soliciting Material Pursuant to § 240.14a-12

ARCA BIOPHARMA, INC.

(Name of Registrant as Specified In Its Charter)

(Name of Person(s) Filing Proxy Statement if other than the Registrant)

Payment of Filing Fee (Check the appropriate box)

- x No fee required.
- .. Fee computed on table below per Exchange Act Rules 14a-6(i)(1) and 0-11.
 - 1. Title of each class of securities to which transaction applies:

 - 2. Aggregate number of securities to which transaction applies:

 - 3. Per unit price or other underlying value of transaction computed pursuant to Exchange Act Rule 0-11 (Set forth the amount on which the filing fee is calculated and state how it was determined):

 - 4. Proposed maximum aggregate value of transaction:

 - 5. Total fee paid:

 - .. Fee paid previously with preliminary materials.

 - .. Check box if any part of the fee is offset as provided by Exchange Act Rule 0-11(a)(2) and identify the filing for which the offsetting fee was paid previously. Identify the previous filing by registration statement number, or the Form or Schedule and the date of its filing.

 - 6. Amount Previously Paid:

 - 7. Form, Schedule or Registration Statement No.:

8. Filing Party:

9. Date Filed:

ARCA BIOPHARMA, INC.

11080 CirclePoint Road, Suite 140

Westminster, Colorado 80020

April 14, 2015

Dear Stockholders of ARCA biopharma, Inc.:

You are cordially invited to attend the Annual Meeting of Stockholders of ARCA biopharma, Inc., a Delaware corporation (the "Company" or "ARCA"). The meeting will be held on Thursday, June 4, 2015 at 9:00 a.m. local time at the Renaissance Boulder Flatiron Hotel, 500 Flatiron Boulevard, Broomfield, CO 80021.

The matters scheduled to be considered at the meeting are (1) to elect the Board's nominees, Dr. Raymond L. Woosley and Mr. Dan J. Mitchell, to the Board of Directors to hold office until the 2018 Annual Meeting of Stockholders, (2) to ratify the selection by the Audit Committee of the Board of Directors of KPMG LLP ("KPMG") as the independent registered public accounting firm of the Company for its fiscal year ending December 31, 2015, (3) to approve amendments to the Company's restated certificate of incorporation, as amended, and authorize the Company's Board of Directors, if in their judgment it is necessary, to select and file one such amendment to effect a reverse stock split of the Company's Common Stock, at a ratio in the range of 3:1 to 20:1, such ratio to be determined at the discretion of the Board of Directors, and (4) to conduct any other business properly brought before the meeting. These items of business are more fully described in this proxy statement that you are encouraged to read in its entirety.

In accordance with the Securities and Exchange Commission ("SEC") rule ("Notice and Access Rule") that allows companies to furnish their proxy materials (including the form of proxy, this proxy statement and our Annual Report on Form 10-K for the fiscal year ended December 31, 2014, filed with the SEC on March 19, 2015,) over the Internet, we intend to send a Notice of Internet Availability of Proxy Materials ("Notice") on or about April 24, 2015 to our stockholders of record as of April 6, 2015. We will also provide access to our proxy materials over the Internet by April 24, 2015. As a result of the Notice and Access Rule, all stockholders receiving the Notice have the ability to access the proxy materials over the Internet and request to receive a paper copy of the proxy materials by mail. Instructions on how to access the proxy materials over the Internet or to request a paper copy may be found on the Notice. In addition, the Notice contains instructions on how stockholders may request to receive proxy materials electronically by e-mail.

All stockholders are cordially invited to attend the Annual Meeting in person. Whether or not you expect to attend the Annual Meeting, please vote, as instructed in the Notice of Internet Availability of Proxy Materials, via the Internet or the telephone, as promptly as possible in order to ensure your representation at the Annual Meeting. Alternatively, you may follow the procedures outlined in the Notice of Internet Availability of Proxy Materials to request a paper proxy card to submit your vote by mail. Even if you have voted by proxy, you may still vote in person if you attend the Annual Meeting. Please note, however, that if your shares are held of record by a broker, bank or other agent and you wish to vote at the Annual Meeting, you must obtain a proxy issued in your name from that record holder.

Sincerely,

/s/ Christopher Ozeroff
Christopher Ozeroff

Secretary, Senior Vice President and General
Counsel

ARCA BIOPHARMA, INC.

11080 CirclePoint Road, Suite 140

Westminster, Colorado 80020

NOTICE OF ANNUAL MEETING OF STOCKHOLDERS

TO BE HELD ON JUNE 4, 2015

Notice is hereby given that the Annual Meeting of Stockholders (the Annual Meeting) of ARCA biopharma, Inc., a Delaware corporation (the Company or ARCA) will be held on Thursday, June 4, 2015 at 9:00 a.m. local time at the Renaissance Boulder Flatiron Hotel, 500 Flatiron Boulevard, Broomfield, CO 80021 for the following purposes:

1. To elect the Board's nominees, Dr. Raymond L. Woosley and Mr. Dan J. Mitchell, to the Board of Directors to hold office until the 2018 Annual Meeting of Stockholders.
2. To ratify the selection by the Audit Committee of the Board of Directors of KPMG LLP as independent registered public accounting firm of the Company for its fiscal year ending December 31, 2015.
3. To approve amendments to the Company's restated certificate of incorporation, as amended, and authorize the Board of Directors, if in their judgment it is necessary, to select and file one such amendment to effect a reverse stock split of our common stock, at a ratio in the range of 3:1 to 20:1, such ratio to be determined at the discretion of the Board of Directors.
4. To conduct any other business properly brought before the meeting.

These items of business are more fully described in the proxy statement accompanying this Notice.

The record date for the Annual Meeting is April 6, 2015. Only stockholders of record at the close of business on that date may vote at the meeting or any adjournment thereof.

By Order of the Board of Directors:

/s/ Christopher Ozeroff
Christopher Ozeroff
Secretary, Senior Vice President and General
Counsel

WESTMINSTER, CO

APRIL 14, 2015

Pursuant to the Internet proxy rules promulgated by the Securities and Exchange Commission, the Company has elected to provide access to its proxy materials over the Internet. Accordingly, stockholders of record at the close of business on April 6, 2015 will receive a Notice of Internet Availability of Proxy Materials and may vote at the Annual Meeting and any adjournment or postponement thereof. The Company expects to mail the Notice of Internet Availability of Proxy Materials on or about April 24, 2015.

All stockholders are cordially invited to attend the Annual Meeting in person. Whether or not you expect to attend the Annual Meeting, please vote, as instructed in the Notice of Internet Availability of Proxy Materials, via the Internet or the telephone, as promptly as possible in order to ensure your representation at the annual meeting. Alternatively, you may follow the procedures outlined in the Notice of Internet Availability of Proxy Materials to request a paper proxy card to submit your vote by mail. Even if you have voted by proxy, you may still vote in person if you attend the Annual Meeting. Please note, however, that if your shares are held of record by a broker, bank or other agent and you wish to vote at the Annual Meeting, you must obtain a proxy issued in your name from that record holder.

ARCA BIOPHARMA, INC.

11080 CirclePoint Road, Suite 140

Westminster, Colorado 80020

PROXY STATEMENT

FOR THE 2015 ANNUAL MEETING OF STOCKHOLDERS

JUNE 4, 2015

This proxy statement (this Proxy Statement) is being furnished to holders of ARCA biopharma, Inc. (sometimes referred to as the Company, ARCA, we, us, and our) common stock, par value \$0.001 per share (the Common Proxies are being solicited on behalf of the Board of Directors of ARCA (the Board of Directors) to be used at the Annual Meeting of Stockholders (the Annual Meeting) to be held on Thursday, June 4, 2015 at 9:00 a.m. local time at the Renaissance Boulder Flatiron Hotel, 500 Flatiron Boulevard, Broomfield, CO 80021 and at any postponement or adjournment thereof, for the purposes set forth in the Notice of Annual Meeting of Stockholders.

ARCA is using the Securities and Exchange Commission (the SEC) rule that allows companies to furnish their proxy materials over the Internet. As a result, we intend to mail to our stockholders a Notice of Internet Availability of Proxy Materials (the Notice) instead of a paper copy of the proxy materials (including the form of proxy, this Proxy Statement and our Annual Report on Form 10-K for the fiscal year ended December 31, 2014, filed with the SEC on March 19, 2015 (the 2014 Annual Report), collectively, the Proxy Materials) on or about April 24, 2015. We will also provide access to our Proxy Materials over the Internet by April 24, 2015. By furnishing the Notice to our stockholders of record, you ***will not*** receive a printed copy of the Proxy Materials in the mail. Instead, the Notice instructs you on how to access and review all of the important information contained in the Proxy Statement and Annual Report electronically or to receive a printed version in the mail. The Notice also instructs you on how you may submit your proxy over the Internet, by toll-free number or in person at the Annual Meeting. Subsequent to receiving the Notice, all stockholders have the ability to access the Proxy Materials over the Internet and request to receive a paper copy of the Proxy Materials by mail. Instructions on how to access the Proxy Materials over the Internet or to request a paper copy may be found on the Notice. In addition, the Notice contains instructions on how stockholders may request to receive Proxy Materials electronically by e-mail.

All stockholders may view and print ARCA's proxy statement and the 2014 Annual Report, which are available at www.arcabiopharma.com.

QUESTIONS AND ANSWERS ABOUT THESE PROXY MATERIALS AND VOTING

Why did I receive a notice regarding the availability of the Proxy Materials on the Internet?

As described above, pursuant to rules adopted by the SEC, we have elected to provide access to the Proxy Materials over the Internet. Accordingly, on or about April 24, 2015, we expect to send the Notice to ARCA's stockholders of record. The Board of Directors is soliciting your proxy to vote at the Annual Meeting. All stockholders will have the ability to access the Proxy Materials on the website referred to in the Notice or request to receive a printed or electronic set of the Proxy Materials. Instructions on how to access the Proxy Materials over the Internet or to request a printed copy may be found in the Notice.

How do I attend the Annual Meeting?

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The meeting will be held on Thursday, June 4, 2015 at 9:00 a.m. local time at the Renaissance Boulder Flatiron Hotel, 500 Flatiron Boulevard., Broomfield, CO 80021. Directions to the Annual Meeting may be found at www.arcabiopharma.com. Information on how to vote in person at the Annual Meeting is discussed below.

1.

Who can vote at the Annual Meeting?

Only stockholders of record at the close of business on April 6, 2015 will be entitled to vote at the Annual Meeting. On this record date, there were 21,198,411 shares of Common Stock outstanding and entitled to vote.

Stockholder of Record: Shares Registered in Your Name

If, on April 6, 2015, your shares of our Common Stock were registered directly in your name with ARCA's transfer agent, Computershare Trust Company N.A., then you are a stockholder of record. As a stockholder of record, you may vote in person at the meeting or vote by proxy. Whether or not you plan to attend the meeting, we urge you to vote by proxy over the telephone or on the Internet as instructed below or return the proxy card we may mail to you to ensure your vote is counted.

Beneficial Owner: Shares Registered in the Name of a Broker or Bank

If, on April 6, 2015, your shares of our Common Stock were held, not in your name, but rather in an account at a brokerage firm, bank, dealer, or other similar organization, then you are the beneficial owner of shares held in street name and the Notice is being forwarded to you by that organization. The organization holding your account is considered to be the stockholder of record for purposes of voting at the Annual Meeting. As a beneficial owner, you have the right to direct your broker or other agent regarding how to vote the shares in your account. You are also invited to attend the Annual Meeting. However, since you are not the stockholder of record, you may not vote your shares in person at the meeting unless you request and obtain a valid proxy from your broker or other agent.

What am I voting on?

There are three matters scheduled for a vote:

Election of two directors;

Ratification of selection by the Audit Committee of the Board of Directors of KPMG as independent registered public accounting firm of the Company for its fiscal year ending December 31, 2015;

Approval of amendments to the Company's restated certificate of incorporation, as amended, and authorization of the Company's Board of Directors, if in their judgment it is necessary, to select and file one such amendment to effect a reverse stock split of the Company's Common Stock, at a ratio in the range of 3:1 to 20:1, such ratio to be determined at the discretion of the Board of Directors.

What if another matter is properly brought before the meeting?

The Board of Directors knows of no other matters that will be presented for consideration at the Annual Meeting. If any other matters are properly brought before the meeting, it is the intention of the persons named in the accompanying proxy to vote on those matters in accordance with their best judgment.

How do I vote?

You may either vote For all the nominees to the Board of Directors or you may Withhold your vote for any nominee you specify. For all other matters to be voted on, you may vote For or Against or abstain from voting. The procedures

for voting are fairly simple:

Stockholder of Record: Shares Registered in Your Name

If you are a stockholder of record, you may vote in person at the Annual Meeting, vote by proxy over the telephone, vote by proxy through the Internet or vote by proxy using a proxy card that you may request or that we may elect to deliver at a later time. Whether or not you plan to attend the meeting, we urge you to vote by proxy to

2.

ensure your vote is counted. You may still attend the meeting and vote in person even if you have already voted by proxy.

To vote in person, come to the Annual Meeting and we will give you a ballot when you arrive.

To vote using the proxy card, simply complete, sign and date the proxy card that may be delivered and return it promptly in the envelope provided. If you return your signed proxy card to us before the Annual Meeting, we will vote your shares as you direct.

To vote over the telephone, dial toll-free **1-800-652-VOTE (8683)** using a touch-tone phone and follow the recorded instructions. You will be asked to provide the company number and control number from the Notice. Your vote must be received by 1:00 a.m. Mountain Time on June 4, 2015 to be counted.

To vote through the Internet, go to **<http://www.investorvote.com/ABIO>** to complete an electronic proxy card. You will be asked to provide the company number and control number from the Notice. Your vote must be received by 1:00 a.m. Mountain Time on June 4, 2015 to be counted.

Beneficial Owner: Shares Registered in the Name of Broker or Bank

If you are a beneficial owner of shares registered in the name of your broker, bank, or other agent, you should have received a Notice containing voting instructions from that organization rather than from ARCA. Simply follow the voting instructions in the Notice to ensure that your vote is counted. To vote in person at the Annual Meeting, you must obtain a valid proxy from your broker, bank, or other agent. Follow the instructions from your broker or bank included with these proxy materials, or contact your broker or bank to request a proxy form.

We provide internet proxy voting to allow you to vote your shares online, with procedures designed to ensure the authenticity and correctness of your proxy vote instructions. However, please be aware that you must bear any costs associated with your access to the Internet, such as usage charges from internet access providers and telephone companies.

How many votes do I have?

On each matter to be voted upon, you have one vote for each share of Common Stock you owned as of April 6, 2015.

What if I return a proxy card or otherwise vote but do not make specific choices?

If you return a signed and dated proxy card or otherwise vote without marking voting selections, your shares will be voted, as applicable, For the election of both nominees for director, For the ratification of KMPG as the Company's independent registered public accounting firm for the fiscal year 2015 and For our proposed reverse stock split of the Company's Common Stock at a ratio in the range of 3:1 to 20:1. If any other matter is properly presented at the meeting, your proxy holder (one of the individuals named on your proxy card) will vote your shares using his or her best judgment.

Who is paying for this proxy solicitation?

We will pay for the entire cost of soliciting proxies. In addition to these proxy materials, the directors and employees may also solicit proxies in person, by telephone, or by other means of communication. Directors and employees will not be paid any additional compensation for soliciting proxies. We may also reimburse brokerage firms, banks and other agents for the cost of forwarding proxy materials to beneficial owners.

What does it mean if I receive more than one Notice?

If you receive more than one Notice, your shares may be registered in more than one name or in different accounts. Please follow the voting instructions on each Notice to ensure that all of your shares are voted.

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Can I change my vote after submitting my proxy?

Yes. You can revoke your proxy at any time before the final vote at the meeting. If you are the record holder of your shares, you may revoke your proxy in any one of the following ways:

You may submit another properly completed proxy card with a later date.

You may grant a subsequent proxy by telephone or through the Internet.

You may send a timely written notice that you are revoking your proxy to ARCA's Secretary at 11080 CirclePoint Road, Suite 140, Westminster, Colorado, 80020.

You may attend the Annual Meeting and vote in person. Simply attending the meeting will not, by itself, revoke your proxy.

Your most current proxy card or telephone or internet proxy is the one that is counted.

If your shares are held by your broker or bank as a nominee or agent, you should follow the instructions provided by your broker or bank.

When are stockholder proposals due for next year's annual meeting?

To be considered for inclusion in next year's proxy materials, your proposal must be submitted in writing by December 25, 2015, to ARCA's Secretary at 11080 CirclePoint Road, Suite 140, Westminster, Colorado, 80020. If you wish to submit a proposal that is not to be included in next year's proxy materials or nominate a director, you must do so by no earlier than March 6, 2016 and no later than April 5, 2016. You are also advised to review the Company's Bylaws, which contain additional requirements about advance notice of stockholder proposals and director nominations.

How are votes counted?

Votes will be counted by the inspector of election appointed for the meeting. For Proposal 1, to elect new directors, votes For and Withhold will be counted. For Proposals 2 and 3, to approve KMPG as the Company's independent registered public accounting firm for the fiscal year 2015 and the certificates of amendment to the Company's Restated Certificate of Incorporation to effect a reverse stock split of the Company's Common Stock at a ratio in the range of 3:1 to 20:1, votes For and Against, abstentions and broker non-votes will be counted. Abstentions will be counted towards the vote total for Proposals 2 and 3, and will have the same effect as Against votes. Broker non-votes have no effect and will not be counted towards the vote total for any proposal.

