

ARCA biopharma, Inc.  
Form 424B4  
February 10, 2014

**Prospectus Supplement No. 14**

**Filed pursuant to Rule 424 (b)(4)**

**(to Prospectus dated May 30, 2013)**

**Registration No. 333-187508**

**125,000 Shares of Series A Convertible Preferred Stock**

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

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

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

### **ARCA biopharma, Inc.**

This prospectus supplement supplements the prospectus dated May 30, 2013 (the Prospectus ), as supplemented by that certain Prospectus Supplement No. 1 dated July 17, 2013 ( Supplement No. 1 ), 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 ), and by that certain Prospectus Supplement No. 13 dated January 8, 2014 ( Supplement No. 13, and together with Supplement No. 1, Supplement No. 2, Supplement No. 3, Supplement No. 4, Supplement No. 5, Supplement No. 6, Supplement No. 7, Supplement No. 8, Supplement No. 9, Supplement No. 10, Supplement No. 11, and Supplement No. 12, the Supplements ), which form a part of our Registration Statement on Form S-1 (Registration No. 333-187508). This prospectus supplement is being filed to update and supplement the information in the Prospectus and the Supplements with the information contained in our current reports on Form 8-K and Form 8-K/A, each filed with the Securities and Exchange Commission (the Commission ) on February 4, 2014 and February 10, 2014, respectively (the Current Reports ). Accordingly, we have attached the Current Reports 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 February 10, 2014, the last reported sale price of our common stock was \$1.77 per share.

**Investing in our securities involves a high degree of risk. You should review carefully the risks and uncertainties described under the heading Risk Factors beginning on page 5 of the Prospectus and beginning on page 23 of our quarterly report on Form 10-Q for the quarterly period ended September 30, 2013 before you decide whether to invest in shares of our common stock.**

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

**The date of this prospectus supplement is February 10, 2014**

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

**FORM 8-K**

**CURRENT REPORT**

**Pursuant to Section 13 or 15(d)**  
**of the Securities Exchange Act of 1934**

**Date of Report (Date of earliest event reported): February 4, 2014 (February 3, 2014)**

**ARCA BIOPHARMA, INC.**

**(Exact name of registrant as specified in its charter)**

**Delaware**  
**(State or other jurisdiction**

**of incorporation)**

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

**File Number)**

**36-3855489**  
**(IRS Employer**

**Identification No.)**

**ARCA biopharma, Inc.**

**80020**

**11080 CirclePoint Road, Suite 140**

**Westminster, Colorado**

**(Address of principal executive offices)**

**(Zip Code)**

**Registrant's telephone number, including area code: (720) 940-2200**

**Not applicable**

**(Former name or former address, if changed since last report)**

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

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

## **Item 1.01 Entry into a Material Definitive Agreement**

### ***Public Offering***

On February 3, 2014, ARCA biopharma, Inc. (the *Company*) agreed to sell to certain investors (collectively, the *Purchasers*) an aggregate of 5,116,228 shares of the *Company*'s common stock (collectively, the *Common Stock*) and warrants to purchase an aggregate of 1,279,057 shares of the *Company*'s common stock (the *Warrants*), at a purchase price of \$1.70 per share of *Common Stock*, for aggregate net proceeds of approximately \$8 million (the *Offering*). The *Offering* is scheduled to close on February 7, 2014, subject to customary closing conditions. Dawson James Securities, Inc. (the *Dawson*) is acting as the *Company*'s sole placement agent for the *Offering*.

Each *Purchaser* in the *Offering* will be issued a *Warrant* to purchase 0.25 shares of the *Company*'s *Common Stock* (the *Warrant Shares*) for each share of *Common Stock* purchased. The *Warrants* have an exercise price of \$2.125 per share, will expire on the five year anniversary of the date of issuance, and are exercisable immediately upon issuance, provided that the *Warrants* are not exercisable by their holder to the extent (but only to the extent) that such holder or any of its affiliates would beneficially own in excess of 4.99% of our common stock, subject to each holder's right to increase the beneficial ownership limitation to up to 9.99% on 61 days prior notice to us.

The securities will be sold pursuant to a Placement Agency Agreement dated January 21, 2014, as amended, by and between the *Company* and Dawson (the *Placement Agency Agreement*), and have been registered under the Securities Act of 1933 (the *Securities Act*) pursuant to the *Company*'s Registration Statement on Form S-3, as amended (No. 333-172686) (the *Registration Statement*), which was declared effective by the Securities and Exchange Commission on April 4, 2011, and the *Common Stock* and *Warrants* are being offered and sold pursuant to a prospectus supplement dated February 4, 2014 (the *Prospectus Supplement*). This Current Report on Form 8-K shall not constitute an offer to sell or a solicitation of an offer to buy any *Common Stock* or *Warrants*, nor shall there be any sale of the *Common Stock* or *Warrants* in any state or jurisdiction in which such an offer, solicitation or sale would be unlawful prior to registration or qualification under the securities laws of any such state or other jurisdiction.

The *Company* has also entered into a *Warrant Agency Agreement* dated February 3, 2014 (the *Warrant Agency Agreement*) with Computershare Inc. and Computershare Trust Company, N.A. (together with Computershare Inc., the *Warrant Agent*) pursuant to which the *Warrant Agent* will act as the *Company*'s agent in connection with the issuance, registration, transfer, exchange, exercise and replacement of the *Warrants* and the delivery of the *Warrant Shares*. The *Warrants* will be issued in book-entry form.

The foregoing description of the *Offering* does not purport to be complete and is qualified in its entirety by reference to the *Registration Statement* (including the exhibits thereto) and the *Prospectus Supplement*, each of which is incorporated herein by reference.

### ***Placement Agent Warrants***

Pursuant to the *Placement Agency Agreement*, Dawson agreed to act as the *Company*'s exclusive placement agent in connection with the *Offering* and the *Company* agreed to pay Dawson a cash fee equal to 7% of the aggregate gross proceeds of the *Offering* (the *Placement Agent Fee*), as well as reimburse Dawson for all expenses incurred by Dawson in connection with the *Offering*, subject to a maximum of \$50,000. In addition, the *Company* agreed to issue to Dawson warrants to purchase up to an aggregate of 3% of the aggregate number of shares of *Common Stock* sold in the *Offering* (the *Placement Agent Warrants*). As a result, the *Company* will (i) pay a *Placement Agent Fee* to Dawson equal to \$608,831.13 and (ii) issue *Placement Agent Warrants* to purchase 153,486 shares of *Common Stock* to Dawson. The *Placement Agent Warrants* have substantially the same terms as the *Warrants* issued to the *Purchasers*, except that the *Placement Agent Warrants* have an exercise price of \$2.125 per share, expire on April 4, 2016, or the five year anniversary of the effective date of the *Registration Statement*, and are restricted from transfer for a period of

180 days under FINRA Rule 5110 from the date of effectiveness or commencement of sales on connection with the Offering.

The Placement Agent Warrants and the shares of the Company's Common Stock underlying the Placement Agent Warrants have not been registered under the Securities Act and have been issued in reliance on an exemption from the registration requirements of the Securities Act afforded by Section 4(2) thereof. The Placement Agent Warrants and the shares of the Company's Common Stock underlying the Placement Agent Warrants may not be offered or sold in the United States in the absence of an effective registration statement or exemption from applicable registration requirements.

A copy of the opinion of Cooley LLP relating to the legality of the issuance and sale of the securities in the Offering is attached as Exhibit 5.1 hereto. The foregoing summaries of the terms of the Placement Agency Agreement, the form of Warrant to be issued to the Purchasers and the Warrant Agency Agreement are subject to, and qualified in their entirety by, such documents attached hereto as Exhibits 1.1, 4.1, and 4.2, respectively, which are incorporated herein by reference.

### ***Forward-Looking Statements***

Statements in this report that are not strictly historical in nature constitute forward-looking statements. Such statements include, but are not limited to, the Company's issuance of securities, the amount of proceeds from the Offering and the closing of the Offering. Such forward-looking statements involve known and unknown risks, uncertainties and other factors, that may cause actual results to be materially different from any results expressed or implied by such forward-looking statements. All forward-looking statements are qualified in their entirety by this cautionary statement. The Company is providing this information as of this date and does not undertake any obligation to update any forward-looking statements contained in this report as a result of new information, future events or otherwise.

### **Item 9.01. Financial Statements and Exhibits.**

(d) Exhibits.

#### **Exhibit**

<b>Number</b>	<b>Description</b>
1.1	Placement Agency Agreement by and between ARCA biopharma, Inc. and Dawson James Securities, Inc., dated January 21, 2014
1.2	Amendment No. 1 to Placement Agency Agreement by and between ARCA biopharma, Inc. and Dawson James Securities, Inc., dated January 31, 2014
4.1	Form of Common Stock Purchase Warrant
4.2	Warrant Agency Agreement by and among ARCA biopharma, Inc., Computershare Inc. and Computershare Trust Company, N.A. dated February 3, 2014
5.1	Opinion of Cooley LLP
23.1	Consent of Cooley LLP (included in Exhibit 5.1)
99.1	Press Release titled ARCA biopharma Announces Proposed Public Offering of Common Stock and Warrants, dated February 3, 2014
99.2	Press Release titled ARCA biopharma Announces Pricing of \$9 Million Public Offering of Common Stock and Warrants, dated February 4, 2014

**SIGNATURES**

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

**ARCA BIOPHARMA, INC.**

Date: February 4, 2014

By: /s/ Patrick M. Wheeler  
Patrick M. Wheeler

Chief Financial Officer



**INDEX TO EXHIBITS**

**Exhibit**

<b>Number</b>	<b>Description</b>
1.1	Placement Agency Agreement by and between ARCA biopharma, Inc. and Dawson James Securities, Inc., dated January 21, 2014
1.2	Amendment No. 1 to Placement Agency Agreement by and between ARCA biopharma, Inc. and Dawson James Securities, Inc., dated January 31, 2014
4.1	Form of Common Stock Purchase Warrant
4.2	Warrant Agency Agreement by and among ARCA biopharma, Inc., Computershare Inc. and Computershare Trust Company, N.A. dated February 3, 2014
5.1	Opinion of Cooley LLP
23.1	Consent of Cooley LLP (included in Exhibit 5.1)
99.1	Press Release titled ARCA biopharma Announces Proposed Public Offering of Common Stock and Warrants, dated February 3, 2014
99.2	Press Release titled ARCA biopharma Announces Pricing of \$9 Million Public Offering of Common Stock and Warrants, dated February 4, 2014

**PLACEMENT AGENCY AGREEMENT**

January 21, 2014

Dawson James Securities, Inc.

One North Federal Highway

Suite 500

Boca Raton, Florida 33432

Ladies and Gentlemen:

**Introduction.** Subject to the terms and conditions herein (this Agreement ), ARCA biopharma, Inc., a Delaware corporation (the Company ), proposes to offer and sell registered securities of the Company, including, but not limited to, shares (the Shares ) of the Company's common stock, par value \$0.001 per share (the Common Stock ), and registered warrants to purchase Common Stock (the Warrants and, together with the Shares, and the Common Stock underlying the Warrants, the Securities ) directly to various investors (each, an Investor and, collectively, the Investors ) through Dawson James Securities, Inc., as placement agent ( Dawson or the Placement Agent ).

The Company hereby confirms its agreement with the Placement Agent as follows:

**Section 1. Agreement to Act as Placement Agent.**

(a) On the basis of the representations, warranties and agreements of the Company herein contained, and subject to all the terms and conditions of this Agreement, the Placement Agent shall be the exclusive Placement Agent in connection with the offering and sale by the Company of the Securities from in a proposed takedown, or series of takedowns, under the Company's registration statement on Form S-3 (File No.333-172686) (the Registration Statement ), with the terms of such offerings (each, an Offering ) to be subject to market conditions and negotiations between the Company and the prospective Investors. The Placement Agent will act on a reasonable best efforts basis and the Company agrees and acknowledges that there is no guarantee of the successful placement of the Securities, or any portion thereof, in the prospective Offering. Under no circumstances will the placement Agent or any of its Affiliates (as defined below) be obligated to underwrite or purchase any of the Shares for its own account or otherwise provide any financing. The Placement Agent shall act solely as the Company's agent and not as principal. The Placement Agent shall have no authority to bind the Company with respect to any prospective offer to purchase Shares and the Company shall have the sole right to accept offers to purchase Shares and may reject any such offer, in whole or in part. Subject to the terms and conditions hereof and of the Subscription Agreements to be entered into between the Company and the Investors in the Offering, payment of the purchase price for, and delivery of, the Securities shall be made at one or more closings (each a Closing and the date on which each Closing occurs, a Closing Date ). As compensation for services rendered, on each Closing Date, the Company shall pay to the Placement Agent the fees and expenses set forth below:

(i) A cash fee equal to 7% of the gross proceeds received by the Company from the sale of the Securities at the closing of each Offering (a Closing ).

(ii) Such number of warrants (the Dawson Warrants ) to Dawson or its designees at each Closing to purchase shares of Common Stock equal to 3% of the

aggregate number of shares of Common Stock sold in each Offering, plus any shares of Common Stock underlying any convertible Securities sold in each Offering to such Investors (excluding any Shares underlying the Warrants). The Dawson Warrants shall have the same terms as the warrants (if any) issued to the Investors in the each Offering except that the exercise price shall be 125% of the public offering price per share and the expiration date shall be five years from Closing date of each Offering. The Dawson Warrants shall not have anti-dilution protections or be transferable for six months from the date of each Offering except as permitted by FINRA Rule 5110, and further, the number of shares of Common Stock underlying the Dawson Warrants shall be reduced if necessary to comply with FINRA rules or regulations.

(iii) The Company also agrees to reimburse Dawson's actual expenses incurred in an amount not to exceed \$50,000 for the Offering (provided, however, that such expense cap in no way limits or impairs the indemnification and contribution provisions of this Agreement). Such reimbursement shall be payable immediately upon (but only in the event of) a Closing of an Offering.

(b) The term of the Placement Agent's exclusive engagement will begin on the date hereof and end on the earlier of February 15, 2014 or 10 business days after the receipt by either party hereto of written notice of termination (the Exclusive Term). Notwithstanding anything to the contrary contained herein, the provisions concerning confidentiality, indemnification and contribution contained herein and the Company's obligations contained in the indemnification provisions will survive any expiration or termination of this Agreement, and the Company's obligation to pay fees actually earned and payable and to reimburse expenses actually incurred and reimbursable pursuant to Section 1(a)(ii) hereof and which are permitted to be reimbursed under FINRA Rule 5110(f)(2)(D), will survive any expiration or termination of this Agreement. Nothing in this Agreement shall be construed to limit the ability of the Placement Agent or its Affiliates to pursue, investigate, analyze, invest in, or engage in investment banking, financial advisory or any other business relationship with Persons (as defined below) other than the Company. As used herein (i) Person means an individual or corporation, partnership, trust, incorporated or unincorporated association, joint venture, limited liability company, joint stock company, government (or an agency or subdivision thereof) or other entity of any kind and (ii) Affiliate means any Person that, directly or indirectly through one or more intermediaries, controls or is controlled by or is under common control with a Person as such terms are used in and construed under Rule 405 under the Securities Act of 1933, as amended (the Securities Act).