What are broker non-votes ?

Broker non-votes occur when a beneficial owner of shares held in street name does not give instructions to the broker or nominee holding the shares as to how to vote. Generally, if shares are held in street name, the beneficial owner of the shares is entitled to give voting instructions to the broker or nominee holding the shares. If the beneficial owner does not provide voting instructions, the broker or nominee can still vote the shares with respect to matters that are considered to be routine, but not with respect to non-routine matters. Under the rules and interpretations of the New

York Stock Exchange (NYSE), non-routine matters are matters that may substantially affect the rights or privileges of shareholders, such as mergers, shareholder proposals and elections of directors, even if not contested.

How many votes are needed to approve each proposal?

Proposal No. 1, for the election of directors. For this proposal, the two nominees receiving the most For votes (from the holders of votes of shares present in person or represented by proxy and entitled to vote on the election of directors) will be elected. Only votes For or Withheld votes will affect the outcome. Broker non-votes will have no effect.

Proposal No. 2, to ratify the selection of KPMG LLP as the Company s independent registered public accounting firm for fiscal year 2015. This proposal must receive For votes from the holders of a majority

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of shares present and entitled to vote either in person or by proxy. If you Abstain from voting, it will have the same effect as an Against vote. Broker non-votes will have no effect.

Proposal No. 3, to approve the Amendments to the Company's Restated Certificate of Incorporation, as Amended. The affirmative vote of a majority of the Company's outstanding Common Stock is required to pass this proposal to approve the amendments of the Company's restated certificate of incorporation, as amended, and authorize the Board of Directors, if in their judgment it is necessary, to select and file one such amendment to effect a reverse stock split of the Company's Common Stock at a ratio in the range of 3:1 to 20:1, such ratio to be determined at the discretion of the Board of Directors. Brokerage firms have authority to vote their customers' unvoted shares held by the firms in street name on this proposal. If a broker does not exercise this authority, such broker non-votes, as well as any abstentions, will be treated as votes against this proposal.

What is the quorum requirement?

A quorum of stockholders is necessary to hold a valid meeting. A quorum will be present if stockholders holding a majority of the outstanding shares of Common Stock entitled to vote are present at the meeting in person or represented by proxy. On the record date, April 6, 2015, there were 21,198,411 shares of Common Stock outstanding and entitled to vote. Thus, the holders of 10,599,206 shares of Common Stock must be present in person or represented by proxy at the meeting to have a quorum.

Your shares will be counted towards the quorum only if you submit a valid proxy (or one is submitted on your behalf by your broker, bank or other nominee) or if you vote in person at the meeting. Abstentions and broker non-votes will be counted towards the quorum requirement. If there is no quorum, the holders of a majority of shares present at the meeting in person or represented by proxy may adjourn the meeting to another date.

How can I find out the results of the voting at the Annual Meeting?

Preliminary voting results will be announced at the Annual Meeting. In addition, final voting results will be published in a current report on Form 8-K that we expect to file within four business days after the Annual Meeting. If final voting results are not available to us in time to file a Form 8-K within four business days after the meeting, we intend to file a Form 8-K to publish preliminary results and, within four business days after the final results are known to us, file an additional Form 8-K to publish the final results.

EXPLANATORY NOTE

The Company, a Delaware Corporation formerly known as Nuvelo, Inc., completed a merger transaction on January 27, 2009, with ARCA biopharma, Inc., a Delaware Corporation (ARCA Colorado), in which ARCA Colorado shareholders acquired a majority of the outstanding stock of the Company, and ARCA Colorado became a subsidiary of the Company. The Company then changed its name to ARCA biopharma, Inc. These transactions are referred to herein as the merger. Unless the context otherwise requires or as otherwise stated herein, all references herein to the Company, ARCA, we, us and our refer to ARCA Colorado prior to the completion of the merger and to ARCA biopharma, Inc. following the completion of the merger and the name change, and all references to Nuvelo refer to Nuvelo, Inc. prior to the completion of the merger and the name change.

NO PERSON IS AUTHORIZED TO GIVE ANY INFORMATION OR TO MAKE ANY REPRESENTATION OTHER THAN THOSE CONTAINED IN THIS PROXY STATEMENT, AND, IF GIVEN OR MADE, SUCH INFORMATION MUST NOT BE RELIED UPON AS HAVING BEEN AUTHORIZED. THE DELIVERY OF THIS PROXY STATEMENT SHALL, UNDER NO CIRCUMSTANCES, CREATE ANY IMPLICATION THAT THERE HAS BEEN NO CHANGE IN THE AFFAIRS OF ARCA SINCE THE DATE OF THIS

PROXY STATEMENT.

5.

PROPOSAL 1

ELECTION OF BOARD OF DIRECTORS

The Company's Amended and Restated Certificate of Incorporation provides that the Board of Directors is divided into three classes to provide for staggered terms and that each director will serve for a term of three years or less, depending on the class to which the Board of Directors has assigned a director not previously elected by the stockholders. There are currently no vacancies on the Board. Vacancies on the Board may be filled only by persons elected by a majority of the remaining directors. A director elected by the Board to fill a vacancy in a class, including vacancies created by an increase in the number of directors, shall serve for the remainder of the full term of that class and until the director's successor is duly elected and qualified. The Company may reduce or increase the size of the Board by resolution adopted by the affirmative vote of a majority of the directors.

There are currently two Class II directors whose terms expire at the annual stockholders' meeting in 2017, one Class I director, whose term expires at the annual stockholders' meeting in 2016, and two Class III directors, whose terms expire at the annual stockholders' meeting in 2015. The Board of Directors has nominated two Class III directors, Dr. Raymond L. Woosley and Mr. Dan J. Mitchell, for election to the Board of Directors, each for a three-year term ending on the date of the annual meeting in 2018 or until a successor is duly elected and qualified or appointed.

If elected at the Annual Meeting, each of these nominees would serve until the 2018 annual meeting and until his or her successor has been duly elected and qualified, or, if sooner, until the director's death, resignation or removal. It is the Company's policy to encourage directors and nominees for director to attend the Annual Meeting. Three of the Company's directors then on the Board attended the 2014 Annual Meeting of Stockholders in person, and two attended by telephone.

Directors are elected by a plurality of the votes of the holders of shares present in person or represented by proxy and entitled to vote on the election of directors. The two nominees receiving the highest number of affirmative votes will be elected. Each person nominated for election has agreed to serve if elected. The Company's management has no reason to believe that any nominee will be unable to serve.

Director Qualifications and Diversity

The below paragraphs provide information as of the date of this proxy statement about each nominee and current members of the Board of Directors, including age, all positions currently held, principal occupation and business experience for the past five years. In addition to the information presented regarding each nominee's specific experience, qualifications, attributes and skills that led the Board to conclude that such director or nominee should be able to serve as a director, the Board also believes that all of the directors and nominees have a reputation of integrity, honesty and adherence to high ethical standards. They each have demonstrated business acumen and an ability to exercise sound judgment as well as a commitment to service to ARCA and the Board.

Our Nominating and Corporate Governance Committee considers diversity in the director identification and nomination process. The Nominating and Corporate Governance Committee seeks nominees with a broad diversity of experience, professions, skills, geographic representation and backgrounds. Such Committee does not assign specific weights to particular criteria and no particular criterion is necessarily applicable to all prospective nominees. ARCA believes that the backgrounds and qualifications of the directors, considered as a group, should provide a significant composite mix of experience, knowledge and abilities that will allow the Board to fulfill its responsibilities. Nominees are not discriminated against on the basis of race, religion, national origin, sexual orientation, disability or any other basis proscribed by law.

6.

NOMINEES FOR ELECTION FOR A THREE-YEAR TERM EXPIRING AT THE 2018 ANNUAL MEETING

THE BOARD OF DIRECTORS RECOMMENDS

A VOTE IN FAVOR OF EACH NAMED NOMINEE.

Raymond L. Woosley, M.D., Ph.D.

Dr. Woosley, age 72, was appointed to the ARCA Board of Directors in July 2013. Dr. Woosley is currently the President Emeritus, of the Critical Path Institute (C-Path), a non-profit, public-private partnership with the Federal Food and Drug Administration, of which he was a founder in November 2004, and where he served as President, Chief Executive Officer and Chairman of the Board from 2005 to 2011. Since 2012, Dr. Woosley has also been the Director of CredibleMeds Worldwide, an independent, nonprofit research and education organization. Since 2001, Dr. Woosley has also been a Professor of Medicine and Pharmacology at The University of Arizona Health Sciences Center (UAHSC), and, since 2012, Professor Emeritus, where he was also Vice President for Health Sciences from 2001 to 2005, and Dean of the College of Medicine from 2001 to 2002. From 1988 to 2001, Dr. Woosley was a professor of medicine at the Georgetown University School of Medicine, where he was also Director of the Institute of Cardiovascular Sciences from 1994 to 2000, and Division Chief, Clinical Pharmacology, in the Department of Medicine from 1988 to 1994. Dr. Woosley earned his Ph.D. in Pharmacology from the University of Louisville and his M.D. from the University of Miami. Dr. Woosley's research has been published in over 265 peer-reviewed publications and 50 book chapters. Dr. Woosley is an appropriate member of the Company's Board of Directors, given his expertise and experience in cardiovascular clinical pharmacology, anti-arrhythmic therapeutics, pharmacogenetic drug development and therapeutic regulatory approval.

Dan J. Mitchell

Mr. Mitchell, age 58, was appointed to the ARCA Board of Directors in February 2014. He founded and is a manager of Sequel Venture Partners, L.L.C., a venture capital firm formed in January 1997. Prior to founding Sequel Venture Partners, Mr. Mitchell was a founder of Capital Health Venture Partners, a health care focused venture capital firm, where he was a General Partner from October 1986 until 2006, and he was in the Venture Capital Division of the Trust Department of the First National Bank of Chicago from 1983 to 1985. He currently serves on the board of directors of GlobeImmune, Inc., a publicly traded biopharmaceutical company, and several private companies. Mr. Mitchell holds a B.S. from the University of Illinois and an M.B.A. from the University of California at Berkeley. Mr. Mitchell is an appropriate member of the Company's Board of Directors given his expertise and experience in the pharmaceutical industry, pharmaceutical development, and in corporate finance and governance.

DIRECTOR CONTINUING IN OFFICE UNTIL THE 2016 ANNUAL MEETING

Linda Grais, M.D.

Dr. Grais, age 58, has served as a member of the Company's Board of Directors since the merger with Nuvelo in January 2009. Before the merger, Dr. Grais had served as a director of ARCA Colorado since May 2007. Dr. Grais has been a director of Ocera Therapeutics, Inc., a public biopharmaceutical company, since January 2008 and became President and Chief Executive Officer of Ocera in June 2012. Dr. Grais served as a Managing Member at InterWest Partners, a venture capital firm from May 2005 until February 2011. From July 1998 to July 2003, Dr. Grais was a founder and executive vice president of SGX Pharmaceuticals Inc., a drug discovery company. Prior to that, she was a corporate attorney at Wilson Sonsini Goodrich & Rosati, where she practiced in such areas as venture financings, public offerings and strategic partnerships. Before practicing law, Dr. Grais worked as an assistant clinical professor of Internal Medicine and Critical Care at the University of California, San Francisco. Dr. Grais received a B.A. from Yale University, magna cum laude, and Phi Beta Kappa, an M.D. from Yale Medical School and a J.D. from Stanford

Law School. Dr. Grais is an appropriate member of the Company's Board of Directors because of her diverse training and experience as both a medical doctor and a lawyer, her experience as a founder and senior executive of a pharmaceutical company, and her experience as an investor in new life sciences companies. She also has extensive experience with and knowledge of the Company's business from her service on the Board of ARCA Colorado since 2007, and her service as a Board and Committee member for the Company since January 2009.

7.

DIRECTORS CONTINUING IN OFFICE UNTIL THE 2017 ANNUAL MEETING

Michael R. Bristow, M.D., Ph.D.

Dr. Bristow, age 70, has served as the Company's President and Chief Executive Officer since July 2009. Prior to that time, Dr. Bristow served as the Company's Chief Science and Medical Officer and a director since the merger with Nuvelo. Dr. Bristow was one of the founders of ARCA Colorado in September 2004, and served as its Chairman and Chief Executive Officer from that date until he was appointed to the position of Chief Science and Medical Officer in November 2006. Dr. Bristow is a Professor of Medicine and the former Head of Cardiology at the University of Colorado Health Sciences Center, where he has been since October 1991. Dr. Bristow was one of the founders of Myogen, Inc. and served as Myogen's Chief Science and Medical Officer from October 1996 to February 2006 and as a Scientific Advisor to Myogen from February 2006 until the acquisition of Myogen by Gilead Sciences, Inc. in November 2006. Dr. Bristow is an appropriate member of the Company's Board of Directors given his extensive experience and expertise as a cardiologist, medical researcher and drug developer in the field of cardiovascular medicine, and heart failure specifically, and his experience as a founder and manager of cardiovascular-focused, public pharmaceutical company. Dr. Bristow also has extensive experience with, and knowledge of, ARCA's business, as the founder and former Chief Science and Medical Officer of ARCA Colorado, and the current President and Chief Executive Officer of ARCA, and as a Board member of ARCA Colorado since 2005, and of the Company since January 2009.

Robert E. Conway

Mr. Conway, age 61, was appointed to the ARCA Board of Directors in September 2013. Mr. Conway served as the Chief Executive Officer and member of the Board of Directors of Array Biopharma, a publicly traded pharmaceutical company, from 1999 to 2012. Prior to joining Array, Mr. Conway was the Chief Operating Officer and Executive Vice President of Hill Top Research, Inc., from 1996 to 1999. From 1979 until 1996, Mr. Conway held various executive positions for Corning Inc. including Corporate Vice President and General Manager of Corning Hazleton, Inc., a contract research organization. From 2004 to 2013, he served on the Boards of Directors of PRA International, Inc., which was a public company for a portion of his tenure there, and eResearch Technology, Inc., a private company. Mr. Conway serves as the Chairman of Wall Family Enterprise, a leading library and educational supplies company. In addition, Mr. Conway is a member of the Strategic Advisory Committee of Genstar Capital, LLC. Mr. Conway received a B.S. in accounting from Marquette University in 1976. He is an appropriate nominee to the Company's Board of Directors given his experience and expertise in the pharmaceutical industry, in pharmaceutical development and clinical trials, and in corporate finance, governance, accounting and public company compliance.

INFORMATION REGARDING THE BOARD OF DIRECTORS AND CORPORATE GOVERNANCE

INDEPENDENCE OF THE BOARD OF DIRECTORS

As required under the Nasdaq Stock Market (Nasdaq) listing standards, a majority of the members of a listed company's Board of Directors must qualify as independent, as affirmatively determined by the Board of Directors. The Board consults with the Company's counsel to ensure that the Board's determinations are consistent with relevant securities and other laws and regulations regarding the definition of independent, including those set forth in pertinent listing standards of the Nasdaq, as in effect from time to time.

Consistent with these considerations, after review of all relevant identified transactions or relationships between each director, or any of his or her family members, and the Company, its senior management and its independent registered public accounting firm, the Board has affirmatively determined that the following four directors are independent directors within the meaning of the applicable Nasdaq listing standards: Mr. Conway, Dr. Grais, Mr. Mitchell and Dr. Woosley. In making this determination, the Board found that none of the directors or nominees for director had a

material or other disqualifying relationship with the Company. Dr. Bristow, the

8.

Company's President and Chief Executive Officer is not an independent director by virtue of his relationship with the Company.

BOARD LEADERSHIP STRUCTURE

The Company has structured its Board of Directors in a way that the Company believes effectively serves its objectives of corporate governance and management oversight. The Company separates the roles of CEO and Chairman of the Board in recognition of the differences between the two roles. The Company believes that the CEO should be responsible for the day to day leadership and performance of the Company, while the Chairman of the Board should work with the CEO and the rest of the Board to set the strategic direction for the Company and provide guidance to, and oversight of the CEO. The Chairman also sets the agenda for Board meetings and presides over them.

Mr. Conway, who is an independent director, was elected Chairman of the Board in 2014. In this capacity, Mr. Conway, among other things, calls and presides over Board meetings, including meetings of the independent directors, and sets meeting agendas. In this role, Mr. Conway can effectively coordinate between the Board and management regarding risk management issues and the implementation of appropriate responses, and can help ensure the effective independent functioning of the Board in its oversight responsibilities. Accordingly, the Chairman has substantial ability to shape the work of the Board.

ROLE OF THE BOARD IN RISK OVERSIGHT AND RISK MANAGEMENT

One of the Board's key functions is informed oversight of the Company's risk management process. The Board does not have a standing risk management committee, but rather administers this oversight function directly through the Board as a whole, as well as through various Board standing committees that address risks inherent in their respective areas of oversight. In particular, while the Board is responsible for monitoring and assessing strategic risk exposure, the audit committee has the responsibility to consider and discuss the major financial risk exposures and the steps management has taken to monitor and control these exposures, including guidelines and policies to govern the process by which risk assessment and management is undertaken. The audit committee also monitors compliance with legal and regulatory requirements, in addition to oversight of the performance of ARCA's accounting and financial reporting processes. The nominating and corporate governance committee monitors the effectiveness of the corporate governance guidelines, including whether they are successful in preventing illegal or improper liability-creating conduct. The compensation committee assesses and monitors whether any compensation policies and programs have the potential to encourage excessive risk-taking. The entire Board and its committees address risk management issues from time-to-time and at least annually meet with the employees responsible for risk management in the committees respective areas of oversight. Both the Board as a whole and the various standing committees receive periodic reports from the employees responsible for risk management, as well as incidental reports as matters may arise. It is the responsibility of the committee chairs to report findings regarding material risk exposures to the Board as quickly as possible.