**Section 2. Representations, Warranties and Covenants of the Company.** The Company hereby represents, warrants and covenants to the Placement Agent as of the date hereof, and as of each Closing Date, as follows:

(a) Securities Law Filings. The Company has filed with the Securities and Exchange Commission (the Commission) the Registration Statement under the Securities Act, which was filed on March 9, 2011 and declared effective on April 4, 2011 for the registration of the Securities. At the time of such filing, the Company met the requirements of Form S-3 under the Securities Act applicable to such filing. Following the determination of pricing among the Company and the prospective Investors introduced to the Company by the Placement Agent, the Company will file with the Commission pursuant to Rule 424(b) under the Securities Act, and the rules and regulations (the Rules and Regulations) of the Commission promulgated thereunder, a prospectus supplement relating to the terms of the Offering and of the Securities and the plan of distribution thereof and will advise the Placement Agent of all further information (financial and

other) with respect to the Company required to be set forth therein. Such registration statement, at any given time, including the exhibits thereto filed at such time, as amended at such time, is hereinafter called the Registration Statement ; such prospectus in the form in which it appears in the Registration Statement is hereinafter called the Base Prospectus ; and the amended or supplemented form of prospectus, in the form in which it will be filed with the Commission pursuant to Rule 424(b) (including the Base Prospectus as so amended or supplemented) is hereinafter called the Prospectus Supplement. The Registration Statement at the time it originally became effective is hereinafter called the Original Registration Statement. Any reference in this Agreement to the Registration Statement, the Original Registration Statement, the Base Prospectus or the Prospectus Supplement shall be deemed to refer to and include the documents incorporated by reference therein (the Incorporated Documents ), if any, which were filed under the Securities Exchange Act of 1934, as amended (the Exchange Act ), at any given time, as the case may be; and any reference in this Agreement to the terms amend, amendment or supplement with respect to the Registration Statement, the Original Registration Statement, the Base Prospectus or the Prospectus Supplement shall be deemed to refer to and include the filing of any document under the Exchange Act after the date of this Agreement, or the issue date of the Base Prospectus or the Prospectus Supplement, as the case may be, deemed to be incorporated therein by reference. All references in this Agreement to financial statements and schedules and other information that is contained, included, described, referenced, set forth or stated in the Registration Statement, the Base Prospectus or the Prospectus Supplement (and all other references of like import) shall be deemed to mean and include all such financial statements and schedules and other information that is or is deemed to be incorporated by reference in the Registration Statement, the Base Prospectus or the Prospectus Supplement, as the case may be. The Company has not received any notice that the Commission has issued or intends to issue a stop order suspending the effectiveness of the Registration Statement or the use of the Base Prospectus or the Prospectus Supplement or intends to commence a proceeding for any such purpose.

(b) Assurances. The Original Registration Statement, as amended, (and any further documents to be filed with the Commission) contains all exhibits and schedules as required by the Securities Act. Each of the Registration Statement and any post-effective amendment thereto, at the time it became effective, complied in all material respects with the Securities Act and the Exchange Act and the applicable Rules and Regulations and did not and, as amended or supplemented, if applicable, will not, contain any untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein not misleading. The Base Prospectus, and the Prospectus Supplement, each as of its respective date, comply or will comply in all material respects with the Securities Act and the Exchange Act and the applicable Rules and Regulations. Each of the Base Prospectus and the Prospectus Supplement, as amended or supplemented, did not and will not contain as of the date thereof any untrue statement of a material fact or omit to state a material fact necessary in order to make the statements therein, in light of the circumstances under which they were made, not misleading. The Incorporated Documents, if any, when they were filed with the Commission, conformed in all material respects to the requirements of the Exchange Act and the applicable Rules and Regulations, and none of such documents, when they were filed with the Commission, contained any untrue statement of a material fact or omitted to state a material fact necessary to make the statements therein (with respect to Incorporated Documents incorporated by reference in the Base Prospectus or Prospectus Supplement), in light of the circumstances under which they were made not misleading; and any further documents so filed and incorporated by reference in the Base Prospectus or Prospectus Supplement, when such documents are filed with the Commission, will conform in all material respects to the requirements of the Exchange Act and the applicable Rules and Regulations, as applicable, and will not contain any untrue statement of a material fact or

omit to state a material fact necessary to make the statements therein, in light of the circumstances under which they were made, not misleading. No post-effective amendment to the Registration Statement reflecting any facts or events arising after the date thereof which represent, individually or in the aggregate, a fundamental change in the information set forth therein is required to be filed with the Commission. There are no documents required to be filed with the Commission in connection with the transaction contemplated hereby that (x) have not been filed as required pursuant to the Securities Act or (y) will not be filed within the requisite time period. There are no contracts or other documents required to be described in the Base Prospectus, or Prospectus Supplement, or to be filed as exhibits or schedules to the Registration Statement, that have not been described or filed as required. The Company is eligible to use free writing prospectuses in connection with the Placement pursuant to Rules 164 and 433 under the Securities Act. Any free writing prospectus that the Company is required to file pursuant to Rule 433(d) under the Securities Act has been, or will be, filed with the Commission in accordance with the requirements of the Securities Act and the applicable rules and regulations of the Commission thereunder. Each free writing prospectus that the Company has filed, or is required to file, pursuant to Rule 433(d) under the Securities Act or that was prepared by or behalf of or used by the Company complies or will comply in all material respects with the requirements of the Securities Act and the applicable rules and regulations of the Commission thereunder. The Company will not, without the prior consent of the Placement Agent, prepare, use or refer to, any free writing prospectus. Notwithstanding anything else in this Agreement, the Company makes no representation or warranty with respect to Placement Agent Information.

Placement Agent Information means any information furnished in writing to the Company by the Placement Agent expressly for use in connection with the Prospectus Supplement

(c) Offering Materials. The Company has delivered, or will as promptly as practicable deliver, to the Placement Agent complete conformed copies of the Registration Statement and of each consent and certificate of experts, as applicable, filed as a part thereof, and conformed copies of the Registration Statement (without exhibits), the Base Prospectus, and the Prospectus Supplement, as amended or supplemented, in such quantities and at such places as the Placement Agent reasonably requests. Neither the Company nor any of its directors and officers has distributed and none of them will distribute, prior to the Closing Date, any offering material in connection with the offering and sale of the Securities other than the Base Prospectus, the Prospectus Supplement, the Registration Statement, copies of the documents incorporated by reference therein and any other materials permitted by the Securities Act.

(d) Subsidiaries. The Company has no subsidiaries. All references to Subsidiary and Subsidiaries shall be disregarded and have no effect.

(e) Organization and Qualification. The Company and each of the Subsidiaries is an entity duly incorporated or otherwise organized, validly existing and in good standing under the laws of the jurisdiction of its incorporation or organization, with the requisite power and authority to own and use its properties and assets and to carry on its business as currently conducted. Neither the Company nor any Subsidiary is in violation or default of any of the provisions of its respective certificate or articles of incorporation, bylaws or other organizational or charter documents. Each of the Company and the Subsidiaries is duly qualified to conduct business and is in good standing as a foreign corporation or other entity in each jurisdiction in which the nature of the business conducted or property owned by it makes such qualification necessary, except where the failure to be so qualified or in good standing, as the case may be, could not have or reasonably be expected to result in: (i) a material adverse effect on the legality, validity or enforceability of this Agreement or any other agreement entered into between the Company and the Investors, (ii) a material adverse effect on the results of operations, assets, business, prospects

or condition (financial or otherwise) of the Company and the Subsidiaries, taken as a whole, or (iii) a material adverse effect on the Company's ability to perform in any material respect on a timely basis its obligations under this Agreement or the transactions contemplated under the Prospectus Supplement (any of (i), (ii) or (iii), a Material Adverse Effect ) and no an action, claim, suit, investigation or proceeding (including, without limitation, an informal investigation or partial proceeding, such as a deposition), whether commenced or threatened ( Proceeding ) has been instituted in any such jurisdiction revoking, limiting or curtailing or seeking to revoke, limit or curtail such power and authority or qualification. For purposes of this Agreement, the terms knowledge and awareness and their derivatives with respect to the Company refer to the actual knowledge of the Company's Chief Executive Officer, Chief Financial Officer, Controller and General Counsel.

(f) Authorization; Enforcement. The Company has the requisite corporate power and authority to enter into and to consummate the transactions contemplated by this Agreement and the Prospectus Supplement and otherwise to carry out its obligations hereunder and thereunder. The execution and delivery of each of this Agreement by the Company and the consummation by it of the transactions contemplated hereby and thereby and under the Prospectus Supplement have been duly authorized by all necessary action on the part of the Company and no further action is required by the Company, the Company's Board of Directors (the Board of Directors ) or the Company's stockholders in connection therewith other than in connection with the Required Approvals (as defined below). This Agreement has been duly executed by the Company and, when delivered in accordance with the terms hereof, will constitute the valid and binding obligation of the Company enforceable against the Company in accordance with its terms, except (i) as limited by general equitable principles and applicable bankruptcy, insolvency, reorganization, moratorium and other laws of general application affecting enforcement of creditors' rights generally, (ii) as limited by laws relating to the availability of specific performance, injunctive relief or other equitable remedies and (iii) insofar as indemnification and contribution provisions may be limited by applicable law.

(g) No Conflicts. The execution, delivery and performance by the Company of this Agreement and the transactions contemplated pursuant to the Prospectus Supplement, the issuance and sale of the Securities and the consummation by it of the transactions contemplated hereby and thereby to which it is a party do not and will not (i) conflict with or violate any provision of the Company's or any Subsidiary's certificate or articles of incorporation, bylaws or other organizational or charter documents, or (ii) conflict with, or constitute a default (or an event that with notice or lapse of time or both would become a default) under, result in the creation of any Lien (lien, charge, security interest, encumbrance, right of first refusal, preemptive right or other restriction) upon any of the properties or assets of the Company or any Subsidiary under, or give to others any rights of termination, amendment, acceleration or cancellation (with or without notice, lapse of time or both) of, any agreement, credit facility, debt or other instrument (evidencing a Company or Subsidiary debt or otherwise) or other understanding to which the Company or any Subsidiary is a party or by which any property or asset of the Company or any Subsidiary is bound or affected, or (iii) subject to the Required Approvals, conflict with or result in a violation of any law, rule, regulation, order, judgment, injunction, decree or other restriction of any court or governmental authority to which the Company or a Subsidiary is subject (including federal and state securities laws and regulations), or by which any property or asset of the Company or a Subsidiary is bound or affected; except in the case of each of clauses (ii) and (iii), such as could not have or reasonably be expected to result in a Material Adverse Effect.

(h) Filings, Consents and Approvals. The Company is not required to obtain any consent, waiver, authorization or order of, give any notice to, or make any filing or registration

with, any court or other federal, state, local or other governmental authority or other Person in connection with the execution, delivery and performance by the Company of this Agreement and the transactions contemplated pursuant to the Prospectus Supplement, other than: (i) the filing with the Commission of the Prospectus Supplement, (ii) application(s) to the Nasdaq Capital Market (the Trading Market ) for the listing of the Securities for trading thereon in the time and manner required thereby and (iii) such filings as are required to be made under applicable state securities laws (collectively, the Required Approvals ).

(i) Issuance of the Securities: Registration. The Shares are duly authorized and, when issued and paid for in accordance with the Prospectus Supplement, will be duly and validly issued, fully paid and nonassessable, free and clear of all Liens imposed by the Company. The shares underlying the Warrants (the Warrant Shares ), when issued in accordance with the terms of the Warrants, will be validly issued, fully paid and nonassessable, free and clear of all Liens imposed by the Company. The Company has reserved from its duly authorized capital stock the maximum number of shares of Common Stock issuable pursuant to the Prospectus Supplement. The Warrants are valid and binding obligations of the Company.

(j) Capitalization. The capitalization of the Company is as set forth in the Incorporated Documents or the Prospectus Supplement. The Company has not issued any capital stock since its most recently filed periodic report under the Exchange Act, other than pursuant to the exercise of employee stock options under the Company's stock option plans, the issuance of shares of Common Stock to employees pursuant to the Company's employee stock purchase plans and pursuant to the conversion and/or exercise of securities of the Company or the Subsidiaries which would entitle the holder thereof to acquire at any time any Common Stock, including, without limitation, any debt, preferred stock, rights, options, warrants or other instrument that is at any time convertible into or exercisable or exchangeable for, or otherwise entitles the holder thereof to receive, Common Stock (Common Stock Equivalents ) outstanding as of the date of the most recently filed periodic report under the Exchange Act. No Person has any right of first refusal, preemptive right, right of participation, or any similar right to participate in the transactions contemplated by this Agreement and the transactions contemplated pursuant to the Prospectus Supplement. Except as a result of the purchase and sale of the Securities or as otherwise set forth in SEC Reports, there are no outstanding options, warrants, scrip rights to subscribe to, calls or commitments of any character whatsoever relating to, or securities, rights or obligations convertible into or exercisable or exchangeable for, or giving any Person any right to subscribe for or acquire, any shares of Common Stock, or contracts, commitments, understandings or arrangements by which the Company or any Subsidiary is or may become bound to issue additional shares of Common Stock or Common Stock Equivalents. The issuance and sale of the Securities will not obligate the Company to issue shares of Common Stock or other securities to any Person (other than the Investors) and will not result in a right of any holder of Company securities to adjust the exercise, conversion, exchange or reset price under any of such securities. All of the outstanding shares of capital stock of the Company are validly issued, fully paid and nonassessable, have been issued in compliance with all federal and state securities laws, and none of such outstanding shares was issued in violation of any preemptive rights or similar rights to subscribe for or purchase securities. No further approval or authorization of any stockholder, the Board of Directors or others is required for the issuance and sale of the Securities. Except as set forth in the SEC Reports, there are no stockholders agreements, voting agreements or other similar agreements with respect to the Company's capital stock to which the Company is a party or, to the knowledge of the Company, between or among any of the Company's stockholders.

(k) SEC Reports; Financial Statements. The Company has filed all reports, schedules, forms, statements and other documents required to be filed by the Company under the Securities Act and the Exchange Act, including pursuant to Section 13(a) or 15(d) thereof, for the two years preceding the date hereof (or such shorter period as the Company was required by law or regulation to file such material) (the foregoing materials, including the exhibits thereto and documents incorporated by reference therein, together with the Prospectus and the Prospectus Supplement, being collectively referred to herein as the SEC Reports ) on a timely basis or has received a valid extension of such time of filing and has filed any such SEC Reports prior to the expiration of any such extension. As of their respective dates, the SEC Reports complied in all material respects with the requirements of the Securities Act and the Exchange Act, as applicable, and none of the SEC Reports, when filed, contained any untrue statement of a material fact or omitted to state a material fact required to be stated therein or necessary in order to make the statements therein, in the light of the circumstances under which they were made, not misleading. The financial statements of the Company included in the SEC Reports comply in all material respects with applicable accounting requirements and the rules and regulations of the Commission with respect thereto as in effect at the time of filing. Such financial statements have been prepared in accordance with United States generally accepted accounting principles applied on a consistent basis during the periods involved (GAAP ), except as may be otherwise specified in such financial statements or the notes thereto and except that unaudited financial statements may not contain all footnotes required by GAAP, and fairly present in all material respects the financial position of the Company and its consolidated Subsidiaries as of and for the dates thereof and the results of operations and cash flows for the periods then ended, subject, in the case of unaudited statements, to normal, immaterial, year-end audit adjustments.

(l) Material Changes; Undisclosed Events, Liabilities or Developments. Since the date of the latest audited financial statements included within the SEC Reports, except as specifically disclosed in a subsequent SEC Report filed prior to the date hereof or as otherwise set forth in the Prospectus Supplement, (i) there has been no event, occurrence or development that has had or that could reasonably be expected to result in a Material Adverse Effect, (ii) the Company has not incurred any liabilities (contingent or otherwise) other than (A) trade payables and accrued expenses incurred in the ordinary course of business consistent with past practice and (B) liabilities not required to be reflected in the Company's financial statements pursuant to GAAP or disclosed in filings made with the Commission, (iii) the Company has not altered its method of accounting, (iv) the Company has not declared or made any dividend or distribution of cash or other property to its stockholders or purchased, redeemed or made any agreements to purchase or redeem any shares of its capital stock and (v) the Company has not issued any equity securities to any officer, director or Affiliate, except pursuant to existing Company stock option plans. Except as set forth in the SEC Reports, the Company does not have pending before the Commission any request for confidential treatment of information. Except for the issuance of the Securities contemplated by the Prospectus Supplement or disclosed in the Prospectus Supplement, no event, liability, fact, circumstance, occurrence or development has occurred or exists or is reasonably expected to occur or exist with respect to the Company or its Subsidiaries or their respective business, prospects, properties, operations, assets or financial condition that would be required to be disclosed by the Company under applicable securities laws at the time this representation is made or deemed made that has not been publicly disclosed at least 1 Trading Day prior to the date that this representation is made.

(m) Litigation. There is no action, suit, inquiry, notice of violation, proceeding or investigation pending or, to the knowledge of the Company, threatened against or affecting the Company, any Subsidiary or any of their respective properties before or by any court, arbitrator, governmental or administrative agency or regulatory authority (federal, state, county, local or



foreign) (collectively, an Action ) which (i) adversely affects or challenges the legality, validity or enforceability of any of this Agreement and the transactions contemplated pursuant to the Prospectus Supplement or the Securities or (ii) could, if there were an unfavorable decision, have or reasonably be expected to result in a Material Adverse Effect. Except as set forth in the SEC Reports, neither the Company nor any Subsidiary, nor any director or officer thereof, is or has been the subject of any Action involving a claim of violation of or liability under federal or state securities laws or a claim of breach of fiduciary duty. Except as set forth in the SEC Reports, there has not been, and to the knowledge of the Company, there is not pending or contemplated, any investigation by the Commission involving the Company or any current or former director or officer of the Company. The Commission has not issued any stop order or other order suspending the effectiveness of any registration statement filed by the Company or any Subsidiary under the Exchange Act or the Securities Act for the last three years.

(n) Labor Relations. No material labor dispute exists or, to the knowledge of the Company, is imminent with respect to any of the employees of the Company, which could reasonably be expected to result in a Material Adverse Effect. None of the Company's or its Subsidiaries' employees is a member of a union that relates to such employee's relationship with the Company or such Subsidiary, and neither the Company nor any of its Subsidiaries is a party to a collective bargaining agreement, and the Company and its Subsidiaries believe that their relationships with their employees are good. No executive officer of the Company, to the knowledge of the Company, is, or is now expected to be, in violation of any material term of any employment contract, confidentiality, disclosure or proprietary information agreement or non-competition agreement, or any other contract or agreement or any restrictive covenant in favor of any third party, and the continued employment of each such executive officer does not subject the Company or any of its Subsidiaries to any liability with respect to any of the foregoing matters. The Company and its Subsidiaries are in compliance with all U.S. federal, state, local and foreign laws and regulations relating to employment and employment practices, terms and conditions of employment and wages and hours, except where the failure to be in compliance could not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect.

(o) Compliance. Neither the Company nor any Subsidiary: (i) is in default under or in violation of (and no event has occurred that has not been waived that, with notice or lapse of time or both, would result in a default by the Company or any Subsidiary under), nor has the Company or any Subsidiary received notice of a claim that it is in default under or that it is in violation of, any indenture, loan or credit agreement or any other agreement or instrument to which it is a party or by which it or any of its properties is bound (whether or not such default or violation has been waived), (ii) is in violation of any judgment, decree or order of any court, arbitrator or governmental body or (iii) is or has been in violation of any statute, rule, ordinance or regulation of any governmental authority, including without limitation all foreign, federal, state and local laws relating to taxes, environmental protection, occupational health and safety, product quality and safety and employment and labor matters, except in each case as could not have or reasonably be expected to result in a Material Adverse Effect.

(p) Regulatory Permits. The Company and the Subsidiaries possess all certificates, authorizations and permits issued by the appropriate federal, state, local or foreign regulatory authorities necessary to conduct their respective businesses as presently conducted as described in the SEC Reports, except where the failure to possess such permits could not reasonably be expected to result in a Material Adverse Effect (Material Permits ), and neither the Company nor any Subsidiary has received any notice of proceedings relating to the revocation or modification of any Material Permit.

(q) Title to Assets. The Company and the Subsidiaries have good and marketable title in fee simple to all real property owned by them and good and marketable title in all personal property owned by them that is material to the business of the Company and the Subsidiaries, in each case free and clear of all Liens, except for Liens as do not materially affect the value of such property and do not materially interfere with the use made and proposed to be made of such property by the Company and the Subsidiaries and Liens for the payment of federal, state or other taxes, the payment of which is neither delinquent nor subject to penalties. Any real property and facilities held under lease by the Company and the Subsidiaries are held by them under valid, subsisting and enforceable leases with which the Company and the Subsidiaries are in compliance in all material respects.

(r) Patents and Trademarks. The Company and the Subsidiaries have, or have rights to use, all patents, patent applications, trademarks, trademark applications, service marks, trade names, trade secrets, inventions, copyrights, licenses and other intellectual property rights and similar rights necessary or material for use in connection with their respective businesses as described in the SEC Reports as being owned by or licensed to the Company and which the failure to so have could reasonably be expected to have a Material Adverse Effect (collectively, the Intellectual Property Rights ). Neither the Company nor any Subsidiary has received a notice (written or otherwise) that any of, the Intellectual Property Rights has expired, terminated or been abandoned, or is expected to expire or terminate or be abandoned, within two (2) years after the date of this Agreement. Neither the Company nor any Subsidiary has received, since the date of the latest audited financial statements included within the SEC Reports, a notice (written or otherwise) of a claim or otherwise has any knowledge that the Intellectual Property Rights misappropriate or infringe upon the proprietary rights of any Person, except as would not reasonably be expected to have a Material Adverse Effect. To the knowledge of the Company, all such Intellectual Property Rights are enforceable in all material respects and there is no existing infringement by another Person of any of the Intellectual Property Rights. The Company and its Subsidiaries have taken reasonable security measures to protect the secrecy, confidentiality and value of all of their Intellectual Property Rights, except where failure to do so could not, individually or in the aggregate, reasonably be expected to have a Material Adverse Effect.

(s) Insurance. The Company and the Subsidiaries are insured by insurers of recognized financial responsibility against such losses and risks and in such amounts as are prudent and customary in the businesses in which the Company and the Subsidiaries are engaged, including, but not limited to, directors and officers insurance coverage. Neither the Company nor any Subsidiary has any reason to believe that it will not be able to renew its existing insurance coverage as and when such coverage expires or to obtain similar coverage from similar insurers as may be necessary to continue its business without a significant increase in cost.

(t) Transactions With Affiliates and Employees. Except as set forth in the SEC Reports, none of the officers or directors of the Company and, to the knowledge of the Company, none of the employees of the Company is presently a party to any transaction with the Company or any Subsidiary (other than for services as employees, officers and directors), including any contract, agreement or other arrangement providing for the furnishing of services to or by, providing for rental of real or personal property to or from, or otherwise requiring payments to or from any officer, director or such employee or, to the knowledge of the Company, any entity in which any officer, director, or any such employee has a substantial interest or is an officer, director, trustee or partner, in each case in excess of \$120,000 other than for (i) payment of salary or consulting fees for services rendered, (ii) reimbursement for expenses incurred on behalf of the Company and (iii) other employee benefits, including stock option agreements under any stock option plan of the Company.

(u) Sarbanes-Oxley; Internal Accounting Controls. The Company is in compliance with any and all applicable requirements of the Sarbanes-Oxley Act of 2002 that are effective as of the date hereof, and any and all applicable rules and regulations promulgated by the Commission thereunder that are effective as of the date hereof and as of each Closing Date. The Company and the Subsidiaries maintain a system of internal accounting controls sufficient to provide reasonable assurance that: (i) transactions are executed in accordance with management's general or specific authorizations, (ii) transactions are recorded as necessary to permit preparation of financial statements in conformity with GAAP and to maintain asset accountability, (iii) access to assets is permitted only in accordance with management's general or specific authorization, and (iv) the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action is taken with respect to any differences. The Company has established disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) for the Company and designed such disclosure controls and procedures to ensure that information required to be disclosed by the Company in the reports it files or submits under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the Commission's applicable rules and forms. The Company's certifying officers have evaluated the effectiveness of the Company's disclosure controls and procedures as of the end of the period covered by the Company's most recently filed periodic report under the Exchange Act (such date, the Evaluation Date). The Company presented in its most recently filed periodic report under the Exchange Act the conclusions of the certifying officers about the effectiveness of the disclosure controls and procedures based on their evaluations as of the Evaluation Date. Since the Evaluation Date, there have been no changes in the Company's internal control over financial reporting (as such term is defined in the Exchange Act) that has materially affected, or is reasonably likely to materially affect, the Company's internal control over financial reporting.

(v) Certain Fees. Except as set forth in the Prospectus Supplement, no brokerage or finder's fees or commissions are or will be payable by the Company to any broker, financial advisor or consultant, finder, placement agent, investment banker, bank or other Person with respect to the transactions contemplated by this Agreement and the transactions contemplated pursuant to the Prospectus Supplement. The Investors shall have no obligation with respect to any fees arising under this Agreement or with respect to any claims made by or on behalf of other Persons for fees of a type contemplated in this Section that may be due in connection with the transactions contemplated by this Agreement and the transactions contemplated pursuant to the Prospectus Supplement.

(w) Investment Company. The Company is not, and immediately after receipt of payment for the Securities, will not be or be required to register as an investment company within the meaning of the Investment Company Act of 1940, as amended. The Company shall conduct its business in a manner so that it will not become required to register as an investment company subject to registration under the Investment Company Act of 1940, as amended.

(x) Registration Rights. No Person has any right to cause the Company to effect the registration under the Securities Act of any securities of the Company, except such rights as have been validly waived or satisfied except as set forth in the SEC Reports.

(y) Listing and Maintenance Requirements. The Common Stock is registered pursuant to Section 12(b) or 12(g) of the Exchange Act, and the Company has taken no action designed to, or which to its knowledge is likely to have the effect of, terminating the registration of the Common Stock under the Exchange Act nor has the Company received any notification that the Commission is contemplating terminating such registration. Except as set forth in the SEC Reports, the Company has not, in the 12 months preceding the date hereof, received notice

from any Trading Market on which the Common Stock is or has been listed or quoted to the effect that the Company is not in compliance with the listing or maintenance requirements of such Trading Market. Except as set forth in the SEC Reports, the Company is, and has no reason to believe that it will not in the foreseeable future continue to be, in compliance with all such listing and maintenance requirements.

(z) Application of Takeover Protections. The Company and the Board of Directors have taken all necessary action, if any, in order to render inapplicable any control share acquisition, business combination, poison pill (including any distribution under a rights agreement) or other similar anti-takeover provision under the Company's certificate of incorporation (or similar charter documents) or the laws of its state of incorporation that is or could become applicable to the Investors as a result of the Investors and the Company fulfilling their obligations or exercising their rights under this Agreement and the transactions contemplated pursuant to the Prospectus Supplement, including without limitation as a result of the Company's issuance of the Securities and the Investors' ownership of the Securities.

(aa) Disclosure. Except with respect to the material terms and conditions of the transactions contemplated by this Agreement and the transactions contemplated pursuant to the Prospectus Supplement, the Company confirms that neither it nor any other Person acting on its behalf (other than the Placement Agent, as to which no representation is made) has provided any of the Investors or their agents or counsel with any information that it believes constitutes or might constitute material, non-public information which is not otherwise disclosed in the Prospectus Supplement. The Company understands and confirms that the Investors will rely on the foregoing representation in effecting transactions in securities of the Company. All of the disclosure furnished by or on behalf of the Company to the Investors regarding the Company, its business and the transactions contemplated hereby, including the Prospectus Supplement and the Disclosure Schedules to this Agreement, is true and correct and does not contain any untrue statement of a material fact or omit to state any material fact necessary in order to make the statements made therein, in light of the circumstances under which they were made, not misleading. The press releases disseminated by the Company during the twelve months preceding the date of this Agreement taken as a whole do not contain any untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary in order to make the statements therein, in light of the circumstances under which they were made and when made, not misleading.

(bb) No Integrated Offering. Neither the Company, nor any of its Affiliates, nor any Person acting on its or their behalf (excluding the Placement Agent) has, directly or indirectly, made any offers or sales of any security or solicited any offers to buy any security, under circumstances that would cause this offering of the Securities to be integrated with prior offerings by the Company for purposes of any applicable shareholder approval provisions of any Trading Market on which any of the securities of the Company are listed or designated.

(cc) Solvency. Based on the consolidated financial condition of the Company as of each Closing Date, after giving effect to the receipt by the Company of the proceeds from the sale of the Securities hereunder, (i) the fair saleable value of the Company's assets exceeds the amount that will be required to be paid on or in respect of the Company's existing debts and other liabilities (including known contingent liabilities) as they mature, (ii) the Company's assets do not constitute unreasonably small capital to carry on its business as now conducted, and (iii) the current cash flow of the Company, together with the proceeds the Company would receive, were it to liquidate all of its assets, after taking into account all anticipated uses of the cash, would be sufficient to pay all amounts on or in respect of its liabilities when such amounts are required to

be paid. The Company does not intend to incur debts beyond its ability to pay such debts as they mature (taking into account the timing and amounts of cash to be payable on or in respect of its debt). Except as expressly set forth in the SEC Reports, the Company has no knowledge of any facts or circumstances which lead it to believe that it will file for reorganization or liquidation under the bankruptcy or reorganization laws of any jurisdiction within one year from each Closing Date.

(dd) Tax Status. Except for matters that would not, individually or in the aggregate, have or reasonably be expected to result in a Material Adverse Effect, the Company and each Subsidiary (i) has made or filed (or timely requested an extension with respect to) all United States federal and state income and all foreign income and franchise tax returns, reports and declarations required by any jurisdiction to which it is subject, (ii) has paid all taxes and other governmental assessments and charges that are material in amount, shown or determined to be due on such returns, reports and declarations or set aside on its books provision reasonably adequate for the payment of all material taxes for the periods to which such returns, reports or declarations apply. There are no unpaid taxes in any material amount claimed to be due by the taxing authority of any jurisdiction, and the officers of the Company or of any Subsidiary know of no basis for any such claim other than those subject to good faith dispute by the Company or for which the Company has set aside on its books provision reasonably adequate for the payment thereof.

(ee) Foreign Corrupt Practices. Neither the Company, nor to the knowledge of the Company, any agent or other person acting on behalf of the Company, has (i) directly or indirectly, used any funds for unlawful contributions, gifts, entertainment or other unlawful expenses related to foreign or domestic political activity, (ii) made any unlawful payment to foreign or domestic government officials or employees or to any foreign or domestic political parties or campaigns from corporate funds, (iii) failed to disclose fully any contribution made by the Company (or made by any person acting on its behalf of which the Company is aware) which is in violation of law, or (iv) violated in any material respect any provision of the Foreign Corrupt Practices Act of 1977, as amended.