MEETINGS OF THE BOARD OF DIRECTORS

The Board of Directors met six times during the 2014 fiscal year. The independent members of the Board met separately as a group in connection with each of the four regularly scheduled board meetings in 2014.

INFORMATION REGARDING COMMITTEES OF THE BOARD OF DIRECTORS

The Board has three standing committees: an Audit Committee, a Compensation Committee, and a Nominating and Corporate Governance Committee. The following table provides membership and meeting information for fiscal year 2014, for each of the Board committees:

| Name | Audit | Compensation | Nominating and Corporate Governance |
|-------------------------------|-------|--------------|-------------------------------------|
| Dr. Michael R. Bristow | | | |
| Dr. Linda Grais (2) | X | X* | X |
| Dr. Raymond L. Woosley | X | X | X* |
| Mr. Robert E. Conway | X* | X | |
| Mr. Dan J. Mitchell (1) | X | | X |
| Total meetings in fiscal 2014 | 4 | 5 | 4 |

(1) On February 11, 2014, Mr. Mitchell joined the Board.

(2) On February 11, 2014, Ms. Grais resigned from the Audit Committee upon Mr. Mitchell's appointment.

* Current Committee Chairperson.

Below is a description of each committee of the Board of Directors. Each of the committees has authority to engage legal counsel or other experts or consultants, as it deems appropriate to carry out its responsibilities. The Board of Directors has determined that each member of each committee meets the applicable Nasdaq rules and regulations regarding independence and that each member is free of any relationship that would impair his or her individual exercise of independent judgment with regard to the Company.

Audit Committee

The Audit Committee of the Board of Directors was established by the Board in accordance with Section 3(a)(58)(A) of the Securities Exchange Act of 1934, as amended (the Exchange Act), to oversee the Company's corporate accounting and financial reporting processes and audits of its financial statements. For this purpose, the Audit Committee performs several functions. The Audit Committee evaluates the performance of and assesses the qualifications of the independent registered public accounting firm; determines and approves the engagement of the independent registered public accounting firm; determines whether to retain or terminate the existing independent registered public accounting firm or to appoint and engage a new independent registered public accounting firm; reviews and approves the retention of the independent registered public accounting firm to perform any proposed permissible non-audit services; monitors the rotation of partners of the independent registered public accounting firm on the Company's audit engagement team as required by law; reviews and approves or rejects transactions between the company and any related persons; confers with management and the independent registered public accounting firm regarding the effectiveness of internal controls over financial reporting; establishes procedures, as required under applicable law, for the receipt, retention and treatment of complaints received by the Company regarding accounting, internal accounting controls or auditing matters and the confidential and anonymous submission by employees of concerns regarding questionable accounting or auditing matters; and meets to review the Company's annual audited financial statements and quarterly financial statements with management and the independent registered public accounting firm, including a review of the Company's disclosures under Management's Discussion and Analysis of Financial Condition and Results of Operations. The Audit Committee is currently composed of three directors: Mr. Conway (chair), Mr. Mitchell and Dr. Woosley. The Audit Committee met four times during the fiscal year. The

Audit Committee has adopted a written charter that is available to stockholders on the Company's website at www.arcabiopharma.com.

The Board of Directors reviews the Nasdaq listing standards definition of independence for Audit Committee members on an annual basis and has determined that all members of the Company's Audit Committee are independent (as independence is currently defined in Rule 5605(c)(2)(A)(i) and (ii) of the Nasdaq listing standards). The Board of Directors has also determined that Mr. Conway qualifies as an audit committee financial expert, as defined in applicable SEC rules. The Board made a qualitative assessment of Mr. Conway's level of

knowledge and experience based on a number of factors, including his prior experience, business acumen and independence.

Report of the Audit Committee of the Board of Directors¹

The Audit Committee has reviewed and discussed the audited financial statements for the fiscal year ended December 31, 2014 with management of the Company. The Audit Committee has discussed with the independent registered public accounting firm the matters required to be discussed by Statement on Auditing Standards No. 61, as amended (AICPA, *Professional Standards*, Vol. 1, AU section 380), as adopted by the Public Company Accounting Oversight Board (PCAOB) in Rule 3200T. The Audit Committee has also received the written disclosures and the letter from the independent registered public accounting firm required by applicable requirements of the PCAOB regarding the independent registered public accounting firm s communications with the audit committee concerning independence, and has discussed with the independent registered public accounting firm the accounting firm s independence. Based on the foregoing, the Audit Committee has recommended to the Board of Directors that the audited financial statements be included in the Company s Annual Report on Form 10-K for the fiscal year ended December 31, 2014.

Mr. Robert Conway

Mr. Dan Mitchell

Dr. Raymond Woosley

Compensation Committee

The Compensation Committee is currently composed of three directors: Mr. Robert Conway, Dr. Linda Grais (chair) and Dr. Raymond Woosley. All members of the Compensation Committee are independent, as independence is currently defined in Rule 5605(a)(2) of the Nasdaq listing standards. The Compensation Committee met five times during the fiscal year. The Compensation Committee has adopted a written charter that is available to stockholders on the Company s website at www.arcabiopharma.com.

The Compensation Committee of the Board of Directors acts on behalf of the Board to review, adopt and oversee the Company s compensation strategy, policies, plans and programs, including:

- overseeing succession planning for senior management of the Company, including a review of the performance and advancement potential of current and future senior management and succession plans for each and recommending, as appropriate, the retention of potential succession candidates;

- assessing the overall compensation structure of the Company and evaluating and recommending changes to the Company s compensation philosophies and strategies;

- reviewing and approving performance-based compensation plans or programs, including establishing goals and targets, applicable to the Chief Executive Officer and other members of the management team;

administering, reviewing, and approving all executive compensation programs or plans, and all of the Company's incentive compensation and stock plans and awards thereunder of the Company, including amendments to the programs, plans or awards made thereunder; and

preparing and approving the Report of the Compensation Committee to be included as part of the Company's annual meeting proxy statement, to the extent required.

- ¹ The material in this report is not soliciting material, is not deemed filed with the Commission and is not to be incorporated by reference in any filing of the Company under the Securities Act of 1933, as amended, or the Exchange Act, whether made before or after the date hereof and irrespective of any general incorporation language in any such filing.

Compensation Committee Processes and Procedures

Typically, the Compensation Committee meets on a regular basis as it deems appropriate. The agenda for each meeting is usually developed by the Chair of the Compensation Committee. The Compensation Committee meets regularly in executive session. However, from time to time, various members of management and other employees as well as outside advisors or consultants may be invited by the Compensation Committee to make presentations, to provide financial or other background information or advice or to otherwise participate in Compensation Committee meetings. The Chief Executive Officer may not participate in, or be present during, any deliberations or determinations of the Compensation Committee regarding his compensation or individual performance objectives. The Compensation Committee has the sole authority to retain compensation consultants to assist in its evaluation of executive and director compensation, including the authority to approve the consultant's reasonable fees and other retention terms.

In June 2013, the Company's Compensation Committee reviewed the Company's executive compensation in light of general market conditions in the life science industry. As part of this review process, the Compensation Committee identified a peer group of biotechnology companies that it viewed as having a similar profile to ARCA at that time. This peer group included Alexza Pharmaceuticals, Affymax, Amicus Therapeutics, Inc., Palatin Technologies, Inc., Celsion Corp., NovaBay Pharmaceuticals, Galena Biopharma, Inc., Northwest Biotherapeutics, Inc., and Discovery Laboratories, Inc.

In setting 2014 base salary and cash bonus award amounts for the ARCA Named Executive Officers, the Compensation Committee analyzed the peer group data and targeted cash compensation in the 50th percentile of cash compensation paid to similarly situated executive officers within the peer group. The Board recommended and approved a base salary of \$281,139 for Dr. Bristow, a base salary of \$265,975 for Mr. Wheeler and a base salary of \$274,773 for Mr. Ozeroff for the fiscal year 2014. In early 2015, the Board recommended and approved two percent increases to executive officer salaries for the fiscal year 2015. The Compensation Committee recommended and the Board approved bonuses based on previous performance for the ARCA Named Executive Officers.

Historically, the Compensation Committee has made most of the significant adjustments to annual compensation, determined bonus and equity awards and established new performance objectives at one or more meetings held during the first quarter of the year. However, the Compensation Committee also considers matters related to individual compensation, such as compensation for new executive hires, as well as high-level strategic issues, such as the efficacy of the Company's compensation strategy, potential modifications to that strategy and new trends, plans or approaches to compensation, at various meetings throughout the year. Generally, the Compensation Committee's process comprises two related elements: the determination of compensation levels and the establishment of performance objectives for the current year.

The Committee reviews and approves the compensation of the Chief Executive Officer and the other executive officers of the Company, including annual base salaries, annual and long-term incentive or bonus awards, employment agreements, and severance and change in control agreements/provisions, in each case as, when and if appropriate, and any special or supplemental benefits. For executives other than the Chief Executive Officer, the Compensation Committee solicits and considers evaluations and recommendations submitted to the Committee by the Chief Executive Officer. The Committee evaluates the performance of the Chief Executive Officer in light of Company and individual goals and objectives, and makes appropriate recommendations for improving performance. In performing the evaluation, the Chair of the Committee may solicit comments from the other non-employee members of the Board and lead the Board in an overall review of the Chief Executive Officer's performance in an executive session of non-employee Board members. If the compensation for the Chief Executive Officer or any other executive officer is governed by an employment agreement, the Committee approves such employment agreement and any amendments thereto.

12.

For all executives as part of its deliberations, the Compensation Committee may review and consider, as appropriate, materials such as financial reports and projections, operational data, tax and accounting information, tally sheets that set forth the total compensation that may become payable to executives in various hypothetical scenarios, executive and director stock ownership information, company stock performance data, analyses of historical executive compensation levels and current Company-wide compensation levels.

Nominating and Corporate Governance Committee

The Nominating and Corporate Governance Committee of the Board of Directors is responsible for identifying, reviewing and evaluating candidates to serve as directors of the Company (consistent with criteria approved by the Board), reviewing and evaluating incumbent directors, recommending to the Board candidates for election to the Board of Directors, making recommendations to the Board regarding compensation for Board and Committee service, making recommendations to the Board regarding the membership of the committees of the Board, assessing the performance of the Board and developing a set of corporate governance principles for the Company. The Nominating and Corporate Governance Committee is currently composed of three directors, Dr. Grais, Mr. Mitchell and Dr. Woosley (chair). All members of the Nominating and Corporate Governance Committee in 2014 were independent (as independence is currently defined in Rule 5605(a)(2) of the Nasdaq listing standards). The Nominating and Corporate Governance Committee met four times during the 2014 fiscal year. The Nominating and Corporate Governance Committee has adopted a written charter that is available to stockholders on the Company's website and www.arcabiopharma.com.

The Board has adopted a process for identifying and evaluating director nominees, including stockholder nominees. Before recommending an individual to the Board for Board membership, the Nominating and Corporate Governance Committee canvasses its members and the Company's management team for potential candidates for the Board of Directors. The Nominating and Corporate Governance Committee also uses its network of contacts to identify potential candidates and, if it deems appropriate, may also engage a professional search firm. The Nominating and Corporate Governance Committee will consider stockholders' recommendations for nominees to serve as director if notice is timely received by the Secretary of the Company. Candidates nominated by stockholders will be evaluated in the same manner as other candidates. The Nominating and Corporate Governance Committee keeps the Board apprised of its discussions with potential nominees, and the names of potential nominees received from its current directors, management, and stockholders, if the stockholder notice of nomination is timely made.

Although the Board has not adopted a fixed set of minimum qualifications for candidates for Board membership, the Nominating and Corporate Governance Committee generally considers several factors in its evaluation of a potential member, such as the candidate's education, professional background and field of expertise including industry or academic experience in the pharmaceutical and biotechnology fields, experience in corporate governance and management, the reasonable availability of the potential member to devote time to the affairs of the Company, as well as any other criteria deemed relevant by the Board or the Nominating and Corporate Governance Committee. However, the Nominating and Corporate Governance Committee retains the right to modify these qualifications from time to time. Candidates for director nominees are reviewed in the context of the current composition of the Board, the operating requirements of the Company and the long-term interests of stockholders. In conducting this assessment, the Nominating and Corporate Governance Committee typically considers diversity, age, skills and such other factors as it deems appropriate given the current needs of the Board and the Company, to maintain a balance of knowledge, experience and capability. The Nominating and Corporate Governance Committee believes it is essential that Board members come from a variety of backgrounds and experiences.

In the case of incumbent directors whose terms of office are set to expire, the Nominating and Corporate Governance Committee reviews these directors' overall contributions to the Company and the Board during their terms, including level of attendance, level of participation, quality of performance and contribution to the Board's responsibilities and actions, and any relationships and transactions that might impair the directors' independence. In the case of new

director candidates, the Nominating and Corporate Governance Committee also determines whether the nominee is independent for Nasdaq and SEC purposes, which determination is based upon applicable Nasdaq listing standards, applicable SEC rules and regulations and the advice of counsel, if necessary. The Nominating and Corporate Governance Committee conducts any appropriate and necessary inquiries into the backgrounds and qualifications of possible candidates after considering the function and needs of the Board. The Nominating and

Corporate Governance Committee meets to discuss and consider the candidates' qualifications and then determines whether to recommend a nominee to the Board by majority vote.

Stockholders who wish to recommend individuals for consideration by the Nominating and Corporate Governance Committee to become nominees for election to the Board of Directors may do so by delivering a written recommendation to the Nominating and Corporate Governance Committee addressed to the Corporate Secretary, between 60 and 90 days before the one year anniversary date of ARCA's last Annual Meeting of Stockholders. Recommendations must include the full name of the proposed nominee, a description of the proposed nominee's business experience for at least the previous five years, complete biographical information, a description of the proposed nominee's qualifications as a director, and a representation that the recommending stockholder is a beneficial or record owner of ARCA's stock. Any such submission must be accompanied by the written consent of the proposed nominee to be named as a nominee and to serve as a director if elected. To date, the Nominating and Corporate Governance Committee has not rejected a timely director nominee from a stockholder.

In 2014, the Nominating and Corporate Governance Committee did not pay any fees to assist in the process of identifying or evaluating director candidates.

STOCKHOLDER COMMUNICATIONS WITH THE BOARD OF DIRECTORS

Stockholders who wish to communicate with the Board may do so by e-mail by using the following email address: directors@arcabiopharma.com; or by mail by following the directions as set forth on ARCA's website at www.arcabiopharma.com, under the section titled "Corporate Governance" and the subsection titled "Governance Documents".

CODE OF BUSINESS CONDUCT AND ETHICS

The Company has adopted the ARCA biopharma, Inc. Code of Business Conduct and Ethics that applies to all officers, directors and employees. The Code of Business Conduct and Ethics is available on the Company's website at www.arcabiopharma.com. If the Company makes any substantive amendments to the Code of Business Conduct and Ethics or grants any waiver from a provision of the Code of Business Conduct and Ethics to any executive officer or director, the Company will promptly disclose the nature of the amendment or waiver on its website and file any current report on Form 8-K required by applicable law or Nasdaq listing standards.

PROPOSAL 2**RATIFICATION OF SELECTION OF THE INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM**

The Audit Committee of the Board of Directors has selected KPMG LLP (KPMG) as the Company's independent registered public accounting firm for the fiscal year ending December 31, 2015 and has further directed that management submit the selection of the independent registered public accounting firm for ratification by the stockholders at the Annual Meeting. KPMG has audited the Company's fiscal year financial statements since 2009. Representatives of KPMG are expected to be present at the Annual Meeting. They will have an opportunity to make a statement if they so desire and will be available to respond to appropriate questions.

Neither the Company's Bylaws nor other governing documents or law require stockholder ratification of the selection of KPMG as the Company's independent registered public accounting firm. However, the Board is submitting the selection of KPMG to the stockholders for ratification as a matter of good corporate practice. If the stockholders fail to ratify the selection, the Audit Committee of the Board will reconsider whether or not to retain that firm. Even if the selection is ratified, the Audit Committee of the Board in its discretion may direct the appointment of a different independent registered public accounting firm at any time during the year if they determine that such a change would be in the best interests of the Company and its stockholders.

The affirmative vote of the holders of a majority of the shares present in person or represented by proxy and entitled to vote at the Annual Meeting will be required to ratify the selection of KPMG LLP. Broker non-votes are counted towards a quorum, but are not counted for any purpose in determining whether this matter has been approved.