(ff) Accountants. The accounting firm presently providing outside audit services to the Company is set forth in the Incorporated Documents of the Prospectus. To the knowledge of the Company, such accounting firm is a registered public accounting firm as required by the Exchange Act.

(gg) Regulation M Compliance. The Company has not, and to its knowledge no one acting on its behalf (excluding the Placement Agent) has, (i) taken, directly or indirectly, any action designed to cause or to result in the stabilization or manipulation of the price of any security of the Company to facilitate the sale or resale of any of the Securities, (ii) sold, bid for, purchased, or, paid any compensation for soliciting purchases of, any of the Securities, or (iii) paid or agreed to pay to any Person any compensation for soliciting another to purchase any other securities of the Company, other than, in the case of clauses (ii) and (iii), compensation paid to the Placement Agent in connection with the placement of the Securities.

(hh) Office of Foreign Assets Control. Neither the Company nor, to the Company's knowledge, any director, officer, agent, employee or affiliate of the Company is currently subject to any U.S. sanctions administered by the Office of Foreign Assets Control of the U.S. Treasury Department (OFAC).

(ii) U.S. Real Property Holding Corporation. The Company is not and has never been a U.S. real property holding corporation within the meaning of Section 897 of the Internal Revenue Code of 1986, as amended.

(jj) Bank Holding Company Act. Neither the Company nor any of its Subsidiaries or Affiliates is required to register pursuant to the Bank Holding Company Act of 1956, as amended (the BHCA ) and subject to regulatory restrictions imposed by the Board of Governors of the Federal Reserve System (the Federal Reserve ). Neither the Company nor any of its Subsidiaries or, to the Company's knowledge, its Affiliates, owns or controls, directly or indirectly, five percent (5%) or more of the outstanding shares of any class of voting securities or twenty-five percent or more of the total equity of a bank or any entity that is required to register pursuant to the BHCA and subject to regulatory restrictions imposed by the Federal Reserve. Neither the Company nor any of its Subsidiaries or, to the knowledge of the Company, its Affiliates exercises a controlling influence over the management or policies of a bank or any entity that is required to register pursuant to the BHCA and subject to regulatory restrictions imposed by the Federal Reserve.

(kk) Money Laundering. The operations of the Company are and have been conducted at all times in compliance in all material respects with applicable financial record-keeping and reporting requirements of the Currency and Foreign Transactions Reporting Act of 1970, as amended, applicable money laundering statutes and applicable rules and regulations thereunder (collectively, the Money Laundering Laws ), and no action, suit or proceeding by or before any court or governmental agency, authority or body or any arbitrator involving the Company with respect to the Money Laundering Laws is pending or, to the knowledge of the Company, threatened.

(ll) Certificates. Any certificate signed by an officer of the Company and delivered to the Placement Agent or to counsel for the Placement Agent shall be deemed to be a representation and warranty by the Company to the Placement Agent as to the matters set forth therein.

(mm) Reliance. The Company acknowledges that the Placement Agent will rely upon the accuracy and truthfulness of the foregoing representations and warranties and hereby consents to such reliance.

(nn) Forward-Looking Statements. No forward-looking statements (within the meaning of Section 27A of the Securities Act and Section 21E of the Exchange Act) contained in either the Registration Statement, the Base Prospectus or the Prospectus Supplement has been made or reaffirmed without a reasonable basis or has been disclosed other than in good faith.

(oo) Statistical or Market-Related Data. Any statistical, industry-related and market-related data included or incorporated by reference in the Registration Statement, the Base Prospectus or the Prospectus Supplement, are based on or derived from sources that the Company reasonably and in good faith believes to be reliable and accurate, and such data agree with the sources from which they are derived.

(pp) FINRA Affiliations. There are no affiliations with any FINRA member firm among the Company's officers, directors or, to the knowledge of the Company, any five percent (5%) or greater stockholder of the Company.

**Section 3. Delivery and Payment.** Each Closing shall occur as set forth in the Subscription Agreements and the Escrow Agreement.

Deliveries of the documents with respect to the purchase of the Securities, if any, shall be made at the offices of Placement Agent. All actions taken at a Closing shall be deemed to have occurred simultaneously.

**Section 4. Covenants and Agreements of the Company.** The Company further covenants and agrees with the Placement Agent as follows:

(a) Registration Statement Matters. During the Prospectus Delivery Period (as defined below), the Company will advise the Placement Agent promptly after it receives notice thereof of the time when any amendment to the Registration Statement has been filed or becomes effective or any supplement to any Prospectus Supplement or any amended Prospectus Supplement has been filed and will furnish the Placement Agent with copies thereof. During the Prospectus Delivery Period, the Company will file promptly all reports and any definitive proxy or information statements required to be filed by the Company with the Commission pursuant to Section 13(a), 14 or 15(d) of the Exchange Act subsequent to the date of any Prospectus Supplement. During the Prospectus Delivery Period, the Company will advise the Placement Agent, promptly after it receives notice thereof (i) of any request by the Commission to amend the Registration Statement or to amend or supplement any Prospectus Supplement or for additional information, and (ii) of the issuance by the Commission of any stop order suspending the effectiveness of the Registration Statement or any post-effective amendment thereto or any order directed at any Incorporated Document or any order preventing or suspending the use of the Base Prospectus or any Prospectus Supplement or any amendment or supplement thereto or any post-effective amendment to the Registration Statement, of the suspension of the qualification of the Securities for offering or sale in any jurisdiction, of the institution or threatened institution of any proceeding for any such purpose, or of any request by the Commission for the amending or supplementing of the Registration Statement or a Prospectus Supplement or for additional information. The Company shall use its reasonable efforts to prevent the issuance of any such stop order or prevention or suspension of such use. If the Commission shall enter any such stop order or order or notice of prevention or suspension at any time, the Company will use its reasonable efforts to obtain the lifting of such order at the earliest possible moment. Additionally, the Company agrees that it shall comply with the provisions of Rules 424(b), 430A, 430B and 430C, as applicable, under the Securities Act, including with respect to the timely filing of documents thereunder, and will use its reasonable efforts to confirm that any filings made by the Company under such Rule 424(b) are received in a timely manner by the Commission.

(b) Blue Sky Compliance. To the extent necessary, if any, the Company will cooperate with the Placement Agent and the Investors in endeavoring to qualify the Securities for sale under the securities laws of such jurisdictions (United States) as the Placement Agent and the Investors may reasonably request and will make such applications, file such documents, and furnish such information as may be reasonably required for that purpose, provided the Company shall not be required to qualify as a foreign corporation or to file a general consent to service of process in any jurisdiction where it is not now so qualified or required to file such a consent, and provided further that the Company shall not be required to produce any new disclosure document other than a Prospectus Supplement. The Company will, from time to time, prepare and file such statements, reports and other documents as are or may be required to continue such qualifications in effect for so long a period as the Placement Agent may reasonably request for distribution of the Securities. The Company will advise the Placement Agent promptly of the suspension of the qualification or registration of (or any such exemption relating to) the Securities for offering, sale

or trading in any jurisdiction or any initiation or threat of any proceeding for any such purpose, and in the event of the issuance of any order suspending such qualification, registration or exemption, the Company shall use its best efforts to obtain the withdrawal thereof at the earliest possible moment.

(c) Amendments and Supplements to a Prospectus Supplement and Other Matters. The Company will comply with the Securities Act and the Exchange Act, and the rules and regulations of the Commission thereunder, so as to permit the completion of the distribution of the Securities as contemplated in this Agreement, the Incorporated Documents and any Prospectus Supplement. If during the period in which a prospectus is required by law to be delivered in connection with the distribution of Securities contemplated by the Incorporated Documents or any Prospectus Supplement (the Prospectus Delivery Period), any event shall occur as a result of which, in the judgment of the Company or in the opinion of the Placement Agent or counsel for the Placement Agent, it becomes necessary to amend or supplement the Incorporated Documents or any Prospectus Supplement in order to make the statements therein, in the light of the circumstances under which they were made, as the case may be, not misleading, or if it is necessary at any time to amend or supplement the Incorporated Documents or any Prospectus Supplement or to file under the Exchange Act any Incorporated Document to comply with any law, the Company will promptly prepare and file with the Commission, and furnish at its own expense to the Placement Agent, an appropriate amendment to the Registration Statement or supplement to the Registration Statement, the Incorporated Documents or any Prospectus Supplement that is necessary in order to make the statements in the Incorporated Documents and any Prospectus Supplement as so amended or supplemented, in the light of the circumstances under which they were made, as the case may be, not misleading, or so that the Registration Statement, the Incorporated Documents or any Prospectus Supplement, as so amended or supplemented, will comply with law. Before amending the Registration Statement or supplementing the Incorporated Documents or any Prospectus Supplement in connection with the Offering, the Company will furnish the Placement Agent with a copy of such proposed amendment or supplement and will not file any such amendment or supplement to which the Placement Agent reasonably objects.

(d) Copies of any Amendments and Supplements to a Prospectus Supplement. The Company will furnish the Placement Agent, without charge, during the period beginning on the date hereof and ending on the end of the Prospectus Delivery Period, as many copies of the Incorporated Documents (other than any such document that is filed with the Commission electronically via EDGAR or any successor system) and any Prospectus Supplement and any amendments and supplements thereto (including any Incorporated Documents, if any other than any such document that is filed with the Commission electronically via EDGAR or any successor system) as the Placement Agent may reasonably request.

(e) Free Writing Prospectus. The Company covenants that it will not, unless it obtains the prior written consent of the Placement Agent, not to be unreasonably withheld, make any offer relating to the Securities that would constitute a Company Free Writing Prospectus or that would otherwise constitute a free writing prospectus (as defined in Rule 405 of the Securities Act) required to be filed by the Company with the Commission or retained by the Company under Rule 433 of the Securities Act. In the event that the Placement Agent expressly consents in writing to any such free writing prospectus (a Permitted Free Writing Prospectus), the Company covenants that it shall (i) treat each Permitted Free Writing Prospectus as a Company Free Writing Prospectus, and (ii) comply with the requirements of Rule 164 and 433 of the Securities Act applicable to such Permitted Free Writing Prospectus, including in respect of timely filing with the Commission, legending and record keeping.



- (f) Transfer Agent. The Company will maintain, at its expense, a registrar and transfer agent for the Common Stock.
- (g) Earnings Statement. As soon as practicable and in accordance with applicable requirements under the Securities Act, but in any event not later than 18 months after the last Closing Date, the Company will make generally available to its security holders and to the Placement Agent an earnings statement, covering a period of at least 12 consecutive months beginning after the last Closing Date, that satisfies the provisions of Section 11(a) and Rule 158 under the Securities Act.
- (h) Periodic Reporting Obligations. During the Prospectus Delivery Period, the Company will duly file, on a timely basis, with the Commission and the Trading Market all reports and documents required to be filed under the Exchange Act within the time periods and in the manner required by the Exchange Act.
- (i) Reliance. The Company agrees that the Placement Agent may rely upon, and each is a third party beneficiary of, the representations and warranties, and applicable covenants, set forth in any such purchase, subscription or other agreement with Investors in the Offering.
- (j) No Manipulation of Price. The Company will not take, directly or indirectly, any action designed to cause or result in, or that has constituted or might reasonably be expected to constitute, the stabilization or manipulation of the price of any securities of the Company.
- (k) Acknowledgment. The Company acknowledges that any advice given by the Placement Agent to the Company is solely for the benefit and use of the Board of Directors of the Company and may not be used, reproduced, disseminated, quoted or referred to, without the Placement Agent's prior written consent.

**Section 5. Conditions of the Obligations of the Placement Agent.** The obligations of the Placement Agent hereunder shall be subject to each of the following additional conditions:

- (a) Representations and Warranties; Covenants. The representations and warranties on the part of the Company set forth in Section 2 hereof shall be true and correct in all material respects in each case as of the date hereof and as of the Closing Date as though then made (except that those representations and warranties that address matters only as of a particular date shall remain true and correct in all material respects as of such date), and all covenants and agreements herein contained to be performed on the part of the Company at or prior to the Closing Date shall have been duly performed.
- (b) Compliance with Registration Requirements; No Stop Order; No Objection from the FINRA. Each Prospectus Supplement (in accordance with Rule 424(b)) and free writing prospectus (as defined in Rule 405 of the Securities Act), if any, shall have been duly filed with the Commission, as appropriate; no stop order suspending the effectiveness of the Registration Statement or any part thereof shall have been issued and no proceeding for that purpose shall have been initiated or threatened by the Commission; no order preventing or suspending the use of any Prospectus Supplement shall have been issued and no proceeding for that purpose shall have been initiated or threatened by the Commission; no order having the effect of ceasing or suspending the distribution of the Securities or any other securities of the Company shall have been issued by any securities commission, securities regulatory authority or stock exchange and no proceedings for that purpose shall have been instituted or shall be pending or, to the knowledge of the Company, contemplated by any securities commission, securities regulatory

authority or stock exchange; all requests for additional information on the part of the Commission shall have been complied with; and the FINRA shall have raised no objection to the fairness and reasonableness of the placement terms and arrangements

(c) Corporate Proceedings. All corporate proceedings and other legal matters in connection with this Agreement, the Registration Statement and each Prospectus Supplement, and the registration, sale and delivery of the Securities, shall have been completed or resolved in a manner reasonably satisfactory to the Placement Agent's counsel, and such counsel shall have been furnished with such papers and information as it may reasonably have requested to enable such counsel to pass upon the matters referred to in this Section 5.

(d) No Material Adverse Effect. Subsequent to the execution and delivery of this Agreement and prior to each Closing Date, in the Placement Agent's sole judgment after consultation with the Company, there shall not have occurred any Material Adverse Effect.

(e) Opinion of Counsel for the Company. The Placement Agent shall have received on each Closing Date the favorable opinion of legal counsel to the Company, dated as of such Closing Date addressed to the Placement Agent in form and substance satisfactory to the Placement Agent.

(f) Officers Certificate. The Placement Agent shall have received on each Closing Date a certificate of the Company, dated as of such Closing Date, signed by the Chief Executive Officer and Chief Financial Officer of the Company, to the effect that, and the Placement Agent shall be satisfied that, the signers of such certificate have reviewed the Registration Statement, the Incorporated Documents, any Prospectus Supplement, any Permitted Free Writing Prospectus and this Agreement and to the further effect that:

(i) The representations and warranties of the Company in this Agreement are true and correct, as if made on and as of such Closing Date (except that those representations and warranties that address matter only as of a particular date shall remain true and correct as of such date), and the Company has complied with all the agreements and satisfied all the conditions on its part to be performed or satisfied at or prior to such Closing Date;

(ii) No stop order suspending the effectiveness of the Registration Statement or the use of the Base Prospectus or any Prospectus Supplement has been issued and no proceedings for that purpose have been instituted or are pending or, to the Company's knowledge, threatened under the Securities Act; no order having the effect of ceasing or suspending the distribution of the Securities or any other securities of the Company has been issued by any securities commission, securities regulatory authority or stock exchange in the United States and no proceedings for that purpose have been instituted or are pending or, to the knowledge of the Company, contemplated by any securities commission, securities regulatory authority or stock exchange in the United States;

(iii) When the Registration Statement became effective, at the time of execution of the Subscription Agreements, and at all times subsequent thereto up to the delivery of such certificate, the Registration Statement and the Incorporated Documents, if any, when such documents became effective or were filed with the Commission, contained all material information required to be included therein by the Securities Act and the Exchange Act and the applicable rules and regulations of the Commission thereunder, as the case may be, and in all material respects conformed to the requirements

of the Securities Act and the Exchange Act and the applicable rules and regulations of the Commission thereunder, as the case may be, and the Registration Statement and the Incorporated Documents, if any, did not and do not include any untrue statement of a material fact or omit to state a material fact required to be stated therein or necessary to make the statements therein, in the light of the circumstances under which they were made, not misleading (provided, however, that the preceding representations and warranties contained in this paragraph (iii) shall not apply to any statements or omissions made in reliance upon and in conformity with Placement Agent Information) and, since the effective date of the Registration Statement, there has occurred no event required by the Securities Act and the rules and regulations of the Commission thereunder to be set forth in the Incorporated Documents which has not been so set forth; and

(iv) Subsequent to the respective dates as of which information is given in the Registration Statement, the Incorporated Documents and any Prospectus Supplement, there has not been: (a) any Material Adverse Effect; (b) any transaction that is material to the Company and the Subsidiaries taken as a whole, except transactions entered into in the ordinary course of business; (c) any obligation, direct or contingent, that is material to the Company and the Subsidiaries taken as a whole, incurred by the Company or any Subsidiary, except obligations incurred in the ordinary course of business; (d) any material change in the capital stock (except changes thereto resulting from the exercise of outstanding stock options or warrants) or outstanding indebtedness of the Company or any Subsidiary; (e) any dividend or distribution of any kind declared, paid or made on the capital stock of the Company; or (f) any loss or damage (whether or not insured) to the property of the Company or any Subsidiary which has been sustained or will have been sustained which has a Material Adverse Effect.

(g) Escrow Agreement. The Company and the Placement Agent shall have entered into an escrow agreement with a commercial bank or trust company reasonably satisfactory to both parties pursuant to which the Investors shall deposit their subscription funds in an escrow account and the Company and the Placement Agent shall jointly authorize the disbursement of the funds from the escrow account. The Company shall pay the reasonable fees of the escrow agent as set forth in the Escrow Agreement.

(h) Stock Exchange Listing. The Common Stock shall be registered under the Exchange Act and shall be listed on the principal Trading Market, and the Company shall not have taken any action designed to terminate, or likely to have the effect of terminating, the registration of the Common Stock under the Exchange Act or delisting or suspending from trading the Common Stock from the principal Trading Market, nor shall the Company have received any information suggesting that the Commission or the principal Trading Market is contemplating terminating such registration or listing, in each case except as set forth in the SEC Reports filed prior the date of this Agreement.

(i) Additional Documents. On or before each Closing Date, the Placement Agent and counsel for the Placement Agent shall have received such information and documents as they may reasonably require for the purposes of enabling them to pass upon the issuance and sale of the Securities as contemplated herein, or in order to evidence the accuracy of any of the representations and warranties, or the satisfaction of any of the conditions or agreements, herein contained.

If any condition specified in this Section 5 is not satisfied when and as required to be satisfied, this Agreement may be terminated by the Placement Agent by notice to the Company at any time on or

prior to a Closing Date, which termination shall be without liability on the part of any party to any other party, except that Section 6 (Payment of Expenses), Section 7 (Indemnification and Contribution) and Section 8 (Representations and Indemnities to Survive Delivery) shall at all times be effective and shall survive such termination.

**Section 6. Payment of Expenses.** The Company agrees to pay all costs, fees and expenses incurred by the Company in connection with the performance of its obligations hereunder and in connection with the transactions contemplated hereby, including, without limitation: (i) all expenses incident to the issuance, delivery and qualification of the Securities (including all printing and engraving costs); (ii) all fees and expenses of the registrar and transfer agent of the Common Stock; (iii) all necessary issue, transfer and other stamp taxes in connection with the issuance and sale of the Securities; (iv) all fees and expenses of the Company's counsel, independent public or certified public accountants and other advisors; (v) all costs and expenses incurred in connection with the preparation, printing, filing, shipping and distribution of the Registration Statement (including financial statements, exhibits, schedules, consents and certificates of experts), the Base Prospectus and each Prospectus Supplement, and all amendments and supplements thereto, and this Agreement; (vi) if any such are legally required, all filing fees, reasonable attorneys' fees and expenses incurred by the Company or the Placement Agent in connection with qualifying or registering (or obtaining exemptions from the qualification or registration of) all or any part of the Securities for offer and sale under the state securities or Blue Sky laws or the securities laws of any other country, and, if requested by the Placement Agent, preparing and printing a Blue Sky Survey, or other memorandum, and any supplements thereto, advising the Placement Agent of such qualifications, registrations and exemptions; (vii) if applicable, the filing fees incident to the review and approval by the FINRA of the Placement Agent's participation in the offering and distribution of the Securities; (viii) the fees and expenses associated with listing the Shares and Warrant Shares on the Trading Market; (ix) all costs and expenses incident to the travel and accommodation of the Company's and the Placement Agent's employees on the roadshow, if any; and (x) all other fees, costs and expenses referred to in Part II of the Registration Statement.

**Section 7. Indemnification and Contribution.** The Company agrees to indemnify the Placement Agent in accordance with the provisions of Schedule A hereto, which is incorporated by reference herein and made a part hereof.

**Section 8. Representations and Indemnities to Survive Delivery.** The respective indemnities, agreements, representations, warranties and other statements of the Company or any person controlling the Company, of its officers, and of the Placement Agent set forth in or made pursuant to this Agreement will remain in full force and effect, regardless of any investigation made by or on behalf of the Placement Agent, the Company, or any of its or their partners, officers or directors or any controlling person, as the case may be, and will survive delivery of and payment for the Securities to be sold in the proposed Offering and any termination of this Agreement. A successor to a Placement Agent, or to the Company, its directors or officers or any person controlling the Company, shall be entitled to the benefits of the indemnity, contribution and reimbursement agreements contained in this Agreement.

**Section 9. Notices.** All communications hereunder shall be in writing and shall be mailed, hand delivered or telecopied and confirmed to the parties hereto as follows:

If to the Placement Agent to the address set forth above, attn: CEO, Facsimile: 561.391.5757.

*With a copy not constituting notice to:*

Dawson James Securities, Inc.

Attn: Robert D. Keyser, CEO



1 North Federal Highway, Suite 500

Boca Raton, FL 33432

If to the Company:

ARCA biopharma, Inc.

11080 CirclePoint Road, Suite 140

Westminster, CO 80020

Facsimile: 720-208-9261

Attention: Patrick Wheeler

*With a copy not constituting notice to:*

Cooley LLP

380 Interlocken Crescent

Broomfield, CO 80021

Facsimile: 720-566-4099

Attention: Brent D. Fassett

Any party hereto may change the address for receipt of communications by giving written notice to the others.

**Section 10. Successors.** This Agreement will inure to the benefit of and be binding upon the parties hereto, and to the benefit of the employees, officers and directors and controlling persons referred to in Section 7 hereof, and to their respective successors, and personal representative, and no other person will have any right or obligation hereunder.

**Section 11. Partial Unenforceability.** The invalidity or unenforceability of any section, paragraph or provision of this Agreement shall not affect the validity or enforceability of any other section, paragraph or provision hereof. If any Section, paragraph or provision of this Agreement is for any reason determined to be invalid or unenforceable, there shall be deemed to be made such minor changes (and only such minor changes) as are necessary to make it valid and enforceable.

**Section 12. Governing Law Provisions.** This Agreement shall be deemed to have been made and delivered in New York City, New York and both this engagement letter and the transactions contemplated hereby shall be governed as to validity, interpretation, construction, effect and in all other respects by the internal laws of the State of New York, without regard to the conflict of laws principles thereof. Each of the Placement Agent and the Company: (i) agrees that any legal suit, action or proceeding arising out of or relating to this engagement letter and/or the transactions contemplated hereby shall be instituted exclusively in New York Supreme Court, County of New York, or in the United States District Court for the Southern District of New York, (ii) waives any objection which it may have or hereafter to the venue of any such suit, action or proceeding, and (iii) irrevocably consents to the jurisdiction of the New York Supreme Court, County of New York, and the United States District Court for the Southern District of New York in any such suit, action or proceeding. Each of the Placement Agent and the Company further agrees to accept

and acknowledge service of any and all process which may be served in any such suit, action or proceeding in the New York Supreme Court, County of New York, or in the United States District Court for the Southern District of New York and agrees that service of process upon the Company mailed by certified mail to the Company's address shall be deemed in every respect effective service of process upon the Company, in any such suit, action or proceeding, and service of process upon the Placement Agent mailed by certified mail to the Placement Agent's address shall be deemed in every respect effective service process upon the Placement Agent, in any such suit, action or proceeding. Notwithstanding any provision of this engagement letter to the contrary, the Company agrees that neither

the Placement Agent nor its affiliates, and the respective officers, directors, employees, agents and representatives of the Placement Agent, its affiliates and each other person, if any, controlling the Placement Agent or any of its affiliates, shall have any liability (whether direct or indirect, in contract or tort or otherwise) to the Company for or in connection with the engagement and transaction described herein except for any such liability for losses, claims, damages or liabilities incurred by us that are finally judicially determined to have resulted from the bad faith, gross negligence or violation of law or regulation of or by such individuals or entities. If either party shall commence an action or proceeding to enforce any provision of this Agreement, then the prevailing party in such action or proceeding shall be reimbursed by the other party for its reasonable attorney's fees and other costs and expenses incurred with the investigation, preparation and prosecution of such action or proceeding.

**Section 13. General Provisions.**

(a) This Agreement constitutes the entire agreement of the parties to this Agreement and supersedes all prior written or oral and all contemporaneous oral agreements, understandings and negotiations with respect to the subject matter hereof. This Agreement may be executed in two or more counterparts, each one of which shall be an original, with the same effect as if the signatures thereto and hereto were upon the same instrument. This Agreement may not be amended or modified unless in writing by all of the parties hereto, and no condition herein (express or implied) may be waived unless waived in writing by each party whom the condition is meant to benefit. Section headings herein are for the convenience of the parties only and shall not affect the construction or interpretation of this Agreement.

(b) The Company acknowledges that in connection with the offering of the Securities: (i) the Placement Agent has acted at arms length, are not agents of, and owe no fiduciary duties to the Company or any other person, (ii) the Placement Agent owes the Company only those duties and obligations set forth in this Agreement and (iii) the Placement Agent may have interests that differ from those of the Company. The Company waives to the full extent permitted by applicable law any claims it may have against the Placement Agent arising from an alleged breach of fiduciary duty in connection with the offering of the Securities

*[The remainder of this page has been intentionally left blank.]*



If the foregoing is in accordance with your understanding of our agreement, please sign below whereupon this instrument, along with all counterparts hereof, shall become a binding agreement in accordance with its terms.

Very truly yours,

ARCA BIOPHARMA, INC.,  
a Delaware corporation

By: /s/ Patrick M. Wheeler  
Name: Patrick M. Wheeler  
Title: Chief Financial Officer

The foregoing Placement Agency Agreement is hereby confirmed and accepted as of the date first above written.

**DAWSON JAMES SECURITIES, INC.**

By: /s/ Robert D. Keyser  
Name: Robert D. Keyser, Jr.  
Title: CEO

---

SCHEDULE A INDEMNIFICATION

The Company hereby agrees to indemnify and hold Dawson, its officers, directors, principals, employees, affiliates, and shareholders, and their successors and assigns, harmless from and against any and all loss, claim, damage, liability, deficiencies, actions, suits, proceedings, costs and legal expenses or expense whatsoever (including, but not limited to, reasonable legal fees and other expenses and reasonable disbursements incurred in connection with investigating, preparing to defend or defending any action, suit or proceeding, including any inquiry or investigation, commenced or threatened, or any claim whatsoever, or in appearing or preparing for appearance as witness in any proceeding, including any pretrial proceeding such as a deposition) (collectively, Losses ) arising out of, based upon, or in any way related or attributed to, (i) any breach of a representation, warranty or covenant by the Company contained in this Agreement or (ii) any activities or services performed hereunder by Dawson with respect to any Person who is a third party as to Dawson, unless it is finally judicially determined in a court of competent jurisdiction that such Losses were the primary and direct result of the intentional misconduct, gross negligence or violation of law or regulation of or by Dawson in performing the services hereunder, or are based up any Placement Agent Information.

If Dawson receives written notice of the commencement of any legal action, suit or proceeding with respect to which the Company is or may be obligated to provide indemnification pursuant to this Schedule A, Dawson shall, within thirty (30) days of the receipt of such written notice, give the Company written notice thereof (a Claim Notice ). Failure to give such Claim Notice within such thirty (30) day period shall not constitute a waiver by Dawson of its right to indemnify hereunder with respect to such action, suit or proceeding. Upon receipt by the Company of a Claim Notice from Dawson with respect to any claim for indemnification which is based upon a claim made by a third party ( Third Party Claim ), the Company may assume the defense of the Third Party Claim with counsel of its own choosing, as described below. Dawson shall cooperate in the defense of the Third Party Claim and shall furnish such records, information and testimony and attend all such conferences, discovery proceedings, hearings, trial and appeals as may be reasonably required in connection therewith. Dawson shall have the right to employ its own counsel in any such action, which shall be at the Company s expense if (i) the Company and Dawson shall have mutually agreed in writing to the retention of such counsel, (ii) the Company shall have failed in a timely manner to assume the defense and employ counsel or experts reasonably satisfactory to Dawson in such litigation or proceeding or (iii) the named parties to any such litigation or proceeding (including any impleaded parties) include the Company and Dawson and representation of the Company and Dawson by the same counsel or experts would, in the reasonable opinion of Dawson, be inappropriate due to actual or potential differing interests between the Company and Dawson. The Company shall not satisfy or settle any Third Party Claim for which indemnification has been sought and is available hereunder, without the prior written consent of Dawson, which consent shall not be delayed and which shall not be required if Dawson is granted a release in connection therewith. The indemnification provisions hereunder shall survive the termination or expiration of this Agreement.

The Company further agrees, upon demand by Dawson, to promptly reimburse Dawson for, or pay, any fees, expenses or disbursements as to which Dawson has been indemnified herein with such reimbursement to be made currently as any such fees, expenses or disbursements are incurred by Dawson. Notwithstanding the provisions of the aforementioned indemnification, any such reimbursement or payment by the Company of fees, expenses, or disbursements incurred by Dawson shall be repaid by Dawson in the event of any proceeding in which a final judgment (after all appeals or the expiration of time to appeal) is entered in a court of competent jurisdiction against Dawson based solely upon its gross negligence or intentional misconduct in the performance of its duties hereunder, and provided further, that the Company shall not be required to make reimbursement or payment for any settlement effected without the Company s prior written consent (which consent shall not be unreasonably withheld or delayed).

If for any reason the foregoing indemnification is unavailable or is insufficient to hold Dawson harmless, the Company agrees to contribute the amount paid or payable by Dawson in such proportion as to reflect not only the relative benefits received by the Company, on the one hand, and Dawson, on the other hand, but also the relative fault of the Company and Dawson as well as any relevant equitable considerations. In no event shall Dawson contribute in excess of the fees actually received by it pursuant to the terms of this Agreement.

For purposes of this Agreement, each officer, director, shareholder, and employee or affiliate of Dawson and each person, if any, who controls Dawson (or any affiliate) within the meaning of either Section 15 of the Securities Act of 1933, as amended, or Section 20 of the Securities Exchange Act of 1934, as amended, shall have the same rights as Dawson with respect to matters of indemnification by the Company hereunder.