PRINCIPAL ACCOUNTANT FEES AND SERVICES

The following table represents aggregate fees billed, or expected to be billed, to the Company for the fiscal year ended December 31, 2014 and December 31, 2013 by KPMG, the Company's independent registered public accounting firm.

| | Fiscal Year Ended 2014 | Fiscal Year Ended 2013 |
|--------------------|-----------------------------------|-----------------------------------|
| Audit Fees (1) | \$ 140,760 | \$ 195,080 |
| Audit-related Fees | | |
| Tax Fees | | |
| All Other Fees | | |
| Total Fees | \$ 140,760 | \$ 195,080 |

- (1) Audit Fees include fees for the (i) audit of the financial statements included in our Form 10-K for our fiscal years ended December 31, 2014 and December 31, 2013, (ii) review of interim financial statements included on Forms 10-Q and (iii) attest, consent and review services normally provided by the accountant in connection with SEC filings.

All fees described above were approved by the Audit Committee.

PRE-APPROVAL POLICIES AND PROCEDURES

The above services performed by the independent registered public accounting firm were pre-approved in accordance with the pre-approval policy and procedures adopted by the Audit Committee. This policy describes the permitted audit, audit-related, tax, and other services that the independent registered public accounting firm may perform. The policy also requires that the independent registered public accounting firm provide in writing:

15.

an annual description of all relationships between the independent registered public accounting firm and the client that may reasonably be thought to bear on independence;

confirm that, in the independent registered public accounting firm's professional judgment, the independent registered public accounting firm is independent of the client under SEC requirements;

discuss with the Audit Committee the independent registered public accounting firm's independence and the potential effects on its independence of performing any non-audit related services.

The services expected to be performed by the independent registered public accounting firm during the subsequent fiscal year are presented to the Audit Committee for pre-approval. Any pre-approval must describe, in writing, the particular service or category of services.

Requests for audit, audit-related, tax, and other services not contemplated by those pre-approved services must be submitted to the Audit Committee for specific pre-approval. Generally, pre-approval is considered at the Audit Committee's regularly scheduled meetings. However, the authority to grant specific pre-approval between meetings, as necessary, has been delegated to the chairman of the Audit Committee. In the event that the chairman is not available, the other two Audit Committee members together have the authority to grant specific pre-approval between meetings. The chairman or the other members must update the Audit Committee at the next regularly scheduled meeting of any services that were granted specific pre-approval.

The report of the independent registered public accounting firm, KPMG, on the financial statements of the Company for the year ended December 31, 2014, included in Item 8. Financial Statements and Supplementary Data of our Form 10-K, filed with the SEC on March 19, 2015, states that the Company's recurring losses from operations, dependence upon raising additional funds from strategic transactions, sales of equity, and/or issuance of debt, and the uncertainty surrounding the Company's ability to consummate such transactions, raise substantial doubt about the Company's ability to continue as a going concern. KPMG's report on the consolidated financial statements for the past two years contained no adverse opinion or disclaimer of opinion and was not qualified as to audit scope or accounting principles.

The Audit Committee pre-approved all audit related, tax and other services rendered in 2014 and did not rely on the waiver of pre-approval requirement provided by paragraph (c)(7)(i)(C) of Rule 2-01 of Regulation S-X promulgated under the Exchange Act.

THE BOARD OF DIRECTORS RECOMMENDS

A VOTE IN FAVOR OF PROPOSAL 2.

PROPOSAL 3

APPROVAL OF CERTIFICATES OF AMENDMENT TO THE COMPANY'S

RESTATED CERTIFICATE OF INCORPORATION TO EFFECT A REVERSE STOCK SPLIT

Introduction

The Board has adopted a resolution approving, and recommending to the Company's stockholders for their approval, a series of proposed certificates of amendment to the Company's Restated Certificate of Incorporation (as amended, the Restated Certificate of Incorporation) to effect a reverse split of the shares of the Company's Common Stock at a ratio ranging from 3:1 to 20:1 (the Reverse Stock Split). The texts of the forms of the proposed certificates of amendment to the Restated Certificate of Incorporation are annexed to this proxy statement as Annexes A-1 to A-18. Assuming the stockholders approve the proposal, the Board will have the sole discretion under Section 242(c) of the General Corporation Law of the State of Delaware (the DGCL), as it determines to be in the best interest of the Company and its stockholders, both to select the specific exchange ratio within the designated range of 3:1 to 20:1 and also to decide whether or not to proceed to effect a Reverse Stock Split or instead to abandon the proposed certificates of amendment altogether. If a certificate of amendment is filed with the Secretary of State of the State of Delaware, the certificate of amendment to the Restated Certificate of Incorporation will effect the Reverse Stock Split by reducing the outstanding number of shares of the Company's Common Stock by the ratio to be determined by the Board, but will not increase the par value of the Company's Common Stock, and will not change the number of authorized shares of the Company's Common Stock. If the Board does not implement an approved Reverse Stock Split prior to the one-year anniversary of this meeting, the Board will seek stockholder approval before implementing any Reverse Stock Split after that time.

By approving Proposal No. 3 and the Reverse Stock Split, stockholders will approve each of a series of certificates of amendment to the Restated Certificate of Incorporation pursuant to which any whole number of outstanding shares, between and including three and twenty, would be combined into one share of the Company's Common Stock, and authorize the Board to file only one such certificate of amendment, as determined by the Board in the manner described herein, and to abandon each certificate of amendment not selected by the Board. If approved, the Board may also elect not to effect any Reverse Stock Split and consequently not to file any certificate of amendment to the Restated Certificate of Incorporation. The Board believes that stockholder approval of the series of certificates of amendment granting the Board this discretion, rather than approval of a specified exchange ratio, provides the Board with maximum flexibility to react to then-current market conditions and, therefore, is in the best interests of the Company and its stockholders.

The Company's Nasdaq Listing Compliance

The Company's Common Stock is listed on the Nasdaq Capital Market under the symbol ABIO. To maintain a listing on the Nasdaq Capital Market, the Company must satisfy the applicable listing maintenance standards established by Nasdaq. Among other things, the Company is required to comply with the continued listing requirements of the Nasdaq Capital Market (the Nasdaq Capital Requirements). To comply with such requirements, the Company must substantially meet each of the following requirements:

a minimum bid price of at least \$1.00 per share;

Stockholders' Equity of at least \$2.5 Million, or a total market value of listed securities of at least \$35 million;

Publicly held shares of at least 500,000;

Market value of publicly held securities of \$1 Million; and

At least 300 beneficial holders and holders of record of its Common Stock.

Currently, the Company meets the Nasdaq Capital Requirements, except the \$1.00 minimum bid price. Assuming the stockholders approve Proposal No. 3, the Board will determine whether to effect a Reverse Stock Split in the range of 3:1 to 20:1, at the ratio determined by the Board to be most likely sufficient to allow the Company to meet and maintain the \$1.00 minimum bid price requirement.

Reasons for the Reverse Stock Split

On February 18, 2015, Nasdaq notified us that the bid price of our Common Stock had closed below the required \$1.00 per share for 30 consecutive trading days, and, accordingly, that we did not comply with the applicable Nasdaq minimum bid price requirement. We have been provided 180 calendar days by Nasdaq to regain compliance with this requirement. The Company may be eligible for an additional 180 day extension from Nasdaq.

The Board has considered the potential harm to us of a delisting of the Company's Common Stock and has determined that, if the Company's Common Stock continues to trade below \$1.00 per share, the consummation of the Reverse Stock Split is the best way to maintain liquidity by achieving compliance with the Nasdaq Capital Requirements. Approval of Proposal No. 3 will permit us to file one certificate of amendment to the Restated Certificate of Incorporation and the certificate of amendment filed thereby will contain the number of shares selected by the Board within the limits set forth in Proposal No. 3 to be combined into one share of Common Stock.

The Board also believes that the current low per share market price of the Company's Common Stock has a negative effect on the marketability of the Company's existing shares. The Board believes there are several reasons for this effect. First, certain institutional investors have internal policies preventing the purchase of low-priced stocks. Second, a variety of policies and practices of broker-dealers discourage individual brokers within those firms from dealing in low-priced stocks. Third, because the brokers' commissions on low-priced stocks generally represent a higher percentage of the stock price than commissions on higher priced stocks, the current share price of the Company's Common Stock can result in individual stockholders paying transaction costs (commissions, markups or markdowns) that are a higher percentage of their total share value than would be the case if the share price of the Common Stock were substantially higher. This factor is also believed to limit the willingness of some institutions to purchase the Common Stock. The Board anticipates that a Reverse Stock Split will result in a higher bid price for the Company's Common Stock, which may help to alleviate some of these problems.

If Proposal No. 3 is approved by the holders of the Company's Common Stock and the Board decides to implement the Reverse Stock Split, the Board will determine the ratio of the Reverse Stock Split, in the range of 3:1 to 20:1, as determined in the judgment of the Board to be most likely sufficient to allow us to achieve and maintain compliance with the minimum \$1.00 per share requirement for listing on the Nasdaq Capital Market for the longest period of time while retaining sufficient number of outstanding, tradeable shares to facilitate an adequate market. By way of illustration, assuming a per share price of \$0.70 immediately prior to the filing of the appropriate certificate of amendment to the Restated Certificate of Incorporation, the Board may determine that we should effect a 3:1 or 20:1 reverse stock split, with the goal of achieving a bid price of \$2.10 or \$14.00 per share, respectively. Please refer to the section entitled "Effects of the Reverse Stock Split" below for more detailed examples of the effects of the range of ratios.

We believe that maintaining listing on the Nasdaq Capital Market will provide us with a market for the Common Stock that is more accessible than if the Company's Common Stock were traded on the OTC Bulletin Board or in the "pink sheets" maintained by the OTC Markets Group, Inc. Such alternative markets are generally considered to be less efficient than, and not as broad as, the Nasdaq Capital Market. Among other factors, trading on the Nasdaq Capital Market increases liquidity and may potentially minimize the spread between the bid and asked prices quoted by Market Makers. Further, a Nasdaq Capital Market listing may enhance our access to capital, increase our flexibility in responding to anticipated capital requirements and facilitate the use of our Common Stock in any strategic or financing transactions that it may undertake. We believe that prospective investors will view an investment in the Company more favorably if our shares qualify for listing on the Nasdaq Capital Market as compared with the OTC markets.

We expect that a Reverse Stock Split of our Common Stock will increase the market price of the Common Stock so that we are able to maintain compliance with the Nasdaq minimum bid price listing standard. However, the effect of a

Reverse Stock Split on the market price of the Common Stock cannot be predicted with any certainty, and the history of similar stock split combinations for companies in like circumstances is varied. It is possible that the per share price of the Common Stock after the Reverse Stock Split will not rise in proportion to the reduction in the number of shares of the Common Stock outstanding resulting from the Reverse Stock Split, effectively reducing our market capitalization, and there can be no assurance that the market price per post-reverse split share will either exceed or remain in excess of the \$1.00 minimum bid price for a sustained period of time. The market price of the Company's Common Stock may vary based on other factors that are unrelated to the number of shares outstanding, including the Company's future performance.

In order to maintain the listing on the Nasdaq Capital Market, the Company must maintain a minimum market value of listed securities of at least \$1 million and a minimum market value of Publicly Held Shares of \$1 million. The Company, in addition to other listing requirements, must also maintain a minimum Stockholders' Equity value of at least \$2.5 million. As of December 31, 2014, the Company's market value of listed securities was \$20,169,103, our market value of Publicly Held Shares was \$19,647,664 and our Stockholders' Equity was \$14,741,000. Even if we meet the bid price requirement, if we are unable to comply with the other Nasdaq Capital Requirements, Nasdaq may determine to delist the Company's Common Stock from the Nasdaq Capital Market.

The Board does not intend for this transaction to be the first step in a series of plans or proposals of a going private transaction within the meaning of Rule 13e-3 of the Exchange Act.

Board Discretion to Implement the Reverse Stock Split

If the Board determines to effect the Reverse Stock Split, it will consider certain factors in selecting the specific exchange ratio, including prevailing market conditions, the trading price of the Common Stock and the steps that we will need to take in order to achieve compliance with the bid price requirement and other listing regulations of the Nasdaq Capital Market. Based in part on the price of the Common Stock on the days leading up to the filing of the certificate of amendment to the Restated Certificate of Incorporation effecting the Reverse Stock Split, the Board will determine the ratio of the Reverse Stock Split, in the range of 3:1 to 20:1, that, in the judgment of the Board, is the reverse split ratio most likely to allow us to achieve and maintain compliance with the minimum \$1.00 per share requirement for listing on the Nasdaq Capital Market for the longest period of time, while retaining a sufficient number of outstanding, tradeable shares to facilitate an adequate market.

Notwithstanding approval of the Reverse Stock Split by the stockholders, the Board may, in its sole discretion, abandon all of the proposed certificates of amendment and determine prior to the effectiveness of any filing with the Secretary of State of the State of Delaware not to effect the Reverse Stock Split prior to the one year anniversary of this Special Meeting of stockholders, as permitted under Section 242(c) of the DGCL. If the Board fails to implement any of the certificates of amendment prior to the one year anniversary of this meeting of stockholders, stockholder approval would again be required prior to implementing any Reverse Stock Split.

Consequences if Stockholder Approval for Proposal Is Not Obtained

If stockholder approval for Proposal No. 3 is not obtained, we will not be able to file a certificate of amendment to the Restated Certificate of Incorporation to effect the Reverse Stock Split. Unless the bid price for the Common Stock increases to greater than \$1.00 for ten consecutive business days prior to August 17, 2015, then we will not meet the listing requirements for the Nasdaq Capital Market. If compliance is not achieved by August 17, 2015, and Nasdaq does not grant the Company an additional 180 day extension, then our stock would be delisted from the Nasdaq Capital Market. If we were unable to qualify for the additional compliance period, or if we were unable to regain compliance during any such period, the Common Stock would likely be transferred to the OTC Bulletin Board or OTC Market.

If we fail to meet all applicable Nasdaq Capital Requirements and Nasdaq determines to delist the Common Stock, the delisting could adversely affect the market liquidity of the Common Stock and the market price of the Common Stock could decrease. Delisting could also adversely affect our ability to obtain financing for the continuation of our operations and/or result in the loss of confidence by investors, suppliers, commercial partners and employees. In addition, the limited number of authorized shares of the Common Stock that are neither outstanding nor reserved for issuance could adversely affect the ability of us to raise capital through equity financings.

Effects of the Reverse Stock Split

The following table sets forth the number of shares of the Company's Common Stock that would be outstanding immediately after the Reverse Stock Split at various exchange ratios, based on the 21,150,486 shares of Common Stock outstanding as of December 31, 2014. The table does not account for fractional shares that will be paid in cash.

Approximate Shares of

Common Stock

Outstanding

| Ratio of Reverse Stock Split | After Reverse Stock Split |
|------------------------------|---------------------------|
| None | 21,150,486 |
| 3:1 | 7,050,162 |
| 4:1 | 5,287,621 |
| 5:1 | 4,230,097 |
| 6:1 | 3,525,081 |
| 7:1 | 3,021,498 |
| 8:1 | 2,643,810 |
| 9:1 | 2,350,054 |
| 10:1 | 2,115,048 |
| 11:1 | 1,922,771 |
| 12:1 | 1,762,540 |
| 13:1 | 1,626,960 |
| 14:1 | 1,510,749 |
| 15:1 | 1,410,032 |
| 16:1 | 1,321,905 |
| 17:1 | 1,244,146 |
| 18:1 | 1,175,027 |
| 19:1 | 1,113,183 |
| 20:1 | 1,057,524 |

If a stockholder owns 10,000 shares of Common Stock prior to the Reverse Stock Split, after the Reverse Stock Split that same stockholder would own 3,333 shares in the case of a Reverse Stock Split at the ratio of 3:1, 2,500 shares in the case of a Reverse Stock Split at the ratio of 4:1, 2,000 shares in the case of a Reverse Stock Split at the ratio of 5:1, 1,666 shares in the case of a Reverse Stock Split at the ratio of 6:1, 1,428 shares in the case of a Reverse Stock Split at the ratio of 7:1, 1,250 shares in the case of a Reverse Stock Split at the ratio of 8:1, 1,111 shares in the case of a Reverse Stock Split at the ratio of 9:1, 1,000 shares in the case of a Reverse Stock Split at the ratio of 10:1, 909 shares in the case of a Reverse Stock Split at the ratio of 11:1, 833 shares in the case of a Reverse Stock Split at the ratio of 12:1, 769 shares in the case of a Reverse Stock Split at the ratio of 13:1, 714 shares in the case of a Reverse Stock Split at the ratio of 14:1, 666 shares in the case of a Reverse Stock Split at the ratio of 15:1, 625 shares in the case of a Reverse Stock Split at the ratio of 16:1, 588 shares in the case of a Reverse Stock Split at the ratio of 17:1, 555 shares in the case of a Reverse Stock Split at the ratio of 18:1, 526 shares in the case of a Reverse Stock Split at the ratio of 19:1, and 500 shares in the case of a Reverse Stock Split at the ratio of 20:1.

The lasting effect of the proposed Reverse Stock Split upon the market price for the Company's Common Stock cannot be predicted, and the history of similar reverse stock splits for companies in like circumstances is varied. We cannot assure you that the market price per new share of the Company's Common Stock after the

20.

Reverse Stock Split (which we refer to as "New Shares") will rise in proportion to the reduction in the number of old shares of the Company's Common Stock outstanding (which we refer to as "Old Shares") as a result of the Reverse Stock Split. We also cannot assure you that the market price per New Share will either exceed or remain in excess of the \$1.00 minimum bid price as required by the Nasdaq Capital Requirements, or that we will otherwise meet the requirements of Nasdaq for inclusion for trading on the Nasdaq Capital Market, including, for example, the applicable minimum market value requirements of the Nasdaq Capital Requirements. For instance, in 2013 we executed a reverse split of our Common Stock in order to maintain compliance with the Nasdaq Capital Requirements. We cannot assure you that another reverse split of our Common Stock will not be necessary in the future. The market price of the Company's Common Stock is dependent on our financial condition, performance, prospects and a number of other factors, many of which are unrelated to the number of shares outstanding. If our efforts to meet the Nasdaq Capital Requirements are unsuccessful, the Company's Common Stock would remain subject to delisting.

The liquidity of the Company's Common Stock could be adversely affected by the reduced number of shares that would be outstanding after the Reverse Stock Split, and the reduced number of shares may make it more difficult to trade shares of the Common Stock. In addition, the Reverse Stock Split will increase the number of the Company's stockholders who own odd lots (less than 100 shares). Stockholders who hold odd lots typically will experience an increase in the cost of selling their shares, as well as possible greater difficulty in effecting those sales.

The Reverse Stock Split will affect all of the Company's holders of Common Stock uniformly and will not affect any stockholder's percentage ownership interests in the Company or proportionate voting power, except to the extent that the Reverse Stock Split results in any of the Company's stockholders owning a fractional share, in which case such stockholders will receive a cash payment in lieu of such fractional share. The Company's issued Common Stock will remain fully paid and non-assessable.

The Reverse Stock Split will not affect the par value of the Company's Common Stock. As a result, upon the effectiveness of the Reverse Stock Split, the stated capital on the Company's balance sheet attributable to our Common Stock will be reduced proportionately based on the exchange ratio selected by the Board for the Reverse Stock Split, and the additional paid-in capital account will be credited with the amount by which the stated capital is reduced. The per share net income or loss and net book value of the Company's Common Stock will be increased because there will be fewer shares of the Company's Common Stock outstanding. In addition, proportionate adjustments will be made to the per share exercise price and the number of shares issuable upon the exercise or settlement of all outstanding options, restricted stock units and warrants to purchase or acquire, as applicable, shares of Common Stock of the Company, and the number of shares reserved for issuance pursuant to our existing equity incentive, stock option and employee stock purchase plans will be reduced proportionately based on the exchange ratio selected by the Board for the Reverse Stock Split.

The Reverse Stock Split will have no effect on the total number of shares of Common Stock the Company is authorized to issue under the Restated Certificate of Incorporation. Therefore, upon effectiveness of the Reverse Stock Split, the number of shares of Common Stock that are authorized and unissued will increase relative to the number of issued and outstanding shares. We may use the additional authorized and unissued shares of the Company's Common Stock resulting from the Reverse Stock Split to issue additional shares of the Company's Common Stock from time to time in equity financings, under our equity compensation plans or in connection with other matters. The Board currently has no plans, arrangements or understandings regarding the issuance of such additional authorized and unissued shares of the Company's Common Stock.

The Company's Common Stock is currently registered under Section 12(b) of the Exchange Act, and we are subject to the periodic reporting and other requirements of the Exchange Act. The proposed Reverse Stock Split will not affect the registration of the Common Stock under the Exchange Act. If the proposed Reverse Stock Split is implemented, the Common Stock will continue to be reported on the Nasdaq Capital Market under the symbol "ABIO" (although Nasdaq would likely add the letter "D" to the end of the trading symbol for a period of approximately 20 trading days to

indicate that the Reverse Stock Split has occurred).

Potential Anti-Takeover Effect of the Reverse Stock Split

Upon effectiveness of the Reverse Stock Split, the number of authorized shares of Common Stock that are not issued or outstanding will increase relative to the number of shares of Common Stock that are issued and outstanding prior to the Reverse Stock Split. Although this increase could, under certain circumstances, have an

anti-takeover effect (for example, by permitting issuances that would dilute the stock ownership of a person seeking to effect a change in the composition of the Board or contemplating a tender offer or other transaction for the combination of the Company with another company), Proposal No. 3 is not being proposed in response to any effort of which we are aware to accumulate shares of the Company's Common Stock or to obtain control of the Company.

Effective Date

The Reverse Stock Split will be effected at 5:01 p.m. Eastern time, on the date that the certificate of amendment to the Restated Certificate of Incorporation is filed with the Secretary of State of the State of Delaware. Beginning at the effective time of the Reverse Stock Split, each certificate representing Old Shares will be deemed for all corporate purposes to represent New Shares. The texts of the proposed certificates of amendment to the Restated Certificate of Incorporation are in the forms annexed to this proxy statement as Annexes A-1 through A-18.

Exchange of Stock Certificates

The transfer agent for the Company will act as the exchange agent for purposes of implementing the exchange of stock certificates. Holders of Old Shares will be asked to surrender to the exchange agent certificates representing Old Shares in exchange for certificates representing New Shares in accordance with the procedures to be set forth in a letter of transmittal to be sent by the exchange agent. No new certificates will be issued to a stockholder until the stockholder has surrendered the stockholder's outstanding certificate(s) together with the properly completed and executed letter of transmittal to the exchange agent. Stockholders should not destroy any stock certificates and should not submit any certificates until requested to do so.

Fractional Shares

No fractional shares of Common Stock will be issued as a result of the proposed Reverse Stock Split. Instead, stockholders who otherwise would be entitled to receive fractional shares will, upon surrender to the exchange agent of certificates representing their fractional shares, be entitled to receive cash in an amount equal to the product obtained by multiplying (i) the closing sales price of the Company's Common Stock as reported on the Nasdaq Global Market on the effective date of the certificate of amendment to the Restated Certificate of Incorporation by (ii) the number of shares of the Company's Common Stock held by such stockholder before the Reverse Stock Split that would otherwise have been exchanged for such fractional share interest. Holders of as many as nineteen shares (if we were to implement a 20:1 Reverse Stock Split) of the Company's Common Stock would be eliminated as a result of the cash payment in lieu of any issuance of fractional shares or interests in connection with the Reverse Stock Split. The exact number by which the number of holders of the Company's Common Stock would be reduced will depend on the Reverse Stock Split ratio adopted and the number of stockholders that hold less than the Reverse Stock Split ratio as of the effective date of the Reverse Stock Split. As of April 6, 2015, there were approximately 91 holders of record of the Company's Common Stock, of which 59 were holders of less than 20 shares of the Company's Common Stock. As a result of the Reverse Stock Split, assuming the maximum Reverse Stock Split ratio of 20:1 were selected, we estimate that cashing out fractional stockholders would potentially reduce that number of stockholders of record to 32.

Federal Income Tax Consequences of the Reverse Stock Split

The following is a summary of certain material federal income tax consequences of the Reverse Stock Split to certain holders of Old Shares, but does not purport to be a complete discussion of all of the potential tax considerations relating thereto. This summary is based on the provisions of the United States federal income tax law (including the Internal Revenue Code of 1986, as amended (the Code), Treasury Regulations promulgated thereunder, and judicial and administrative interpretations thereof) as of the date hereof, all of which are subject to change retroactively as well as prospectively. Our view regarding the tax consequences of the Reverse Stock Split are not binding upon the Internal Revenue Service or the courts, and there can be no assurance that the Internal Revenue Service or the courts

will accept the positions expressed below. This summary assumes that the Old Shares were, and the New Shares will be, held as a capital asset, as defined in the Code (i.e., generally, property held for investment). Further, it does not discuss any state, local, foreign or other tax consequences. In addition, this summary does not address the tax consequences applicable to a holder's particular circumstances or to holders that are subject to special tax rules, including without limitation banks, insurance companies, regulated investment companies, personal holding companies, foreign entities, nonresident alien individuals, broker-dealers, traders, tax-exempt entities and persons who hold Old Shares as a position in a hedging transaction, straddle, conversion transaction or other risk reduction transaction. THIS SUMMARY OF CERTAIN MATERIAL U.S. FEDERAL

TAX CONSIDERATIONS IS FOR GENERAL INFORMATION ONLY AND IS NOT TAX ADVICE. EACH STOCKHOLDER IS URGED TO CONSULT WITH SUCH STOCKHOLDER'S OWN TAX ADVISOR WITH RESPECT TO THE TAX CONSEQUENCES OF THE REVERSE STOCK SPLIT.

Other than the cash payments, if any, received by a stockholder in lieu of fractional shares as discussed below, no gain or loss should be recognized by a stockholder upon such stockholder's exchange of Old Shares for New Shares pursuant to the Reverse Stock Split. The aggregate tax basis of the New Shares received pursuant to the Reverse Stock Split will be the same as the stockholder's aggregate tax basis in the Old Shares exchanged therefor, less any basis attributable to fractional share interests. Stockholders who receive cash in lieu of fractional share interests in the New Shares as a result of the Reverse Stock Split will be treated as having received the fractional shares pursuant to the Reverse Stock Split and then as having exchanged the fractional shares for cash in a redemption by the Company, and will generally recognize gain or loss equal to the difference between the amount of cash received in lieu of a fractional share and their adjusted basis allocable to the fractional share interests redeemed. Such gain or loss will be long term capital gain or loss if the Old Shares were held for more than one year. The stockholder's holding period for the New Shares will include the period during which the stockholder held the Old Shares surrendered in the Reverse Stock Split.

No gain or loss will be recognized by us as a result of the Reverse Stock Split.

No Dissenters' Rights

Under applicable Delaware law, the Company's stockholders are not entitled to dissenters' or appraisal rights with respect to the proposed amendment to the Restated Certificate of Incorporation to effect the Reverse Stock Split. We will not independently provide our stockholders with any such right.

Vote Required

The affirmative vote of the holders of a majority of all outstanding shares of the Company's Common Stock on the record date is required for approval of the proposed certificates of amendment to the Restated Certificate of Incorporation set forth in Proposal No. 3 and included as Annexes A-1 through A-18. Broker non-votes with respect to Proposal No. 3 will be treated as votes against the proposal because they represent shares entitled to vote that have not been voted in the affirmative. Abstentions will also have the same effect as votes against the proposal because they represent shares entitled to vote that have not been voted in the affirmative.

THE BOARD UNANIMOUSLY RECOMMENDS A VOTE FOR THIS PROPOSAL.

**SECURITY OWNERSHIP OF
CERTAIN BENEFICIAL OWNERS AND MANAGEMENT**

Principal Stockholders

The following table sets forth certain information regarding the ownership of the Company's Common Stock as of March 31, 2015 by: (i) each director and nominee for director; (ii) each of our named executive officers; (iii) all executive officers and directors of the Company as a group; and (iv) all those known by the Company to be beneficial owners of more than five percent of its Common Stock. Unless otherwise noted below, the address of each beneficial owner listed on the table is c/o ARCA biopharma, Inc., 11080 CirclePoint Road, Suite 140, Westminster, Colorado, 80020.

We have determined beneficial ownership in accordance with the rules of the Securities and Exchange Commission, or the SEC. Except as indicated by the footnotes below, we believe, based on the information furnished to us, that the persons and entities named in the table below have sole voting and investment power with respect to all shares of Common Stock that they beneficially own, subject to applicable community property laws. The table is based upon information supplied by officers, directors and principal stockholders and Schedules 13G or 13D, Form 4s or other ownership reports filed with the SEC. For purposes of this table, certain of our outstanding warrants that may be exercisable for fractional shares have been rounded down to the nearest whole number.

In computing the number of shares of Common Stock beneficially owned by a person and the percentage ownership of that person, we deemed outstanding shares of Common Stock subject to options or warrants held by that person that are currently exercisable or exercisable within 60 days of March 31, 2015. We did not deem these shares outstanding, however, for the purpose of computing the percentage ownership of any other person.

The percentages below are based on 21,198,411 shares of our Common Stock outstanding as of March 31, 2015.

| Beneficial Owner | Shares Beneficially Owned | Percentage of Shares Beneficially Owned |
|--|--|--|
| Directors and Named Executive Officers | | |
| Michael R. Bristow, M.D., Ph.D. (1) | 933,948 | 4.31% |
| Patrick M. Wheeler (2) | 91,597 | * |
| Christopher D. Ozeroff (3) | 91,472 | * |
| Linda Grais, M.D. (4) | 34,111 | * |
| Robert E. Conway (5) | 22,165 | * |
| Raymond L. Woosley (6) | 23,908 | * |
| Dan J. Mitchell (7) | 16,413 | * |
| All current directors and executive officers as a group (8 persons) (8) | 1,217,469 | 5.57% |
| 5% Stockholders | | |
| Entities affiliated with Sabby Healthcare Master Fund, Ltd. (9) | 2,112,934 | 9.97% |

* Represents beneficial ownership of less than 1% of our Common Stock.

- (1) Includes the following owned by (i) Investocor Trust: (a) 139,082 shares and (b) 104,311 shares issuable upon the exercise of warrants, which warrants are immediately exercisable. Dr. Bristow is the sole trustee of Investocor Trust; (ii) NFS as Custodian for Michael Bristow's IRA: (a) 178,215 shares and (b) 124,750 shares issuable upon the exercise of warrants, which warrants are immediately exercisable; (iii) 39,050 shares issuable upon the exercise of warrants, which warrants are immediately exercisable and held directly; and (iv) options to purchase 187,219 shares that are exercisable within 60 days of March 31, 2015.
- (2) Includes options to purchase 65,737 shares that are exercisable within 60 days of March 31, 2015. Mr. Wheeler resigned from the Company effective December 31, 2014, is therefore no longer a Named Executive Officer and will not be a Named Executive Officer going forward.
- (3) Includes (a) options to purchase 32,451 shares that are exercisable within 60 days of March 31, 2015, and (b) 7,934 shares issuable upon the exercise of warrants, which warrants are immediately exercisable.

- (4) Includes options to purchase 34,111 shares that are exercisable within 60 days of March 31, 2015.
- (5) Includes options to purchase 22,165 shares that are exercisable within 60 days of March 31, 2015.
- (6) Includes options to purchase 23,908 shares that are exercisable within 60 days of March 31, 2015.
- (7) Includes options to purchase 16,413 shares that are exercisable within 60 days of March 31, 2015.
- (8) See Notes (1) and (3) through (7) above. Also, includes additional options to purchase 69,825 shares that are exercisable within 60 days of March 31, 2015.
- (9) Based solely upon a Schedule 13G filed with the SEC on January 8, 2015. The address for Sabby Healthcare Master Fund, Ltd. is c/o Ogier Fiduciary Services (Cayman) Limited, 89 Nexus Way, Camana Bay, Grand Cayman KY1-9007, Cayman Islands.

SECTION 16(A) BENEFICIAL OWNERSHIP REPORTING COMPLIANCE

Section 16 of the Securities Exchange Act of 1934, as amended (the Exchange Act) requires the Company s directors and executive officers, and persons who own more than 10% of its Common Stock, to file with the SEC initial reports of ownership and reports of changes in ownership of Common Stock of the Company. Such persons are required by SEC regulation to furnish us with copies of all Section 16(a) forms that they file.

To the Company s knowledge, based solely upon its review of the copies of such reports furnished to it and written representations that no other reports were required, during the fiscal year ended December 31, 2014, all Section 16(a) filing requirements applicable to its officers, directors and ten percent beneficial owners were complied with.

EXECUTIVE OFFICERS

Set forth below is information regarding each of the executive officers as of March 31, 2015.

| Name | Age | Position |
|----------------------------------|------------|--|
| Michael R. Bristow, M.D., Ph.D.* | 70 | President and Chief Executive Officer |
| Brian L. Selby | 53 | Vice President, Finance and Chief Accounting Officer |
| Thomas A. Keuer | 56 | Chief Operating Officer |
| Christopher D. Ozeroff | 56 | Secretary, Senior Vice President and General Counsel |

* Also serves as a director.

Michael R. Bristow, M.D., Ph.D. See Mr. Bristow's biography in Proposal Number 1 Election of Directors.

Brian L. Selby. Mr. Selby has served as the Company's Vice President, Finance and Chief Accounting Officer since December 2014. Previously, Mr. Selby served as the Company's Controller since 2007. Prior to joining the Company, Mr. Selby served as the Controller for Myogen, Inc., a publicly traded pharmaceutical company subsequently acquired by Gilead, from 2004 to 2007. Prior to Myogen, Mr. Selby served as the Controller for several private and publicly traded companies and earlier in his career was an auditor with Deloitte & Touche, LLP. Mr. Selby received his M.S. in Accounting from the University of Colorado and received his B.S., in Business Administration and Finance from Colorado State University, and is a certified public accountant.

Thomas A. Keuer. Mr. Keuer has served as the Company's Chief Operating Officer since December 2014. Mr. Keuer served as the Company's Executive Vice President, Pharmaceutical Operations since 2006. Prior to joining the Company, Mr. Keuer served as the SVP of Operations for Insmmed, Inc. from 2004 to 2006. Prior to Insmmed, Mr. Keuer served as the VP of Engineering for Baxter Healthcare from 1998 to 2004. Prior to Baxter, Mr. Keuer served as the VP of Operations for Somatogen, Inc. Mr. Keuer received his M.S. in Biochemical Engineering from Rice University and received his B.S. in Chemical Engineering from the University of Texas, Austin.