Amendment No. 1 to Placement Agency Agreement dated January 21, 2014

This Amendment No. 1 ( Amendment ) is made as of January 31, 2014 to that certain Placement Agency Agreement dated January 21, 2014 between ARCA biopharma, Inc. and Dawson James Securities, Inc. ( PAA ) with respect to the following:

Section 1(a)(ii) of the PAA is amended and restated in its entirety to read:

(ii) Such number of warrants (the Dawson Warrants ) to Dawson or its designees at each Closing to purchase shares of Common Stock equal to 3% of the aggregate number of shares of Common Stock sold in in each Offering, plus any shares of Common Stock underlying any convertible Securities sold in each Offering to such Investors (excluding any Shares underlying the Warrants). The Dawson Warrants shall have the same terms as the warrants (if any) issued to the Investors in each Offering except that the exercise price shall be 125% of the public offering price per share and the expiration date shall be five years from the effective date of the Registration Statement. The Dawson Warrants shall not have anti-dilution protections or be transferable for six months from the date of each Offering except as permitted by FINRA Rule 5110, and further, the number of shares of Common Stock underlying the Dawson Warrants shall be reduced if necessary to comply with FINRA rule or regulations.

All other terms and conditions of the PAA shall remain in full force and effect. This Amendment may be executed and delivered in counterparts.

In witness whereof, the undersigned have duly executed this Amendment.

ARCA BIOPHARMA, INC.

/s/ Patrick M. Wheeler  
By: Patrick M. Wheeler  
Chief Financial Officer

DAWSON JAMES SECURITIES, INC.

/s/ Robert D. Keyser  
By: Robert D. Keyser, Jr.  
Chief Executive Officer

Amendment No. 1 to Placement Agency Agreement dated January 21, 2014

This Amendment No. 1 ( Amendment ) is made as of January 31, 2014 to that certain Placement Agency Agreement dated January 21, 2014 between ARCA biopharma, Inc. and Dawson James Securities, Inc. ( PAA ) with respect to the following:

Section 1(a)(ii) of the PAA is amended and restated in its entirety to read:

(ii) Such number of warrants (the Dawson Warrants ) to Dawson or its designees at each Closing to purchase shares of Common Stock equal to 3% of the aggregate number of shares of Common Stock sold in in each Offering, plus any shares of Common Stock underlying any convertible Securities sold in each Offering to such Investors (excluding any Shares underlying the Warrants). The Dawson Warrants shall have the same terms as the warrants (if any) issued to the Investors in each Offering except that the exercise price shall be 125% of the public offering price per share and the expiration date shall be five years from the effective date of the Registration Statement. The Dawson Warrants shall not have anti-dilution protections or be transferable for six months from the date of each Offering except as permitted by FINRA Rule 5110, and further, the number of shares of Common Stock underlying the Dawson Warrants shall be reduced if necessary to comply with FINRA rule or regulations.

All other terms and conditions of the PAA shall remain in full force and effect. This Amendment may be executed and delivered in counterparts.

In witness whereof, the undersigned have duly executed this Amendment.

ARCA BIOPHARMA, INC.

/s/ Patrick M. Wheeler  
By: Patrick M. Wheeler  
Chief Financial Officer

DAWSON JAMES SECURITIES, INC.

/s/ Robert D. Keyser  
By: Robert D. Keyser, Jr.  
Chief Executive Officer

COMMON STOCK PURCHASE WARRANT

ARCA BIOPHARMA, INC.

Warrant Shares: [\*] Issue Date: February , 2014  
THIS COMMON STOCK PURCHASE WARRANT (the Warrant ) certifies that, for value received, (the Holder ) is entitled, upon the terms and subject to the limitations on exercise and the conditions hereinafter set forth, at any time on or after the Issue Date and on or prior to the close of business on the five (5) year anniversary of the Issue Date (the Termination Date ) but not thereafter, to subscribe for and purchase from **ARCA biopharma, Inc.**, a Delaware corporation (the Company ), up to [\*] shares (the Warrant Shares ) of the Company's common stock, par value \$0.001 per share ( Common Stock ). For purposes of clarity only, on the Issue Date, the number of Warrant Shares underlying this Warrant equals the number of shares of Common Stock purchased by the initial Holder in the Company's offering pursuant to a registration statement on Form S-3 (File No. 333-172686) multiplied by 0.25 (rounded down to the nearest whole Warrant Share). The purchase price of one share of Common Stock under this Warrant shall be equal to the Exercise Price, as defined in Section 2(b).

Section 1. Definitions. Capitalized terms used and not otherwise defined herein shall have the meanings set forth in that certain Warrant Agency Agreement between the Company and Computershare Trust Company, N.A. (the Warrant Agent ), dated as of February 3, 2014 (the Warrant Agency Agreement ).

Section 2. Exercise.

a) Exercise of Warrant. Exercise of the purchase rights represented by this Warrant may be made, in whole or in part, at any time or times on or after the Issue Date and on or before the Termination Date by delivery (whether via facsimile or otherwise) to the Company (or the Warrant Agent or such other office or agency of the Company as it may designate by notice in writing to the registered Holder at the address of the Holder appearing on the books of the Company or the Warrant Agent) of a duly executed copy of the Notice of Exercise form annexed hereto. No ink-original Notice of Exercise shall be required, nor shall any medallion guarantee (or other type of guarantee or notarization) of any Notice of Exercise form be required. Within two (2) Trading Days following an exercise of this Warrant as aforesaid (the Price Delivery Date ), the Holder shall deliver payment to the Warrant Agent or the Company of an amount equal to the aggregate Exercise Price of the Warrant Shares thereby purchased by wire transfer or cashier's check drawn on a United States bank or, if available, pursuant to the Cashless Exercise procedure specified in Section 2(c) below. Notwithstanding anything herein to the contrary, the Holder shall not be required to physically surrender this Warrant to the Company or the Warrant Agent until the Holder has purchased all of the Warrant Shares available hereunder and the Warrant has been exercised in full, in which case, the Holder shall surrender this Warrant to the Company or the Warrant Agent for cancellation within

three (3) Trading Days after the date the final Notice of Exercise is delivered to the Company or Warrant Agent. Partial exercises of this Warrant resulting in purchases of a portion of the total number of Warrant Shares available hereunder shall have the effect of lowering the outstanding number of Warrant Shares purchasable hereunder in an amount equal to the applicable number of Warrant Shares purchased. The Holder and the Company or the Warrant Agent shall maintain records showing the number of Warrant Shares purchased and the date of such purchases. The Company or the Warrant Agent shall deliver any objection to any Notice of Exercise form within 1 Business Day of receipt of the applicable Notice of Exercise. **The Holder and any assignee, by acceptance of this Warrant, acknowledge and agree that, by reason of the provisions of this paragraph, following the purchase of a portion of the Warrant Shares hereunder, the number of Warrant Shares available for purchase hereunder at any given time may be less than the amount stated on the face hereof.**

b) Exercise Price. The exercise price per share of the Common Stock under this Warrant shall be \$2.125, subject to adjustment as provided hereunder (the Exercise Price ).

c) Cashless Exercise. If at the time of exercise hereof there is no effective registration statement registering, or the prospectus contained therein is not available for, the issuance of the Warrant Shares to the Holder, then this Warrant may only be exercised, in whole or in part, at such time by means of a cashless exercise (a Cashless Exercise ) in which the Holder shall be entitled to receive a certificate for the number of Warrant Shares equal to the quotient obtained by dividing [(A-B) (X)] by (A), where:

(A) = the VWAP on the Trading Day immediately preceding the date on which Holder elects to exercise this Warrant by means of a Cashless Exercise, as set forth in the applicable Notice of Exercise;

(B) = the Exercise Price of this Warrant, as adjusted hereunder; and

(X) = the number of Warrant Shares that would be issuable upon exercise of this Warrant in accordance with the terms of this Warrant if such exercise were by means of a cash exercise at the Exercise Price rather than a Cashless Exercise.

Trading Day means a day on which the principal Trading Market is open for trading.

Trading Market means any of the following markets or exchanges on which the Common Stock is listed or quoted for trading on the date in question: the NYSE MKT, the Nasdaq Capital Market, the Nasdaq Global Market, the Nasdaq Global Select Market or the New York Stock Exchange (or any successors to any of the foregoing).

VWAP means, for any date, the price determined by the first of the following clauses that applies: (a) if the Common Stock is then listed or quoted on a Trading Market, the daily volume weighted average price of the Common Stock for such date (or the nearest preceding date) on the Trading Market on which the Common

Stock is then listed or quoted as reported by Bloomberg L.P. (based on a Trading Day from 9:30 a.m. (New York City time) to 4:02 p.m. (New York City time), (b) if the OTC Bulletin Board is not a Trading Market, the volume weighted average price of the Common Stock for such date (or the nearest preceding date) on the OTC Bulletin Board, (c) if the Common Stock is not then listed or quoted for trading on the OTC Bulletin Board and if prices for the Common Stock are then reported in the Pink Sheets published by OTC Markets Group, Inc. (or a similar organization or agency succeeding to its functions of reporting prices), the most recent bid price per share of the Common Stock so reported, or (d) in all other cases, the fair market value of a share of Common Stock as determined by an independent appraiser selected in good faith by the Holders of a majority in interest of the Warrants then outstanding and reasonably acceptable to the Company, the fees and expenses of which shall be paid by the Company.



d) Mechanics of Exercise.

i. Delivery of Certificates Upon Exercise. Certificates for shares purchased hereunder shall be transmitted by the Warrant Agent to the Holder by crediting the account of the Holder's prime broker with The Depository Trust Company (DTC) through its Deposit/Withdrawal at Custodian (DWAC) system if the Company is then a participant in such system and either (A) there is an effective registration statement permitting the issuance of the Warrant Shares to Holder or (B) this Warrant is being exercised via Cashless Exercise, and otherwise by physical delivery to the address specified by the Holder in the Notice of Exercise by the date that is three (3) Trading Days after the receipt by the Company or the Warrant Agent of the Notice of Exercise (provided that payment of the Exercise Price has then been received by the Company or the Warrant Agent) (such date, the Warrant Share Delivery Date). This Warrant shall be deemed to have been exercised upon delivery of the Notice of Exercise and payment of the Exercise Price. The Warrant Shares shall be deemed to have been issued, and Holder or any other person so designated to be named therein shall be deemed to have become a holder of record of such shares for all purposes, as of the date the Warrant has been exercised. Notwithstanding anything else to the contrary in this Warrant, if the Holder fails to duly deliver payment to the Company or the Warrant Agent of an amount equal to the aggregate Exercise Price of the Warrant Shares to be purchased upon exercise of this Warrant by the applicable Price Delivery Date as set forth in Section 2(a) hereof, the Company will not be obligated to deliver or cause the Warrant Agent to deliver certificates representing any such Warrant Shares (via DWAC or otherwise) until following receipt of such payment, and the applicable Warrant Share Delivery Date shall be deemed extended by one day for each day (or part thereof) that after the Price Delivery Date until such payment is delivered to the Company or the Warrant Agent.

ii. Delivery of New Warrants Upon Exercise. If this Warrant shall have been exercised in part, the Company shall (or shall direct the Warrant Agent to), at the request of a Holder and upon surrender of this Warrant certificate, at the time of delivery of the certificate or certificates representing Warrant Shares, deliver to Holder a new Warrant evidencing the rights of Holder to purchase the unpurchased Warrant Shares called for by this Warrant, which new Warrant shall in all other respects be identical with this Warrant.

iii. Rescission Rights. If the Company fails to cause the Warrant Agent to transmit to the Holder a certificate or the certificates representing the Warrant Shares pursuant to Section 2(d)(i) by the Warrant Share Delivery Date, then, the Holder will have the right to rescind such exercise.

iv. Compensation for Buy-In on Failure to Timely Deliver Certificates Upon Exercise. In addition to any other rights available to the Holder, if the Company fails to cause the Warrant Agent to transmit to the Holder a certificate or the certificates representing the Warrant Shares pursuant to an exercise on or before the Warrant Share Delivery Date, and if after such date the Holder is required by its broker to purchase (in an open market transaction or otherwise) or the Holder's brokerage firm otherwise purchases, shares of Common Stock to deliver in satisfaction of a sale by the Holder of the Warrant Shares which the Holder anticipated receiving upon such exercise (a Buy-In ), then the Company shall (or shall direct the Warrant Agent to), within three (3) Trading Days after the Holder's request and in the Holder's discretion, either (i) pay cash to the Holder in an amount equal to the Holder's total purchase price (including brokerage commissions, if any) for the shares of Common Stock so purchased (the Buy-In Price ), at which point the Company's and the Warrant Agent's obligation to deliver such certificate (and to issue such Warrant Shares or credit such Holder's balance account with DTC) shall terminate, or (ii) promptly honor its obligation to deliver to the Holder a certificate or certificates representing such Warrant Shares or credit such Holder's balance account with DTC and pay cash to the Holder in an amount equal to the excess (if any) of the Buy-In Price over the product of (A) such number of shares of Common Stock, times (B) the VWAP on the date of exercise.

v. No Fractional Shares or Scrip. No fractional shares or scrip representing fractional shares shall be issued upon the exercise of this Warrant. As to any fraction of a share which the Holder would otherwise be entitled to purchase upon such exercise, the Company shall (or shall direct the Warrant Agent to), at its election, either pay a cash adjustment in respect of such final fraction in an amount equal to such fraction multiplied by the Exercise Price or round (up or down) to the nearest whole share.

vi. Charges, Taxes and Expenses. Issuance of certificates for Warrant Shares shall be made without charge to the Holder for any issue or transfer tax or other incidental expense in respect of the issuance of such certificate, all of which taxes and expenses shall be paid by the Company, and such certificates shall be issued in the name of the Holder or in such name or names as may be directed by the Holder; provided, however, that in the event certificates for Warrant Shares are to be issued in a name other than the name of the Holder, this Warrant when surrendered for exercise shall be accompanied by the Assignment Form attached hereto duly executed by the Holder and the Company or the Warrant Agent may require, as a condition thereto, the payment of a sum sufficient to reimburse it for any transfer tax incidental thereto.

vii. Closing of Books. The Company will not close its stockholder books or records in any manner which prevents the timely exercise of this Warrant, pursuant to the terms hereof.

e) Holder's Exercise Limitations. Notwithstanding anything to the contrary contained in this Warrant, this Warrant shall not be exercisable by the Holder hereof to the extent (but only to the extent) that the Holder or any of its Affiliates would beneficially own in excess of 4.99% of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock issuable upon exercise of this Warrant (the Maximum Percentage ). The Holder, upon not less than 61 days prior notice to the Company, may increase or decrease the Maximum Percentage provisions of this Section 2(e), provided that the Maximum Percentage in no event exceeds 9.99% of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock upon exercise of this Warrant held by the Holder and the provisions of this Section 2(e) shall continue to apply. Any such increase or decrease will not be effective until the 61<sup>st</sup> day after such notice is delivered to the Company. For purposes of this Section 2(e), the number of shares of Common Stock beneficially owned by the Holder and its Affiliates shall include the number of Warrant Shares which are subject to the Notice of Exercise with respect to which such determination is being made, but shall exclude the number of shares of Common Stock which are issuable upon (i) exercise of the remaining, unexercised portion of this Warrant and beneficially owned by the Holder or any of its Affiliates, and (ii) exercise or conversion of the unexercised or unconverted portion of any other securities of the Company beneficially owned by the Holder or any of its Affiliates that are subject to a limitation on conversion or exercise similar to the limitation contained herein. To the extent the above limitation applies, the determination of whether this Warrant shall be exercisable (vis-à-vis other convertible, exercisable or exchangeable securities owned by the Holder or any of its Affiliates) and of which such securities shall be exercisable (as among all such securities owned by the Holder) shall, subject to such Maximum Percentage limitation, be determined by the Holder, and the Company shall have no responsibility for determining the accuracy of the Holder's determination. No prior inability to exercise this Warrant pursuant to this paragraph shall have any effect on the applicability of the provisions of this paragraph with respect to any subsequent determination of exercisability. For the purposes of this paragraph, beneficial ownership and all determinations and calculations (including, without limitation, with respect to calculations of percentage ownership) shall be determined in accordance with Section 13(d) of the Exchange Act and the rules and regulations promulgated thereunder. The provisions of this paragraph shall be implemented in a manner otherwise than in strict conformity with the terms of this paragraph to correct this paragraph (or any portion hereof) which may be defective or inconsistent with the intended Maximum Percentage beneficial ownership limitation herein contained or to make changes or supplements necessary or desirable to properly give effect to such Maximum Percentage limitation. The limitations contained in this paragraph shall apply to a successor Holder of this Warrant. The holders of Common Stock shall be third party beneficiaries of this paragraph and the Company may not waive this paragraph without the consent of holders of a majority of its Common Stock. For any reason at any time, upon the written or oral request of the Holder, the Company shall within one (1) Business Day confirm orally and

in writing to the Holder the number of shares of Common Stock then outstanding, including by virtue of any prior conversion or exercise of convertible or exercisable securities into Common Stock, including, without limitation, pursuant to this Warrant.