Christopher D. Ozeroff. Mr. Ozeroff has served as the Company's Senior Vice President since December 2009. Additionally, Mr. Ozeroff has served as the Company's General Counsel and Secretary since January 2009. Previously, Mr. Ozeroff served as the Company's Executive Vice President of Business Development, General Counsel and Secretary since the merger with Nuvelo. Before the merger, Mr. Ozeroff was a co-founder of ARCA Colorado in September 2004, and had served as its Executive Vice President of Business Development, General Counsel and Secretary since that date. Prior to joining the Company, Mr. Ozeroff was a partner with the law firm of Hogan & Hartson L.L.P., where he practiced in such areas as finance, acquisitions, public offerings, and licensing. Mr. Ozeroff completed his undergraduate degree at Stanford University and his law degree at the University of Chicago Law School.

Executive Compensation

The following table shows for the fiscal years ended December 31, 2014 and December 31, 2013, compensation awarded to, paid to, or earned by the Company's principal executive officer and its other named executive officers as of December 31, 2014, collectively, the Named Executive Officers:

SUMMARY COMPENSATION TABLE FOR FISCAL 2014 AND 2013

| Name and Principal Position | Year | Salary (\$)(2) | Option Grants (\$)(1) | Restricted Stock Units (\$)(1) | Bonus (\$) | All Other Compensation (\$) | Total (\$) |
|---|------|-------------------|-----------------------------|---|------------------------|--------------------------------------|------------|
| Michael R. Bristow President and Chief Executive Officer | 2014 | 279,564 | 76,586 | 110,565 | 21,100(6) | 13,585 | 501,400 |
| | 2013 | 259,303 | 297,164 | 172,500 | 70,000(4) 60,050(5) | 13,172 | 872,189 |
| Patrick M. Wheeler (3) Chief Financial Officer | 2014 | 268,211 | 30,486 | 66,690 | | 20,334(7) | 385,721 |
| | 2013 | 232,153 | 86,006 | 103,500 | 60,000(4) 46,650(5) | 8,471 | 536,780 |
| Christopher D. Ozeroff Secretary, Senior Vice President and General Counsel | 2014 | 273,234 | 15,615 | 66,690 | 12,350(6) | 12,279 | 380,168 |
| | 2013 | 253,431 | 44,804 | 103,500 | 35,000(4) 35,200(5) | 4,802 | 476,737 |

- (1) The amounts reported under "Option Grants" and "Restricted Stock Units" in the above table reflect the grant date fair value of these awards as determined in accordance with Financial Accounting Standards Board Accounting Standards Codification Topic 718, Compensation - Stock Compensation, excluding the effects of estimated forfeitures. The value of stock option and restricted stock unit awards was estimated using the Black-Scholes option-pricing model. The valuation assumptions used in the valuation of option grants and restricted stock units may be found in Note 8 to the Company's financial statements included in our annual report on Form 10-K for the year ended December 31, 2014 and filed with the SEC on March 19, 2015.
- (2) The amounts reported under "Salary" in the above table represent the actual amounts paid during the calendar year. Because the Company's actual pay dates do not always coincide with the first and last days of the year, these amounts may differ from the base salary amounts authorized by the Company's Board of Directors and described in the narrative that follows.
- (3) Mr. Wheeler resigned from the Company effective December 31, 2014.
- (4) On June 13, 2013, the Board approved cash bonuses in recognition of past efforts. A portion of such efforts occurred in 2012 but, for purposes of the table set forth above, the entirety of such bonuses have been included with respect to 2013.
- (5) Represents cash bonuses earned under the 2013 Bonus Plan. Cash bonuses earned in 2013 were paid in 2014. See "Executive Compensation" for descriptions of the 2013 Bonus Plan.
- (6) Represents cash bonuses earned under the 2014 Bonus Plan. Cash bonuses earned in 2014 were paid in 2015. See "Executive Compensation" for descriptions of the 2014 Bonus Plan.
- (7) Represents \$10,433 for payment of accrued but unused vacation as of December 31, 2014, paid in January 2015, and a \$9,901 Company contribution under the Company's 401(k) plan.

Narrative Disclosure to Summary Compensation Table***Employment Agreements or Arrangements***

Michael R. Bristow, M.D., Ph.D. Dr. Bristow serves as the Company's President and Chief Executive Officer under an Employment and Retention Agreement that was amended and restated as of June 4, 2008 and further amended pursuant to a Waiver and Amendment Agreement executed as of March 30, 2012. Pursuant to such employment agreement, Dr. Bristow is permitted to continue his academic work for the University of Colorado Health Sciences Center and for the Cardiovascular Institute, so long as it does not interfere with his duties as President and Chief Executive Officer of ARCA.

The Company's Board of Directors approved a 2013 base salary of \$272,950 for Dr. Bristow, effective on June 24, 2013. Dr. Bristow's salary is subject to annual increases if approved by the Company's Board of Directors or Compensation Committee and he is eligible to receive an annual bonus as determined by the Board of Directors or Compensation Committee in its sole discretion. On June 13, 2013, the Board approved a cash bonus of \$70,000 for Dr. Bristow. The Board determined the bonus would be paid in recognition of his past efforts and increased his salary to the level that was in place prior to Dr. Bristow's 2011 voluntary salary reduction which was implemented to save the Company's available capital. The Board also approved the reinstatement of a severance package for Dr. Bristow which would require the Company to make severance payments, in an amount equal to 6 months of his base salary, to Dr. Bristow in the event his employment is terminated under certain situations, as summarized below.

On February 27, 2014, the Board approved a cash bonus of \$60,050 for Dr. Bristow. The cash bonus was earned under the 2013 Bonus Plan. See *Executive Compensation* for descriptions of the 2013 Bonus Plan. The Board also approved a 2014 base salary of \$281,139 for Dr. Bristow.

On February 12, 2015, the Board approved a cash bonus of \$21,100 for Dr. Bristow. The cash bonus was earned under the 2014 Bonus Plan. See *Executive Compensation* for descriptions of the 2014 Bonus Plan. The Board also approved a 2015 base salary of \$286,759 for Dr. Bristow.

If the Company terminates Dr. Bristow's employment without cause, or if Dr. Bristow terminates his employment with good reason (as these terms are defined in his employment agreement), the Company has agreed to pay Dr. Bristow a severance payment equivalent to (i) 6 months of his base salary (if such termination occurs on the same day as or within thirteen months after a change of control of the Company), (ii) a pro rata portion of any bonus compensation under any employee bonus plan that has been approved by the Board of Directors payable to him for the fiscal year in which his employment terminated to be paid at the same time that such incentive bonus would have been paid had the termination not occurred, and (iii) reimbursement to cover out-of-pocket costs to continue group health insurance benefits under COBRA for 6 months, whether he elects or is eligible to receive COBRA (provided, that even if he does not elect or is not eligible to receive COBRA, he will receive the equivalent of such out-of-pocket expenses paid by him not to exceed the costs that the benefits would equal under COBRA if he were so eligible). In addition, ARCA may elect in its sole discretion, to pay additional severance equal to up to 6 months of base salary, which additional payment would extend the covenants and obligations under Dr. Bristow's Employee Intellectual Property, Confidentiality and Non-Compete Agreement for such additional period. The severance payment is conditioned on the execution by Dr. Bristow of a legal release in a form acceptable to the Company. A termination for cause includes willful misconduct, gross negligence, theft, fraud, or other illegal or dishonest conduct, any of which are considered to be materially harmful to the Company; refusal, unwillingness, failure, or inability to perform material job duties or habitual absenteeism; or violation of fiduciary duty, violation of any duty of loyalty, or material breach of any material term of the employment agreement or the Employee Intellectual Property, Confidentiality and Non-Compete Agreement, or any other agreement, with the Company. Good reason includes a relocation of normal work location greater than 30 miles; a decrease in current base salary by more than 15%, with certain exceptions; and the Company's unilateral decision to significantly and detrimentally reduce Dr. Bristow's job responsibilities.

Brian L. Selby. Mr. Selby serves as the Company's Vice President, Finance and Chief Accounting Officer under an Employment Agreement that is effective as of January 1, 2015.

Under his employment agreement, Mr. Selby is entitled to receive an annual base salary of \$220,000, subject to annual increases if approved by the Company's Board of Directors or Compensation Committee and is eligible to receive an annual bonus as determined by the Board of Directors or Compensation Committee in its sole discretion.

If the Company terminates Mr. Selby's employment without cause, or if Mr. Selby terminates his employment with good reason (as these terms are defined in his employment agreement), the Company has agreed to pay Mr. Selby a severance payment equivalent to (i) (a) 6 months of his base salary, if such termination occurs on the same day as or within thirteen months after a change of control of the Company, or (b) six months of his base salary if such termination does not occur on the same day as or within thirteen months after a change of control of the Company,, (ii) a pro rata portion of any bonus compensation under any employee bonus plan that has been approved by the Board of Directors payable to him for the fiscal year in which his employment terminated to be paid at the same time that such incentive bonus would have been paid had the termination not occurred, and (iii) reimbursement to cover out-of-pocket costs to continue group health insurance benefits under COBRA for (x) 12 months, if such termination occurs on the same day as or within thirteen months after a change of control of the Company, or (y) six months if such termination does not occur on the same day as or within thirteen months after a change of control of the Company, whether he elects or is eligible to receive COBRA (provided, in either event, that even if he does not elect or is not eligible to receive COBRA, he will receive the equivalent of such out-of-pocket expenses paid by him not to exceed the costs that the benefits would equal under COBRA if he were so eligible). In addition, ARCA may elect in its sole discretion, to pay additional severance equal to up to 12 months of base salary, which additional payment would extend the covenants and obligations under Mr. Selby's Employee Intellectual Property, Confidentiality and Non-Compete Agreement for such additional period. The severance payment is conditioned on the execution by Mr. Selby of a legal release in a form acceptable to the Company. A termination for cause includes willful misconduct, gross negligence, theft, fraud, or other illegal or dishonest conduct, any of which are considered to be materially harmful to the Company; refusal, unwillingness, failure, or inability to perform material job duties or habitual absenteeism; or violation of fiduciary duty, violation of any duty of loyalty, or material breach of any material term of the employment agreement or the Employee Intellectual Property, Confidentiality and Non-Compete Agreement, or any other agreement, with the Company. Good reason includes a relocation of normal work location greater than 30 miles; a decrease in current base salary by more than 15%, with certain exceptions; and the Company's unilateral decision to significantly and detrimentally reduce Mr. Selby's job responsibilities.

Thomas A. Keuer. Mr. Keuer serves as the Company's Chief Operating Officer under an Amended and Restated Employment Agreement that is effective as of January 1, 2015.

Under his employment agreement, Mr. Keuer is entitled to receive an annual base salary of \$280,000, subject to annual increases if approved by the Company's Board of Directors or Compensation Committee and is eligible to receive an annual bonus as determined by the Board of Directors or Compensation Committee in its sole discretion.

If the Company terminates Mr. Keuer's employment without cause, or if Mr. Keuer terminates his employment with good reason (as these terms are defined in his employment agreement), the Company has agreed to pay Mr. Keuer a severance payment equivalent to (i) (a) 12 months of his base salary, if such termination occurs on the same day as or within thirteen months after a change of control of the Company, or (b) six months of his base salary if such termination does not occur on the same day as or within thirteen months after a change of control of the Company, (ii) a pro rata portion of any bonus compensation under any employee bonus plan that has been approved by the Board of Directors payable to him for the fiscal year in which his employment terminated to be paid at the same time that such incentive bonus would have been paid had the termination not occurred, and (iii) reimbursement to cover out-of-pocket costs to continue group health insurance benefits under COBRA for (x) 12 months, if such termination occurs on the same day as or within thirteen months after a change of control of the Company, or (y) six months if such termination does not occur on the same day as or within thirteen months after a change of control of the Company, whether he elects or is eligible to receive COBRA (provided, in either event, that even if he does not elect or is not eligible to receive COBRA, he will receive the equivalent of such out-of-pocket expenses paid by him not to exceed the costs that the benefits would equal under COBRA if he were so eligible). In addition, ARCA may elect in its sole discretion, to pay additional severance equal to up to 12 months of base salary, which additional payment would extend the covenants and obligations under Mr. Keuer's Employee Intellectual Property, Confidentiality and Non-Compete Agreement for such additional period. The severance payment is conditioned on the execution by

Mr. Keuer of a legal release in a form acceptable to the Company. A termination for cause includes willful misconduct, gross negligence, theft, fraud, or other illegal or dishonest conduct, any of which are considered to be materially harmful to the Company; refusal, unwillingness, failure, or inability to perform material job duties or habitual absenteeism; or violation of fiduciary duty, violation of any duty of loyalty, or material breach of any material term of the employment agreement or the Employee Intellectual Property,

Confidentiality and Non-Compete Agreement, or any other agreement, with the Company. Good reason includes a relocation of normal work location greater than 30 miles; a decrease in current base salary by more than 15%, with certain exceptions; and the Company's unilateral decision to significantly and detrimentally reduce Mr. Keuer's job responsibilities.

Christopher D. Ozeroff. Mr. Ozeroff serves as the Company's Senior Vice President and General Counsel under an Employment and Retention Agreement that was amended and restated as of June 12, 2008 and further amended pursuant to a Waiver and Amendment Agreement executed as of March 30, 2012.

Under his employment agreement, Mr. Ozeroff is entitled to receive an annual base salary of \$259,000, subject to annual increases if approved by the Company's Board of Directors or Compensation Committee and is eligible to receive an annual bonus as determined by the Board of Directors or Compensation Committee in its sole discretion.

The Company's Board of Directors approved a 2013 base salary of \$266,770 for Mr. Ozeroff, effective on June 24, 2013. Mr. Ozeroff's salary is subject to annual increases if approved by the Company's Board of Directors or Compensation Committee and he is eligible to receive an annual bonus as determined by the Board of Directors or Compensation Committee in its sole discretion. On June 13, 2013, the Board approved a cash bonus of \$35,000 for Mr. Ozeroff. The Board determined the bonus would be paid in recognition of his past efforts and increased his salary to the level that was in place prior to Mr. Ozeroff's 2011 voluntary salary reduction which was implemented to save the Company's available capital. The Board also approved the reinstatement of a severance package for Mr. Ozeroff which would require the Company to make severance payments, in an amount equal to 6 months of his base salary, to Mr. Ozeroff in the event his employment is terminated under certain situations, as summarized below.

On February 27, 2014, the Board approved a cash bonus of \$35,200 for Mr. Ozeroff. The cash bonus was earned under the 2013 Bonus Plan. See Executive Compensation for descriptions of the 2013 Bonus Plan. The Board also approved a 2014 base salary of \$274,773 for Mr. Ozeroff.

On February 12, 2015, the Board approved a cash bonus of \$12,350 for Mr. Ozeroff. The cash bonus was earned under the 2014 Bonus Plan. See Executive Compensation for descriptions of the 2014 Bonus Plan. The Board also approved a 2015 base salary of \$280,273 for Mr. Ozeroff.

If the Company terminates Mr. Ozeroff's employment without cause, or if Mr. Ozeroff terminates his employment with good reason (as these terms are defined in his employment agreement), the Company has agreed to pay Mr. Ozeroff a severance payment equivalent to (i) 6 months of his base salary (if such termination occurs on the same day as or within thirteen months after a change of control of the Company), (ii) a pro rata portion of any bonus compensation under any employee bonus plan that has been approved by the Board of Directors payable to him for the fiscal year in which his employment terminated to be paid at the same time that such incentive bonus would have been paid had the termination not occurred, and (iii) reimbursement to cover out-of-pocket costs to continue group health insurance benefits under COBRA for 6 months, whether he elects or is eligible to receive COBRA (provided, that even if he does not elect or is not eligible to receive COBRA, he will receive the equivalent of such out-of-pocket expenses paid by him not to exceed the costs that the benefits would equal under COBRA if he were so eligible). In addition, ARCA may elect in its sole discretion, to pay additional severance equal to up to 6 months of base salary, which additional payment would extend the covenants and obligations under Mr. Ozeroff's Employee Intellectual Property, Confidentiality and Non-Compete Agreement for such additional period. The severance payment is conditioned on the execution by Mr. Ozeroff of a legal release in a form acceptable to the Company. A termination for cause includes willful misconduct, gross negligence, theft, fraud, or other illegal or dishonest conduct, any of which are considered to be materially harmful to the Company; refusal, unwillingness, failure, or inability to perform material job duties or habitual absenteeism; or violation of fiduciary duty, violation of any duty of loyalty, or material breach of any material term of the employment agreement or the Employee Intellectual Property, Confidentiality and Non-Compete Agreement, or any other agreement, with the Company. Good reason includes a relocation of normal

work location greater than 30 miles; a decrease in current base salary by more than 15%, with certain exceptions; and the Company's unilateral decision to significantly and detrimentally reduce Mr. Ozeroff's job responsibilities.

Patrick M. Wheeler. Mr. Wheeler served as the Company's Chief Financial Officer under an Employment Agreement dated February 11, 2009, as amended pursuant to a Waiver and Amendment Agreement executed as of March 30, 2012. Under his employment agreement, Mr. Wheeler was entitled to receive an annual base salary of \$215,000, subject to annual increases if approved by the Company's Board of Directors or Compensation

Committee and was eligible to receive an annual bonus as determined by the Board of Directors or Compensation Committee in its sole discretion.

The Company's Board of Directors approved a 2013 base salary of \$265,000 for Mr. Wheeler, effective on June 24, 2013. On June 13, 2013, the Board approved a cash bonus of \$60,000 for Mr. Wheeler. The Board determined the bonus would be paid in recognition of his past efforts and increased his salary to the level that was in place prior to Mr. Wheeler's 2011 voluntary salary reduction which was implemented to save the Company's available capital.