Section 3. Certain Adjustments.

a) Stock Dividends and Splits. If the Company, at any time while this Warrant is outstanding: (i) pays a stock dividend or otherwise makes a distribution or distributions on shares of its Common Stock or any other equity or equity equivalent securities payable in shares of Common Stock (which, for avoidance of doubt, shall not include any shares of Common Stock issued by the Company upon exercise of this Warrant), (ii) subdivides outstanding shares of Common Stock into a larger number of shares, (iii) combines (including by way of reverse stock split) outstanding shares of Common Stock into a smaller number of shares, or (iv) issues by reclassification of shares of the Common Stock any shares of capital stock of the Company (collectively with the actions described in (i), (ii), (iii) and (iv), a Share Reorganization ), then in each case the Exercise Price shall be multiplied by a fraction of which the numerator shall be the number of shares of Common Stock (excluding treasury shares, if any) outstanding immediately before such event and of which the denominator shall be the number of shares of Common Stock outstanding immediately after such event, and the number of shares issuable upon exercise of this Warrant shall be proportionately adjusted such that the aggregate Exercise Price of this Warrant shall remain unchanged. Any adjustment made pursuant to this Section 3(a) shall become effective immediately after the record date for the determination of stockholders entitled to receive such dividend or distribution and shall become effective immediately after the effective date in the case of a subdivision, combination or re-classification, but if the Company shall legally abandon any such dividend, distribution, subdivision, combination or reclassification prior to effecting such action, no adjustment shall be made pursuant to this Section 3(a) in respect of such action.

b) Pro Rata Distributions. If the Company, at any time while this Warrant is outstanding, shall distribute to all holders of Common Stock (and not to the Holders) evidences of its indebtedness or assets (including cash and cash dividends) or rights or warrants to subscribe for or purchase any security other than a Share Reorganization, then in each such case the Exercise Price shall be adjusted by multiplying the Exercise Price in effect immediately prior to the record date fixed for determination of stockholders entitled to receive such distribution by a fraction of which the denominator shall be the VWAP determined as of the record date mentioned above, and of which the numerator shall be such VWAP on such record date less the then per share fair market value at such record date of the portion of such assets or evidence of indebtedness so distributed applicable to one outstanding share of the Common Stock as determined by the Board of Directors in good faith; provided that in no event shall the Exercise Price be increased as a result of the application of this Section 3(b). Simultaneously with any adjustment to the Exercise Price pursuant to this Section 3(b), the number of Warrant Shares that may be purchased upon exercise of this Warrant shall be increased proportionately, so that after such adjustment the aggregate Exercise Price payable hereunder for the adjusted number of Warrant Shares shall be the same as the aggregate Exercise Price in effect immediately

prior to such adjustment (without regard to any limitations on exercise contained herein). In either case the adjustments shall be described in a statement provided to the Holder of the portion of assets or evidences of indebtedness so distributed or such subscription rights applicable to one share of Common Stock. Such adjustments shall be made whenever any such distribution is made and shall become effective immediately after the record date mentioned above, but if the Company shall legally abandon any such distribution prior to effecting such distribution, no adjustments shall be made pursuant to this Section 3(b) in respect of such action.

c) Fundamental Transaction. If, at any time while this Warrant is outstanding, (i) the Company, directly or indirectly, in one or more related transactions effects any merger or consolidation with or into another Person, (ii) the Company, directly or indirectly, effects any sale, lease, license, assignment, transfer, conveyance or other disposition of all or substantially all of its assets in one or a series of related transactions, (iii) any, direct or indirect, purchase offer, tender offer or exchange offer (whether by the Company or another Person) is completed pursuant to which holders of Common Stock are permitted to sell, tender or exchange their shares for other securities, cash or property and has been accepted by the holders of 50% or more of the outstanding Common Stock, (iv) the Company, directly or indirectly, in one or more related transactions effects any reclassification, reorganization or recapitalization of the Common Stock or any compulsory share exchange pursuant to which the Common Stock is effectively converted into or exchanged for other securities, cash or property, or (v) the Company, directly or indirectly, in one or more related transactions consummates a stock or share purchase agreement or other business combination (including, without limitation, a reorganization, recapitalization, spin-off or scheme of arrangement) with another Person whereby such other Person acquires more than 50% of the outstanding shares of Common Stock (not including any shares of Common Stock held by the other Person or other Persons making or party to, or associated or affiliated with the other Persons making or party to, such stock or share purchase agreement or other business combination) (each a Fundamental Transaction ), then, upon any subsequent exercise of this Warrant, the Holder shall have the right to receive, for each Warrant Share that would have been issuable upon such exercise immediately prior to the occurrence of such Fundamental Transaction (without regard to any limitation in Section 2(e) on the exercise of this Warrant), the number of shares of Common Stock of the successor or acquiring corporation or of the Company, if it is the surviving corporation, and any additional consideration (the Alternate Consideration ) receivable as a result of such Fundamental Transaction by a holder of the number of shares of Common Stock for which this Warrant is exercisable immediately prior to such Fundamental Transaction (without regard to any limitation in Section 2(e) on the exercise of this Warrant). For purposes of any such exercise, the determination of the Exercise Price shall be appropriately adjusted to apply to such Alternate Consideration based on the amount of Alternate Consideration issuable in respect of one share of Common Stock in such Fundamental Transaction, and the Company shall apportion the Exercise Price among the Alternate Consideration in a reasonable manner reflecting the relative value of any different components of the Alternate Consideration. If holders of Common Stock are given any choice as to the securities, cash or property to be received in a Fundamental Transaction, then the Holder shall be given the same choice as to the Alternate Consideration it receives upon any

exercise of this Warrant following such Fundamental Transaction. Any such payment of such amount of such Alternative Consideration shall be made in the same form of consideration (whether securities, cash or property) as is given to the holders of Common Stock in such Fundamental Transaction, and if multiple forms of consideration are given, the consideration shall be paid to the Holder in the same proportion as such consideration is paid to the holders of Common Stock. The terms of any agreement pursuant to which a Fundamental Transaction is effected shall include terms requiring any such successor or surviving entity to comply with the provisions of this Section 3(c) and insuring that this Warrant (or any such replacement security) will be similarly adjusted upon any subsequent transaction analogous to a Fundamental Transaction.

d) Calculations. All calculations under this Section 3 shall be made to the nearest cent or the nearest whole share, as the case may be. For purposes of this Section 3, any calculation of the number of shares of Common Stock deemed to be issued and outstanding as of a given date shall not include treasury shares, if any. Notwithstanding anything to the contrary in this Section 3, no adjustment in the Exercise Price shall be required unless such adjustment would require an increase or decrease of at least 1% in such price; provided however, that any adjustments which by reason of the immediately preceding sentence are not required to be made shall be carried forward and taken into account in any subsequent adjustment. In any case in which this Section 3 shall require that an adjustment in the Exercise Price be made effective as of a record date for a specified event, if Holder exercises this Warrant after such record date, the Company may elect to defer, until the occurrence of such event, the issuance of the shares of Common Stock and other capital stock of the Company in excess of the shares of Common Stock and other capital stock of the Company, if any, issuable upon such exercise on the basis of the Exercise Price in effect prior to such adjustment; provided, however, that in such case the Company or the Warrant Agent shall deliver to Holder a due bill or other appropriate instrument evidencing Holder's right to receive such additional shares and/or other capital securities upon the occurrence of the event requiring such adjustment.

e) Notice to Holder.

i. Adjustment to Exercise Price. Whenever the Exercise Price or number of Warrant Shares is adjusted pursuant to any provision of this Section 3, the Company shall (or cause the Warrant Agent to) promptly mail to the Holder a notice setting forth the Exercise Price and number of Warrant Shares after such adjustment and setting forth a brief statement of the facts requiring such adjustment.

ii. Notice to Allow Exercise by Holder. After the Issue Date and on or prior to the Termination Date, if (A) the Company shall declare a dividend (or any other distribution in whatever form) on the Common Stock, (B) the Company shall declare a special nonrecurring cash dividend on or a redemption of the Common Stock, (C) the Company shall authorize the granting to all holders of the Common Stock rights or warrants to subscribe for or purchase any shares of capital stock of any

class or of any rights, (D) the approval of any stockholders of the Company shall be required in connection with any reclassification of the Common Stock, any consolidation or merger to which the Company is a party, any sale or transfer of all or substantially all of the assets of the Company, or any compulsory share exchange whereby the Common Stock is converted into other securities, cash or property, or (E) the Company shall authorize the voluntary or involuntary dissolution, liquidation or winding up of the affairs of the Company, then, in each case, the Company shall cause to be mailed to the Holder at its last address as it shall appear upon the Warrant Register, at least 20 calendar days prior to the applicable record or effective date hereinafter specified, a notice stating (x) the date on which a record is to be taken for the purpose of such dividend, distribution, redemption, rights or warrants, or if a record is not to be taken, the date as of which the holders of the Common Stock of record to be entitled to such dividend, distributions, redemption, rights or warrants are to be determined or (y) the date on which such reclassification, consolidation, merger, sale, transfer or share exchange is expected to become effective or close, and the date as of which it is expected that holders of the Common Stock of record shall be entitled to exchange their shares of the Common Stock for securities, cash or other property deliverable upon such reclassification, consolidation, merger, sale, transfer or share exchange; provided that the failure to mail such notice or any defect therein or in the mailing thereof shall not affect the validity of the corporate action required to be specified in such notice. To the extent that any notice provided hereunder constitutes, or contains, material, non-public information regarding the Company, the Company shall simultaneously file such notice with the Commission pursuant to a Current Report on Form 8-K. The Holder shall remain entitled to exercise this Warrant during the period commencing on the date of such notice to the effective date of the event triggering such notice except as may otherwise be expressly set forth herein.

Section 4. Transfer of Warrant.

a) Transferability. Subject to compliance with any applicable securities laws, this Warrant and all rights hereunder (including, without limitation, any registration rights) are transferable, in whole or in part, upon surrender of this Warrant at the principal office of the Company or the Warrant Agent (or other designated agent), together with a written assignment of this Warrant substantially in the form attached hereto duly executed by the Holder or its agent or attorney and funds sufficient to pay any transfer taxes payable upon the making of such transfer. Upon such surrender and, if required, such payment, the Company shall execute and deliver a new Warrant or Warrants in the name of the assignee or assignees, as applicable, and in the denomination or denominations specified in such instrument of assignment, and shall issue to the assignor a new Warrant evidencing the portion of this Warrant not so assigned, and this Warrant shall promptly be cancelled. The Warrant, if properly assigned in accordance herewith, may be exercised by a new holder for the purchase of Warrant Shares without having a new Warrant issued.

b) New Warrants. Subject to and in accordance with Section 6 the Warrant Agency Agreement, this Warrant may be divided or combined with other Warrants upon presentation hereof at the aforesaid office of the Company or the Warrant Agent (or other designated agent), together with a written notice specifying the names and denominations in which new Warrants are to be issued, signed by the Holder or its agent or attorney. Subject to compliance with Section 4(a), as to any transfer which may be involved in such division or combination, the Company shall execute and deliver (or cause the Warrant Agent to deliver) a new Warrant or Warrants in exchange for the Warrant or Warrants to be divided or combined in accordance with such notice. All Warrants issued on transfers or exchanges shall be dated the initial issuance date set forth on the first page of this Warrant and shall be identical with this Warrant except as to the number of Warrant Shares issuable pursuant thereto.

c) Warrant Register. This Warrant shall be issuable in book entry form (the Book-Entry Warrant Certificate ) and shall initially be represented by one or more Book-Entry Warrant Certificates deposited with the DTC and registered in the name of Cede & Co., a nominee of the DTC, or as otherwise directed by the DTC. Ownership of beneficial interests in this Warrant shall be shown on, and the transfer of such ownership shall be effected through, records maintained by (i) the DTC or its nominee for each Book-Entry Warrant Certificate or (ii) institutions that have accounts with the DTC (the Warrant Register ). If the DTC subsequently ceases to make its book-entry settlement system available for this Warrant, the Company may instruct the Warrant Agent regarding other arrangements for book-entry settlement. In the event that this Warrant is not eligible for, or it is no longer necessary to have this Warrant available in, book-entry form, the Warrant Agent shall provide written instructions to the DTC to deliver to the Warrant Agent for cancellation each Book-Entry Warrant Certificate, and the Company shall cause the Warrant Agent to deliver to the Holder a physical certificate in the form of this Warrant and the Company or the Warrant Agent shall, thereafter, register this Warrant, upon records to be maintained by the Company for that purpose, in the name of the record Holder hereof from time to time. The Company may deem and treat the registered Holder of this Warrant as the absolute owner hereof for the purpose of any exercise hereof or any distribution to the Holder, and for all other purposes, absent actual notice to the contrary.

#### Section 5. Miscellaneous.

a) No Rights as Stockholder Until Exercise. This Warrant does not entitle the Holder to any voting rights, dividends or other rights as a stockholder of the Company prior to the exercise hereof as set forth in Section 2(d)(i).

b) Loss, Theft, Destruction or Mutilation of Warrant. The Company covenants that upon receipt by the Company or the Warrant Agent of evidence reasonably satisfactory to them of the loss, theft, destruction or mutilation of this Warrant or any stock certificate relating to the Warrant Shares, and in case of loss, theft or



destruction, of indemnity or security reasonably satisfactory to it, and upon surrender and cancellation of such Warrant or stock certificate, if mutilated, the Company will make and deliver (or cause the Warrant Agent to deliver) a new Warrant or stock certificate of like tenor and dated as of such cancellation, in lieu of such Warrant or stock certificate.

c) Saturdays, Sundays, Holidays, etc. If the last or appointed day for the taking of any action or the expiration of any right required or granted herein shall not be a Business Day, then, such action may be taken or such right may be exercised on the next succeeding Business Day.

d) Authorized Shares.