On February 27, 2014, the Board approved a cash bonus of \$46,650 for Mr. Wheeler. The cash bonus was earned under the 2013 Bonus Plan. See Executive Compensation for descriptions of the 2013 Bonus Plan. The Board also approved a 2014 base salary of \$268,975 for Mr. Wheeler.

Mr. Wheeler resigned from the Company effective December 31, 2014 and is therefore no longer a Named Executive Officer. The Company does not owe any severance to Mr. Wheeler, and does not owe him for services provided, other than payment of accrued and unused vacation at December 31, 2014 and Company contribution under the Company's 401(k) plan, as stated in Summary Compensation Table above.

Non-Equity Incentive Plan Compensation

In February 2007, the Compensation Committee and the Board of Directors of ARCA established a bonus structure for its entire executive team. The philosophy employed was to create incentives for the executive officers to achieve key corporate goals. The Compensation Committee retained discretion to change the bonus structure and the bonus payment amounts as it considered appropriate.

2013 Cash Bonus Plan

On February 27, 2014, the Board approved a cash bonus for every employee. The Compensation Committee determined the cash bonus was earned for attainment of the Company's 2013 Goals under its 2013 Cash Bonus Plan (the 2013 Goals). The 2013 Goals were as follows: (1) obtain funding for the GENETIC-AF phase 2B/3 clinical trial, (2) conclude the regulatory and planning process for the GENETIC-AF trial, (3) align partners for the potential patient enrollment in the GENETIC-AF trial during the first quarter of 2014 and (4) maintain a financial plan that maintains the listing of the Company's Common Stock on the Nasdaq Capital Market and supports the Company's financing goals. The 2013 bonuses which were paid were based on the Board's determination with respect to the Company's achievement of the 2013 Goals.

2014 Cash Bonus Plan

On February 12, 2015, the Board approved a cash bonus for certain employees. The Compensation Committee determined the cash bonus was earned for attainment of the Company's 2014 Goals under its 2014 Cash Bonus Plan (the 2014 Goals). The 2014 bonuses which were paid were based on the Board's determination with respect to the Company's achievement of the 2014 Goals.

The 2014 Goals were as follows: (1) obtain remaining Gencaro Phase 2B funding, (2) enroll the first patient in the GENETIC-AF trial during the first quarter of 2014, (3) enroll 25% of Phase 2B patients in the GENETIC-AF trial during 2014, and (4) deliver preclinical research and development discovery suitable for out-licensing, partnering or in-licensing.

2015 Cash Bonus Plan

The Board has set corporate goals for 2015 (the 2015 Goals), which may be updated at the Board's discretion during 2015, to pay any award to any employee under the Company's 2015 Cash Bonus Plan, including executive officers.

The amount payable to each employee is targeted at such employee's target bonus percentage (TBP), but employees, including executive officers, may receive more or less than 100% of their TBP, based upon corporate goal achievement, individual performance and Board discretion.

To receive a cash bonus (if any), each individual employee must be actively employed by the Company, and in good standing, on December 31, 2015. Employees hired after January 1, 2015, will have their cash bonus (if

any) prorated based on the percentage of time the employee worked at ARCA in 2015. The 2015 Goals are based on (1) additional financing for the Company, (2) enrollment of GENETIC-AF and (3) corporate transaction objectives.

Other Elements of Executive Compensation Program

The remaining elements of the Company's executive compensation program, like its broader employee compensation programs, are intended to make the Company's overall compensation program competitive with those of its peer companies, keeping in mind the constraints imposed by the Company's reliance on capital markets as a primary source of cash. The remaining elements of the Company's executive compensation program, (401(k) Plan, Medical, Dental, and Vision Plans, Life and Disability Insurance) are available to all Company employees.

EQUITY COMPENSATION PLAN INFORMATION

The following table sets forth information as of December 31, 2014 for all of our equity compensation plans:

| | No. of Securities to be Issued Upon Exercise of Outstanding Options or Upon Vesting of Restricted Stock Units (a) | Weighted Average Exercise Price or Award Value of Outstanding Options and Awards (\$) (b) | No. of Securities Remaining Available for Future Issuance Under Equity Compensation Plans Excluding Securities Reflected in Column(a) (c) |
|--|--|--|--|
| Equity compensation plans approved by security holders | 1,068,515 (1) | 2.89 | |
| | 471,029 (2) | 1.62 | |
| Total | 1,539,544 | | 672,852 |

(1) Stock Options granted under the equity incentive plans.

(2) Stock Awards granted under the equity incentive plans.

A description of the equity incentive plans we maintain is set forth in Note 8 to the Company's financial statements included in our annual report on Form 10-K for the year ended December 31, 2014 and filed with the SEC on March 19, 2015.

Compensation Risks

ARCA believes its approach to goal setting, setting of targets with payouts at multiple levels of performance, and evaluation of performance results assist in mitigating excessive risk-taking that could harm the value or reward poor judgment by its executives. Several features of the Company's programs reflect sound risk management practices. ARCA believes it has allocated compensation among base salary and short and long-term compensation target opportunities in such a way as to not encourage excessive risk-taking. The multi-year vesting of equity awards properly accounts for the time horizon of risk. Furthermore, the Company's compensation committee assesses and

monitors whether any of ARCA's compensation policies and programs has the potential to encourage excessive risk-taking.

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OUTSTANDING EQUITY AWARDS AT FISCAL YEAR END

The following table shows for the fiscal year ended December 31, 2014, certain information regarding outstanding equity awards at fiscal year end for the Named Executive Officers.

OUTSTANDING EQUITY AWARDS AT DECEMBER 31, 2014

A description of the equity incentive plans we maintain is set forth in Note 8 to the Company's financial statements included in our annual report on Form 10-K for the year ended December 31, 2014 and filed with the SEC on March 19, 2015.

| Name | Option Awards | | | |
|---|---|---|----------------------------|------------------------|
| | Number of Securities Underlying Unexercised Options (#) Exercisable | Number of Securities Underlying Unexercised Options (#) Unexercisable | Option Exercise Price (\$) | Option Expiration Date |
| Michael R. Bristow, President and Chief Executive Officer (3) | 4,147 | | 33.42 | 1/23/2019 |
| | 2,666 | | 17.82 | 2/18/2020 |
| | 5,000 | | 13.44 | 5/20/2021 |
| | 82,084 | 114,916 (1) | 1.38 | 9/16/2023 |
| | 35,761 | 50,064 (1) | 1.38 | 9/16/2023 |
| | 10,730 | 40,770 (2) | 1.95 | 2/26/2024 |
| Patrick Wheeler, Chief Financial Officer (4) | 835 | | 5.40 | 8/3/2016 |
| | 278 | | 10.80 | 5/3/2017 |
| | 4,035 | | 11.16 | 2/12/2018 |
| | 3,333 | | 17.40 | 6/25/2019 |
| | 974 | | 33.42 | 1/23/2019 |
| | 1,066 | | 17.82 | 2/18/2020 |
| | 3,333 | | 13.44 | 5/20/2021 |
| | 34,107 | 47,749 (1) | 1.38 | 9/16/2023 |
| | 4,271 | 16,229 (2) | 1.95 | 2/26/2024 |
| Christopher Ozeroff, Secretary, Senior Vice President and General Counsel (5) | 1,066 | | 17.82 | 2/18/2020 |
| | 3,333 | | 13.44 | 5/20/2021 |
| | 17,768 | 24,874 (1) | 1.38 | 9/16/2023 |
| | 2,188 | 8,312 (2) | 1.95 | 2/26/2024 |

- (1) Options vest in monthly installments through September 17, 2016.
- (2) Options vest in monthly installments through February 27, 2018.
- (3) On February 12, 2015, Dr. Bristow received a grant of 25,900 stock options priced at \$0.67 per share. The option vests in 36 equal monthly installments measured from February 12, 2015.
- (4) Mr. Wheeler resigned from the Company effective December 31, 2014. The Company entered into a Consulting Agreement with Mr. Wheeler effective January 1, 2015, in which Mr. Wheeler will provide certain consulting services to the Company and his outstanding equity awards will continue to vest until the Consulting Agreement is terminated.

- (5) On February 12, 2015, Mr. Ozeroff received a grant of 12,950 stock options priced at \$0.67 per share. The option vests in 36 equal monthly installments measured from February 12, 2015.

| Name | Stock Awards | |
|---|---|--|
| | Number of Shares or Units of Stock That Have Not Vested (#) | Market Value of Shares or Units of Stock That Have Not Vested (\$) |
| Michael R. Bristow, President and Chief Executive Officer (4) | 83,334(1) 56,700(2) | 79,500 54,092 |
| Patrick Wheeler, Chief Financial Officer (3) | 50,000(1) 34,200(2) | 47,700 32,627 |
| Christopher Ozeroff, Secretary, Senior Vice President and General Counsel (5) | 50,000(1) 34,200(2) | 47,700 32,627 |

- (1) Restricted Stock Units vest in equal annual installments through September 17, 2016.
- (2) Restricted Stock Units vest in equal annual installments through February 27, 2018.
- (3) Mr. Wheeler departed the Company effective December 31, 2014. The Company entered into a Consulting Agreement with Mr. Wheeler effective January 1, 2015, in which Mr. Wheeler will provide certain consulting services to the Company and his outstanding equity awards will continue to vest until the Consulting Agreement is terminated.
- (4) On February 12, 2015, Dr. Bristow received a grant of 48,100 restricted stock units (RSUs). The RSUs vest annually in three equal installments beginning on April 2, 2016.
- (5) On February 12, 2015, Mr. Ozeroff received a grant of 24,050 RSUs. The RSUs vest annually in three equal installments beginning on April 2, 2016.

Equity Incentive Compensation

On September 17, 2013, our stockholders approved the ARCA biopharma, Inc. 2013 Equity Incentive Plan (the 2013 Plan) at the 2013 Annual Meeting. The 2013 Plan is the successor to the Amended and Restated ARCA biopharma, Inc. 2004 Equity Incentive Plan (the 2004 Plan).

Certain of the option grants and restricted stock units reported in the table above were granted to the Named Executive Officers in 2013. Each of such option grants and restricted stock units were priced at \$1.38 per share, the closing price of the Company's Common Stock on Nasdaq on the date of grant. The option grants vest in equal monthly installments through September 17, 2016 and have an acceleration provision in the event of a Change of Control of the Company. The options are subject to the terms and conditions of the 2013 Plan, and the Company's standard forms of Stock Option Agreement and Option Grant Notice for the Plan. The restricted stock units vest in equal annual installments through September 17, 2016 and have an acceleration provision in the event of a Change of Control of the Company.

Upon a Change in Control of the Company, the vesting of these option grants and restricted stock units accelerates as follows:

- a) Fifty percent (50%) of the unvested option shares become fully vested and exercisable upon the closing date of such Change in Control and any remaining unvested option shares continue to vest according to the original vesting schedule, and
- b) Upon the one year anniversary of the closing of the Change of Control, or the Named Executive Officer's involuntary termination, whichever occurs first, the remaining unvested option shares shall become fully vested and exercisable.

Certain of the options grants and restricted stock units reported in the table above were granted to the Named Executive Officers in 2014. Each such option grant and restricted stock unit was priced at \$1.95 per share, the closing price of the Company's Common Stock on Nasdaq on the date of grant. The option grants vest in equal monthly installments through February 27, 2018 and have an acceleration provision in the event of a Change of Control of the Company. The options are subject to the terms and conditions of the 2013 Plan and the Company standard forms of Stock Option Agreement and Option Grant Notice for the Plan. The restricted stock units vest in equal annual installments through February 27, 2018 and have an acceleration provision in the event of a Change of Control of the Company.

Upon a Change in Control of the Company, the vesting of these option grants and restricted stock units accelerates as follows:

a) Fifty percent (50%) of the unvested options become fully vested and exercisable upon the closing date of such Change in Control and any remaining unvested option shares continue to vest according to the original vesting schedule, and

b) Upon the one year anniversary of the closing of the Change of Control, or the Named Executive Officer's involuntary termination, whichever occurs first, the remaining unvested option shares shall become fully vested and exercisable.

The following option grants and restricted stock units granted to the Company's executive officers in 2015 were not reported in the table above. Each of such option grants and restricted stock units were priced at \$0.67 per share, the closing price of the Company's Common Stock on Nasdaq on the date of grant. The option grants vest in equal monthly installments through February 12, 2018 and have an acceleration provision in the event of a Change of Control of the Company. The options are subject to the terms and conditions of the Company's 2013 Plan, as amended, and the Company standard forms of Stock Option Agreement and Option Grant Notice for the Plan. The restricted stock units vest in equal annual installments through April 2, 2018 and have an acceleration provision in the event of a Change of Control of the Company.

| Name and Title | Options Granted ⁽¹⁾ | RSUs Granted ⁽²⁾ |
|---|-----------------------------------|--------------------------------|
| Michael Bristow President and Chief Executive Officer | 25,900 | 48,100 |
| Thomas A. Keuer Chief Operating Officer | 13,650 | 25,350 |
| Christopher Ozeroff Senior Vice President, General Counsel & Secretary | 12,950 | 24,050 |
| Brian L. Selby Vice President, Finance | 12,600 | 23,400 |

(1) Exercise price of \$0.67 per share, the closing price of the Company's Common Stock on February 12, 2015. The Option vests in 36 equal monthly installments measured from February 12, 2015.

(2) The RSUs vests annually in three equal installments beginning on April 2, 2016.

Upon a Change in Control of the Company, the vesting of these option grants and restricted stock units accelerates as follows:

a) Fifty percent (50%) of the unvested options become fully vested and exercisable upon the closing date of such Change in Control and any remaining unvested option shares continue to vest according to the original vesting schedule, and

b) Upon the one year anniversary of the closing of the Change of Control, or the executive officer's involuntary termination, whichever occurs first, the remaining unvested option shares shall become fully vested and exercisable.

Option Exercises And Stock Vested

The following table sets forth certain information regarding option exercises and restricted stock units that vested during the year ended December 31, 2014 with respect to the Named Executive Officers:

| Name | Option Awards | | Stock Awards | |
|---------------------|--|---|---|--|
| | Number of Shares Acquired on Exercise (#) | Value Realized on Exercise (\$)(1) | Number of Shares Acquired on Vesting (#) | Value Realized on Vesting (\$)(2) |
| Michael R. Bristow | | | 41,666 | 54,999 |
| Patrick Wheeler | | | 25,000 | 33,000 |
| Christopher Ozeroff | | | 25,000 | 33,000 |

- (1) The value realized on exercise of the options equals the difference between the market price of the underlying stock at exercise and the exercise or base price of the options, multiplied by the number of shares acquired on exercise.
- (2) The value realized on vesting of restricted stock units equals the market value of the Company's Common Stock on the vesting date, multiplied by the number of shares that vested.

DIRECTOR COMPENSATION

The following table shows for the fiscal year ended December 31, 2014 certain information with respect to the compensation of all non-employee directors of the Company:

DIRECTOR COMPENSATION FOR FISCAL 2014 (1)

| | Fees Earned or Paid in Cash (\$) | Option Awards (\$)(2) | Non-Equity Incentive Plan Compensation (\$) | Nonqualified Deferred Compensation Earnings (\$) | All Other Compensation (\$) | Total (\$) |
|------------------------------|---|--------------------------------------|--|---|--|-------------------|
| Linda Grais, M.D. (3) | 52,500 | 10,554 | | | | 63,054 |
| Raymond L. Woosley, M.D. (4) | 47,500 | 10,554 | | | | 58,054 |
| Robert E. Conway (5) | 51,250 | 10,554 | | | | 61,804 |
| Dan J. Mitchell (6) | 30,000 | 31,070 | | | | 61,070 |

- (1) See Summary Compensation Table for disclosure related to Dr. Bristow.
- (2) The amounts reported under "Option Awards" in the above table reflect the aggregate grant date fair value of these awards as determined in accordance with Financial Accounting Standards Board Accounting Standards Codification Topic 718, Compensation - Stock Compensation, excluding the effects of estimated forfeitures. The value of stock option awards was estimated using the Black-Scholes option-pricing model. The valuation assumptions used in the valuation of option awards may be found in Note 8 to the Company's financial statements included in our annual report on Form 10-K for the year ended December 31, 2014 and filed with the SEC on March 19, 2015.
- (3) The aggregate number of option awards outstanding at December 31, 2014 for Dr. Grais was 34,999, of which 28,556 shares were fully vested.
- (4) Dr. Woosley joined the Company's Board of Directors on July 26, 2013. The aggregate number of option awards outstanding at December 31, 2014 for Dr. Woosley was 27,463 shares, of which 18,354 shares were fully vested.
- (5) Mr. Conway joined the Company's Board of Directors on September 3, 2013. The aggregate number of option awards outstanding at December 31, 2014 for Mr. Conway was 26,608, of which 16,609 shares were fully vested.
- (6) Mr. Mitchell joined the Company's Board of Directors on February 11, 2014. The aggregate number of option awards outstanding at December 31, 2014 for Mr. Mitchell was 23,079, of which 10,880 shares were fully vested.
- In 2014, non-employee directors were compensated for their service on the Company's Board, as follows:

Each non-employee director was entitled to an annual retainer fee of \$30,000;

As additional compensation for their services, each non-employee director, upon joining the Board, was entitled to an initial grant of options to purchase 16,000 shares of the Company's Common Stock under the 2013 Plan and an annual grant of an additional 8,000 shares of the Company's Common Stock under the 2013 Plan;

The Audit Committee chair was entitled to receive an additional \$15,000 for service as the Audit Committee chair;

If a non-employee director served as the chair of any other Committee, that director was entitled to receive an additional \$10,000 per chair and the Chairman of the Board was entitled to receive an additional \$15,000;

Each of the members of the Audit Committee, other than the chair, was entitled to receive an additional \$5,000 for his or her service on the Audit Committee; and

For membership on any other Committee, except for the chair of such Committee, a non-employee director was entitled to receive an additional \$5,000.

At the September 17, 2013 meeting of the Board of Directors, the Board decided to increase the equity compensation for non-employee directors to bring the director equity compensation levels within the range of comparable companies. Under the new plan, new non-employee directors will receive a grant of options to purchase 16,000 shares of the Company's Common Stock upon joining the Board, vesting over three years, and an annual grant of options to purchase 8,000 shares of the Company's Common Stock, vesting over one year. In addition, the Board decided to award a joining grant to Dr. Grais and Dr. Zabriskie for their service on the Board. Accordingly, the Board granted Dr. Grais and Dr. Zabriskie options to purchase 16,000 shares of the Company's Common Stock

under the 2013 Plan vesting over three years, and an additional grant of options to purchase 7,417 shares of Common Stock under the 2013 Plan vesting over one year. In addition, the Board granted Dr. Woosley options to purchase 18,213 shares of Common Stock (including 14,750 shares vesting over three years, and 3,463 shares vesting over five months, representing the pro rata grants for joining the Board in July 2013) and Mr. Conway options to purchase 17,358 shares of Common Stock (including 14,750 shares vesting over three years, and 2,608 shares vesting over three months, representing the pro rata grants for joining the Board in September 2013) under the 2013 Plan in order to align their equity compensation with the new director equity compensation levels. The purchase price for the options issued on September 17, 2013 was \$1.38, which was equal to the closing price of the Company's Common Stock on Nasdaq on the date of the grant. If the non-employee director's service terminates in connection with or at any time following a change in control, then any unexpired options that remain unvested shall become fully vested.

At the February 11, 2014 meeting of the Board of Directors, the Board awarded a stock option grant to Dan J. Mitchell for joining the Board. Accordingly, the Board granted Mr. Mitchell options to purchase 16,000 shares of the Company's Common Stock under the 2013 Plan vesting over three years, and an additional grant of options to purchase 7,079 shares of Common Stock under the 2013 Plan vesting over one year. In addition, the Board granted to Dr. Woosley, Dr. Grais and Mr. Conway each grants of 8,000 shares of Common Stock vesting over one year. The purchase price for the options issued on February 11, 2014 was \$1.80 per share, which was equal to the closing price of the Company's Common Stock on Nasdaq on the date of the grant. If the non-employee director's service terminates in connection with or at any time following a change in control, then any unexpired options that remain unvested shall become fully vested.

At the February 12, 2015 meeting of the Board of Directors, the Board awarded annual stock option grants to the Directors. Mr. Mitchell, Dr. Grais, Dr. Woosley and Mr. Conway each were granted options to purchase 8,000 shares of Common Stock under the 2013 Plan vesting over one year. The purchase price for the options issued on February 12, 2015 was \$0.67 per share, which was equal to the closing price of the Company's Common Stock on Nasdaq on the date of the grant. If the non-employee director's service terminates in connection with or at any time following a change in control, then any unexpired options that remain unvested shall become fully vested.

CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS

Transactions With the Company's President and Chief Executive Officer

The Company has entered into unrestricted research grants with Dr. Bristow's, the Company's President and Chief Executive Officer, academic research laboratory at the University of Colorado. Funding of any unrestricted research grants is contingent upon the Company's financial condition, and can be deferred or terminated at the Company's discretion. Total expense under these arrangements for the years ended December 31, 2014 and 2013 was \$350,000 and \$297,000 respectively.

Certain Transactions With or Involving Related Persons

The following is a summary of transactions since January 1, 2013 to which we have been a party in which the amount involved exceeded the lesser of \$120,000 or one percent of the average of our total assets at fiscal years ended 2013 and 2014, and in which any of our executive officers, directors or holders of more than 5% of our capital stock, or any member of the immediate family of any of the foregoing persons, had or will have a direct or indirect material interest, other than compensation arrangements disclosed above under the heading "Executive Compensation". The following tables summarize the purchases in these financing transactions of our Common Stock and warrants by our executive officers, directors or holders of more than 5% of our capital stock, or any member of the immediate family of any of the foregoing persons and their affiliated entities.

The January, 2013 Private Placement

On January 22, 2013, we sold approximately \$1 million of our Common Stock and warrants for Common Stock in a private placement transaction with accredited investors including our Chief Executive Officer. We issued 356,430 shares of Common Stock together with warrants to purchase 249,501 shares of Common Stock. The net proceeds, after deducting placement agent fees and other offering expenses, were approximately \$805,000. Each unit, consisting of a share of Common Stock and a warrant to purchase 0.70 shares of Common Stock, was sold at a purchase price of \$2.81 per unit. The warrants were exercisable upon issuance, expire seven years from the date of issuance, and have an exercise price of \$2.28 per share. Pursuant to the terms of the Registration Rights Agreements (the Rights Agreements) entered into as part of this and prior Private Placement transactions, we filed a registration statement for the resale of the shares underlying the units sold in these private placements. That registration statement was declared effective by the Securities and Exchange Commission on February 14, 2013.

| January 2013 Private Placement | Name of Purchaser | Dollars Invested | Post-Split Shares | Post-Split Warrant Shares |
|---------------------------------------|---|-------------------------|--------------------------|----------------------------------|
| 5% Shareholder and Affiliate | NFS custodian for Michael R. Bristow | \$ 500,000 | 178,215 | 124,750 |
| 5% Shareholder | Sabby Healthcare Volatility Master Fund, Ltd. | \$ 249,999.94 | 89,107 | 62,375 |

The February, 2013 Registered Direct Offering

On January 31, 2013, we sold approximately \$730,000 of our Common Stock and warrants for Common Stock in a Registered Direct Offering in which we issued 164,636 shares of Common Stock and warrants to purchase 65,855 shares of Common Stock. The net proceeds, after deducting placement agent fees and other offering expenses payable by us, was approximately \$616,000. Each unit, consisting of a share of Common Stock and a warrant to purchase 0.40 shares of Common Stock, was sold at a purchase price of \$4.43 per unit. The warrants were exercisable upon issuance, expire five years from the date of issuance, and have an exercise price of \$4.13 per share. The Registered Direct Offering was effected pursuant to a prospectus supplement filed with the Securities and Exchange Commission on February 1, 2013. The warrant agreements provide for settlement of the warrants in unregistered shares should an effective registration statement or current prospectus not be in place at the time a warrant is exercised.

| February 2013 Registered Direct Offering | Name of Purchaser | Dollars Invested | Post-Split Shares | Post-Split Warrant Shares |
|---|---|-------------------------|--------------------------|----------------------------------|
| 5% Shareholder | Sabby Healthcare Volatility Master Fund, Ltd. | \$ 364,999.49 | 82,318 | 32,927 |

The June 2013 Public Offering

On June 4, 2013, we sold shares of our Series A Convertible Preferred Stock (Preferred Stock) and warrants to purchase Common Stock in a public offering for aggregate gross proceeds of \$20 million. We issued 125,000 shares of Preferred Stock and warrants to purchase up to 6,250,000 shares of Common Stock at a purchase price of \$160 per share of Preferred Stock. The net proceeds, after deducting placement agent fees and other offering expenses payable by us, were approximately \$17.9 million. Each share of Preferred Stock was convertible into 100 shares of our Common Stock at any time at the option of the holder. The warrants have an exercise price of \$1.60 per share, will expire on the five year anniversary of the date of issuance, and were exercisable immediately upon issuance. Our Chief Executive Officer participated in the offering, purchasing 781 shares of Preferred Stock and warrants to purchase 39,050 shares of Common Stock. As of December 31, 2013, no shares of Preferred Stock remained outstanding as 125,000 shares of the Preferred Stock had been converted into 12,500,000 shares of Common Stock

since June 4, 2013.

39.

The securities were sold pursuant to a placement agreement and have been registered under the Securities Act of 1933 pursuant to the Company's Registration Statement on Form S-1, as amended (No.333-187508), which was declared effective by the Securities and Exchange Commission on May 29, 2013, and the Preferred Stock and warrants were offered and sold pursuant to a prospectus dated May 30, 2013.

| | | Dollars Invested | Series A Preferred Shares | Common Warrant Shares |
|----------------------------------|--|-----------------------------|--|--------------------------------------|
| June 2013 Public Offering | Name of Purchaser | | | |
| 5% Shareholder | Sabby Management LLC | \$ 10,000,000 | 62,500 | 3,125,000 |
| 5% Shareholder and Affiliate | Michael R. Bristow, M.D., Ph.D., President and CEO | \$ 124,960 | 781 | 39,050 |

Policies and Procedures for Related Party Transactions

In January 2009, in conjunction with our merger with Nuvelo, Inc., our board of directors adopted an audit committee charter that provides that the audit committee will review and approve all related party transactions. Accordingly, all related party transactions are reviewed and approved by our audit committee, including the private placements described above. This review covers any material transaction, arrangement or relationship, or any series of similar transactions, arrangements or relationships, in which we were or are to be a participant, and a related party had or will have a direct or indirect material interest, including, purchases of goods or services by or from the related party or entities in which the related party has a material interest, indebtedness, guarantees of indebtedness and employment by us of a related party.

HOUSEHOLDING OF PROXY MATERIALS

The SEC has adopted rules that permit companies and intermediaries (e.g., brokers) to satisfy the delivery requirements for Notices of Internet Availability of Proxy Materials or other Annual Meeting materials with respect to two or more stockholders sharing the same address by delivering a single Notice of Internet Availability of Proxy Materials or other Annual Meeting materials addressed to those stockholders. This process, which is commonly referred to as householding, potentially means extra convenience for stockholders and cost savings for companies.

This year, a number of brokers with account holders who are ARCA biopharma, Inc. stockholders will be householding the Company's proxy materials. A single Notice of Internet Availability of Proxy Materials will be delivered to multiple stockholders sharing an address unless contrary instructions have been received from the affected stockholders. Once you have received notice from your broker that they will be householding communications to your address, householding will continue until you are notified otherwise or until you revoke your consent. If, at any time, you no longer wish to participate in householding and would prefer to receive a separate Notice of Internet Availability of Proxy Materials, please notify your broker or ARCA biopharma, Inc. Direct your written request to Secretary, ARCA biopharma, Inc., 11080 CirclePoint Road, Suite 140, Westminster, Colorado, 80020 or contact Investor Relations at 720-940-2100. The Company undertakes to promptly deliver a separate copy of the Notice of Internet Availability of Proxy Materials promptly upon receiving your written request. Stockholders who currently receive multiple copies of the Notices of Internet Availability of Proxy Materials at their addresses and would like to request householding of their communications should contact their brokers.

OTHER MATTERS

The Board of Directors knows of no other matters that will be presented for consideration at the Annual Meeting. If any other matters are properly brought before the meeting, it is the intention of the persons named in the accompanying proxy to vote on such matters in accordance with their best judgment.

By Order of the Board of Directors

/s/ Christopher Ozeroff
Christopher Ozeroff
Secretary, Senior Vice President and General
Counsel

April 14, 2015

A copy of the Company's Annual Report to the Securities and Exchange Commission on Form 10-K for the fiscal year ended December 31, 2014, is available without charge upon written request to: Corporate Secretary, ARCA biopharma, Inc., 11080 CirclePoint Road, Suite 140, Westminster, Colorado 80020.

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 3 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 day of , 2015.

ARCA BIOPHARMA, INC.

By:

CHRISTOPHER D. OZEROFF

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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.

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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 day of , 2015.

ARCA BIOPHARMA, INC.

By:

CHRISTOPHER D. OZEROFF

CERTIFICATE OF AMENDMENT
OF
AMENDED AND RESTATED CERTIFICATE OF INCORPORATION
OF
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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 16 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 day of , 2015.

ARCA BIOPHARMA, INC.

By:

CHRISTOPHER D. OZEROFF

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 17 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.

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By:

CHRISTOPHER D. OZEROFF

Electronic Voting Instructions

Available 24 hours a day, 7 days a week!

Instead of mailing your proxy, you may choose one of the voting methods outlined below to vote your proxy.

VALIDATION DETAILS ARE LOCATED BELOW IN THE TITLE BAR.

Proxies submitted by the Internet or telephone must be received by 1:00 a.m., Mountain Time, on June 4, 2015.

Vote by Internet

Go to www.investorvote.com/ABIO

Or scan the QR code with your smartphone

Follow the steps outlined on the secure website

Vote by telephone

Call toll free 1-800-652-VOTE (8683) within the USA, US territories & Canada on a touch tone telephone

Follow the instructions provided by the recorded message

Using a **black ink** pen, mark your votes with an **X** as shown in this example. Please do not write outside the designated areas.

q IF YOU HAVE NOT VOTED VIA THE INTERNET OR TELEPHONE, FOLD ALONG THE PERFORATION, DETACH AND RETURN THE BOTTOM PORTION IN THE ENCLOSED ENVELOPE.

q

A Proposals The Board of Directors recommends a vote FOR all the nominees listed and FOR Proposals 2 and 3.

1. Election of Two Directors for a three-year term ending at the Annual Meeting of Stockholders in 2018 or until the election and qualification of their respective successors.

| | | | | | | |
|--------------------------------------|------------|-----------------|--|---------------------|-----------------|----------|
| NOMINEES: | For | Withhold | | For | Withhold | + |
| 01 - Raymond L. Woosley, M.D., Ph.D. | .. | .. | | 02 -Dan J. Mitchell | .. | .. |

| | | | | | | | |
|---|------------|----------------|----------------|--|------------|----------------|----------------|
| | For | Against | Abstain | | For | Against | Abstain |
| 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. | .. | .. | .. | 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. | .. | .. | .. |

In their discretion, the proxies are also authorized to vote upon such other matters as may properly come before the Annual Meeting.

B Non-Voting Items

Change of Address Please print your new address below. **Comments** Please print your comments below. **Meeting Attendance**

Mark the box to the right if you plan to attend the Annual Meeting.

C Authorized Signatures This section must be completed for your vote to be counted. Date and Sign Below

Please date and sign exactly as the name appears on this card. Joint owners should each sign. Please give full title when signing as executor, administrator, trustee, attorney, guardian for a minor, etc. Signatures for corporations and partnerships should be in the corporate or firm name by a duly authorized person.

m/dd/yyyy) Please print date below. Signature 1 Please keep signature within the box. Signature 2 Please keep signature within
/ /

**Important notice regarding the Internet availability of
proxy materials for the Annual Meeting of Stockholders.**

**The ARCA biopharma, Inc. Annual Report
and ARCA biopharma, Inc. Notice of Annual Meeting are available at:**

www.edocumentview.com/ABIO

**q IF YOU HAVE NOT VOTED VIA THE INTERNET OR TELEPHONE, FOLD ALONG THE
PERFORATION, DETACH AND RETURN THE BOTTOM PORTION IN THE ENCLOSED
ENVELOPE. q**

Proxy ARCA BIOPHARMA, INC.

PROXY SOLICITED BY THE BOARD OF DIRECTORS OF ARCA BIOPHARMA, INC.

FOR THE ANNUAL MEETING OF STOCKHOLDERS TO BE HELD ON JUNE 4, 2015

The undersigned hereby acknowledges receipt of the Notice of Annual Meeting of Stockholders and Proxy Statement of ARCA biopharma, Inc. (the Company), dated April 14, 2015, in connection with the Company's Annual Meeting of Stockholders to be held at the Renaissance Boulder Flatiron Hotel, 500 Flatiron Boulevard, Broomfield, CO 80021, at 9:00 a.m., Mountain Time, on Thursday, June 4, 2015, and does hereby appoint Michael R. Bristow, M.D., Ph.D., Thomas A. Keuer and Christopher D. Ozeroff, and each of them (with full power to act alone), proxies of the undersigned with all the powers the undersigned would possess if personally present and with full power of substitution in each of them, to appear and vote all shares of Common Stock of the Company which the undersigned would be entitled to vote if personally present at the 2015 Annual Meeting of Stockholders, and at any postponement or adjournment thereof.

The shares represented hereby will be voted as directed herein. **IN EACH CASE, IF NO DIRECTION IS INDICATED, SUCH SHARES WILL BE VOTED FOR ALL NOMINEES LISTED AND FOR PROPOSALS 2 AND 3. AS TO ANY OTHER MATTER THAT MAY PROPERLY COME BEFORE THE MEETING OR ANY POSTPONEMENT OR ADJOURNMENT THEREOF, SAID PROXY HOLDERS WILL VOTE IN ACCORDANCE WITH THEIR BEST JUDGMENT. THIS PROXY MAY BE REVOKED IN WRITING AT**

ANY TIME PRIOR TO THE VOTING THEREOF.

PLEASE VOTE, DATE AND SIGN ON THE REVERSE SIDE AND RETURN PROMPTLY IN THE ENCLOSED ENVELOPE.

Please be sure to sign and date this Proxy.