The Company covenants that, during the period the Warrant is outstanding, it will reserve from its authorized and unissued Common Stock a sufficient number of shares to provide for the issuance of the Warrant Shares upon the exercise of any purchase rights under this Warrant (without regard to any limitations on exercise contained herein). The Company further covenants that its issuance of this Warrant shall constitute full authority to its officers who are charged with the duty of executing stock certificates to execute and issue the necessary certificates for the Warrant Shares upon the exercise of the purchase rights under this Warrant. The Company will take all such reasonable action as may be necessary to assure that such Warrant Shares may be issued as provided herein without violation of any applicable law or regulation, or of any requirements of the Trading Market upon which the Common Stock may be listed. The Company covenants that all Warrant Shares which may be issued upon the exercise of the purchase rights represented by this Warrant will, upon exercise of the purchase rights represented by this Warrant and payment for such Warrant Shares in accordance herewith, be duly authorized, validly issued, fully paid and nonassessable and free from all taxes, liens and charges created by the Company in respect of the issue thereof (other than taxes in respect of any transfer occurring contemporaneously with such issue).

Except and to the extent as waived or consented to by the Holder, the Company shall not by any action, including, without limitation, amending its certificate of incorporation or through any reorganization, transfer of assets, consolidation, merger, dissolution, issue or sale of securities or any other voluntary action, avoid or seek to avoid the observance or performance of any of the terms of this Warrant, but will at all times in good faith assist in the carrying out of all such terms and in the taking of all such actions as may be necessary or appropriate to protect the rights of Holder as set forth in this Warrant against impairment. Without limiting the generality of the foregoing, the Company will (i) not increase the par value of any Warrant Shares above the amount payable therefor upon such exercise immediately prior to such increase in par value, (ii) take all such action as may be necessary or appropriate in order that the Company may validly and legally issue fully paid and nonassessable Warrant Shares upon the exercise of this Warrant and (iii) use commercially reasonable efforts to obtain all such authorizations, exemptions or consents from any public regulatory body having jurisdiction thereof, as may be, necessary to enable the Company to perform its obligations under this Warrant.

Before taking any action which would result in an adjustment in the number of Warrant Shares for which this Warrant is exercisable or in the Exercise Price, the Company shall obtain all such authorizations or exemptions thereof, or consents thereto, as may be necessary from any public regulatory body or bodies having jurisdiction thereof.

e) Governing Law. This Warrant shall be governed by, and construed in accordance with, the laws of the State of New York without giving effect to the conflicts of law principles thereof.

f) Nonwaiver and Expenses. No course of dealing or any delay or failure to exercise any right hereunder on the part of Holder shall operate as a waiver of such right or otherwise prejudice Holder's rights, powers or remedies. Without limiting any other provision of this Warrant, if the Company willfully and knowingly fails to comply with any provision of this Warrant, which results in any material damages to the Holder, the Company shall pay to Holder such amounts as shall be sufficient to cover any costs and expenses including, but not limited to, reasonable attorneys' fees, including those of appellate proceedings, incurred by Holder in collecting any amounts due pursuant hereto or in otherwise enforcing any of its rights, powers or remedies hereunder.

g) Notices. Any notice, request or other document required or permitted to be given or delivered to the Holder by the Company shall be delivered in accordance with the notice provisions of the Warrant Agency Agreement.

h) Limitation of Liability. No provision hereof, in the absence of any affirmative action by Holder to exercise this Warrant to purchase Warrant Shares, and no enumeration herein of the rights or privileges of Holder, shall give rise to any liability of Holder for the purchase price of any Common Stock or as a stockholder of the Company, whether such liability is asserted by the Company or by creditors of the Company.

i) Remedies. The Holder, in addition to being entitled to exercise all rights granted by law, including recovery of damages, will be entitled to specific performance of its rights under this Warrant. The Company agrees that monetary damages would not be adequate compensation for any loss incurred by reason of a breach by it of the provisions of this Warrant and hereby agrees to waive and not to assert the defense in any action for specific performance that a remedy at law would be adequate.

j) Successors and Assigns. Subject to applicable securities laws, this Warrant and the rights and obligations evidenced hereby shall inure to the benefit of and be binding upon the successors and permitted assigns of the Company and the successors and permitted assigns of Holder. The provisions of this Warrant are intended to be for the benefit of any Holder from time to time of this Warrant and shall be enforceable by the Holder or holder of Warrant Shares.

k) Amendment. This Warrant may be modified or amended or the provisions hereof waived with the written consent of the Company and the Holder.

l) Severability. Wherever possible, each provision of this Warrant shall be interpreted in such manner as to be effective and valid under applicable law, but if any provision of this Warrant shall be prohibited by or invalid under applicable law, such provision shall be ineffective to the extent of such prohibition or invalidity, without invalidating the remainder of such provisions or the remaining provisions of this Warrant.

m) Confidentiality. The Holder agrees to keep confidential any proprietary information relating to the Company delivered by the Company or the Warrant Agent hereunder; provided that nothing herein shall prevent the Holder from disclosing such information: (i) to any holder of Warrants or Warrant Shares, (ii) to any Affiliate of any holder of Warrants or Warrant Shares or any actual or potential transferee of the rights or obligations hereunder that agrees to be bound by this Section 5(m), (iii) upon order, subpoena, or other process of any court or administrative agency or otherwise required by law, (iv) upon the request or demand of any regulatory agency or authority having jurisdiction over such party, (v) which has been publicly disclosed without breach of any obligation to the Company, (vi) which has been obtained from any Person that is not a party hereto or an Affiliate of any such party without any breach of any obligation to the Company, (vii) in connection with the exercise of any remedy, or the resolution of any dispute hereunder, (viii) to the legal counsel or certified public accountants for any holder of Warrants or Warrant Shares, or (ix) as otherwise expressly contemplated by this Warrant. Notwithstanding the foregoing, the Company shall not provide material, non-public information or confidential or proprietary information to the Holder without such Holder's written consent.

n) Headings. The headings used in this Warrant are for the convenience of reference only and shall not, for any purpose, be deemed a part of this Warrant.

\*\*\*\*\*

*(Signature Pages Follow)*

IN WITNESS WHEREOF, the Company has caused this Warrant to be executed by its officer thereunto duly authorized as of the date first above indicated.

**ARCA BIOPHARMA, INC.**

By:

Name: Patrick M. Wheeler

Title: Chief Financial Officer

-15-

**NOTICE OF EXERCISE**

TO: ARCA BIOPHARMA, INC.

(1) The undersigned hereby elects to purchase \_\_\_\_\_ Warrant Shares of the Company pursuant to the terms of the attached Warrant (only if exercised in full), and tenders herewith payment of the exercise price in full, together with all applicable transfer taxes, if any.

(2) Payment shall take the form of (check applicable box):

[  ] in lawful money of the United States; or

[  ] (if permitted) the cancellation of such number of Warrant Shares as is necessary, in accordance with the formula set forth in subsection 2(c), to exercise this Warrant with respect to the maximum number of Warrant Shares purchasable pursuant to the Cashless Exercise procedure set forth in subsection 2(c).

(3) Please issue a certificate or certificates representing said Warrant Shares in the name of the undersigned or in such other name as is specified below:

The Warrant Shares shall be delivered to the following DWAC Account Number or by physical delivery of a certificate to:

[SIGNATURE OF HOLDER]

Name of Investing

Entity:

*Signature of Authorized Signatory of Investing Entity:*

Name of Authorized Signatory:

Title of Authorized Signatory:

Date:



---

**ASSIGNMENT FORM**

(To assign the foregoing warrant, execute  
this form and supply required information.

Do not use this form to exercise the warrant.)

FOR VALUE RECEIVED, [            ] all of or [            ] shares of the foregoing Warrant and all rights evidenced  
thereby are hereby assigned to

whose address is

\_\_\_\_\_  
\_\_\_\_\_

Dated: \_\_\_\_\_, \_\_\_\_

Holder s Signature:

Holder s Address:

NOTE: The signature to this Assignment Form must correspond with the name as it appears on the face of the  
Warrant, without alteration or enlargement or any change whatsoever.

ARCA biopharma, Inc.,  
Computershare Inc.  
and  
Computershare Trust Company, N.A. as  
Warrant Agent

Warrant Agency Agreement

Dated as of February 3, 2014



---

WARRANT AGENCY AGREEMENT

WARRANT AGENCY AGREEMENT, dated as of February 3, 2014 (Agreement), between ARCA biopharma, Inc., a Delaware corporation (the Company), Computershare Inc., a Delaware corporation (Computershare), and its wholly-owned subsidiary, Computershare Trust Company, N.A., a federally chartered, limited purpose trust company (together with Computershare, the Warrant Agent).

WITNESSETH

WHEREAS, pursuant to an offering by the Company of shares of common stock, par value \$0.001 per share (the Common Stock), and warrants to purchase Common Stock, pursuant to an effective registration statement on Form S-3, SEC File No. 333-172686 (the Registration Statement), the Company wishes to issue warrants (the Warrants) in book entry form entitling the respective holders of the Warrants (the Holders), which term shall include a Holder's transferees, successors and assigns) to purchase an aggregate of 1,279,057 shares of Common Stock upon the terms and subject to the conditions hereinafter set forth (the Offering);

WHEREAS, the shares of Common Stock and Warrants to be issued in connection with the Offering shall be immediately separable and will be issued separately, but will be purchased together in the Offering; and

WHEREAS, the Company wishes the Warrant Agent to act on behalf of the Company, and the Warrant Agent is willing so to act, in connection with the issuance, registration, transfer, exchange, exercise and replacement of the Warrants and, in the Warrant Agent's capacity as the Company's transfer agent, the delivery of the Warrant Shares.

NOW, THEREFORE, in consideration of the premises and the mutual agreements herein set forth, the parties hereby agree as follows:

Section 1. Certain Definitions. For purposes of this Agreement, the following terms have the meanings indicated:

- (a) Affiliate has the meaning ascribed to it in Rule 12b-2 under the Securities Exchange Act of 1934, as amended (the Exchange Act).
- (b) Business Day means any day except any Saturday, any Sunday, any day which is a federal legal holiday in the United States or any day on which the New York Stock Exchange is authorized or required by law or other governmental action to close.
- (c) Close of Business on any given date means 5:00 p.m., New York City time, on such date; provided, however, that if such date is not a Business Day it means 5:00 p.m., New York City time, on the next succeeding Business Day.
- (e) Person means an individual, corporation, association, partnership, limited liability company, joint venture, trust, unincorporated organization, government or political subdivision thereof or governmental agency or other entity.
- (j) Warrant Certificate means a certificate in substantially the form attached as Exhibit 1 hereto, representing such number of Warrant Shares as is indicated on the face thereof, provided that any reference to the delivery of a Warrant Certificate in this Agreement shall include delivery of notice from the Depository or a Participant (each as defined below) of the transfer or exercise of Warrant in the form of a Book-Entry Warrant Certificate (as defined below).
- (k) Warrant Shares means the shares of Common Stock underlying the Warrants and issuable upon exercise of the Warrants. For purposes of clarity only, on the Issue Date, the number of Warrant Shares underlying each initial Holder's Warrant equals the number of shares of Common Stock purchased by such initial Holder in the Company's offering pursuant to the Registration Statement multiplied by 0.25 (rounded down to the nearest whole Warrant

Share).

All other capitalized terms used but not otherwise defined herein shall have the meaning ascribed to such terms in the Warrant Certificate.

Section 2. Appointment of Warrant Agent. The Company hereby appoints the Warrant Agent to act as agent for the Company in accordance with the terms and conditions hereof, and the Warrant Agent hereby accepts such appointment. The Company may from time to time appoint such Co-Warrant Agents as it may, in its sole discretion, deem necessary or desirable.

Section 3. Book-Entry Warrant Certificates.

(a) The Warrants shall be issuable in book entry (the Book-Entry Warrant Certificates ). All of the Warrants shall initially be represented by one or more Book-Entry Warrant Certificates deposited with The Depository Trust Company (the Depository ) and registered in the name of Cede & Co., a nominee of the Depository, or as otherwise directed by the Depository. Ownership of beneficial interests in the Warrants shall be shown on, and the transfer of such ownership shall be effected through, records maintained by (i) the Depository or its nominee for each Book-Entry Warrant Certificate or (ii) institutions that have accounts with the Depository (such institution, with respect to a Warrant in its account, a Participant ).

(b) If the Depository subsequently ceases to make its book-entry settlement system available for the Warrants, the Company may instruct the Warrant Agent regarding other arrangements for book-entry settlement. In the event that the Warrants are not eligible for, or it is no longer necessary to have the Warrants available in, book-entry form, the Warrant Agent shall provide written instructions to the Depository to deliver to the Warrant Agent for cancellation each Book-Entry Warrant Certificate, and the Company shall instruct the Warrant Agent to deliver to each Holder a Warrant Certificate.

Section 4. Form of Warrant Certificates. The Warrant Certificate, together with the form of election to purchase Common Stock ( Exercise Notice ) and the form of assignment to be printed on the reverse thereof, shall be substantially in the form of Exhibit 1 hereto.

Section 5. Countersignature and Registration. The Warrant Certificates shall be executed on behalf of the Company by its Chief Executive Officer, Chief Financial Officer or Vice President, either manually or by facsimile signature, and have affixed thereto the Company's seal or a facsimile thereof which shall be attested by the Secretary or an Assistant Secretary of the Company, either manually or by facsimile signature. The Warrant Certificates shall be countersigned by the Warrant Agent either manually or by facsimile signature and shall not be valid for any purpose unless so countersigned. In case any officer of the Company who shall have signed any of the Warrant Certificates shall cease to be such officer of the Company before countersignature by the Warrant Agent and issuance and delivery by the Company, such Warrant Certificates, nevertheless, may be countersigned by the Warrant Agent, issued and delivered with the same force and effect as though the person who signed such Warrant Certificate had not ceased to be such officer of the Company; and any Warrant Certificate may be signed on behalf of the Company by any person who, at the actual date of the execution of such Warrant Certificate, shall be a proper officer of the Company to sign such Warrant Certificate, although at the date of the execution of this Warrant Agreement any such person was not such an officer.

The Warrant Agent will keep or cause to be kept, at one of its offices, or at the office of one of its agents, books for registration and transfer of the Warrant Certificates issued hereunder. Such books shall show the names and addresses of the respective holders of the Warrant Certificates, the number of warrants evidenced on the face of each of such Warrant Certificate and the date of each of such Warrant Certificate.

The Warrant Agent will create a special account for the issuance of Warrant Certificates.

Section 6. Transfer, Split Up, Combination and Exchange of Warrant Certificates; Mutilated, Destroyed, Lost or Stolen Warrant Certificates. Subject to the provisions of the Warrant Certificate and the last sentence of this first paragraph of Section 6 and subject to applicable law, rules or regulations, or any stop transfer instructions the Company may give to the Warrant Agent, at any time after the closing date of the Offering, and at or prior to the Close of Business on the Termination Date (as such term is hereinafter defined), any Warrant Certificate or Warrant Certificates or Book-Entry Warrant Certificate or Book-Entry Warrant Certificates may be transferred, split up, combined or exchanged for another Warrant Certificate or Warrant Certificates or Book-Entry Warrant Certificate or Book-Entry Warrant Certificates, entitling the Holder to purchase a like number of shares of Common Stock as the

Warrant Certificate or Warrant Certificates or Book-Entry Warrant Certificate or Book-Entry Warrant Certificates surrendered then entitled such Holder to purchase. Any Holder desiring to transfer, split up, combine or exchange any Warrant Certificate or Book-Entry Warrant Certificate shall make such request in writing delivered to the Warrant Agent, and shall surrender the Warrant Certificate or Warrant Certificates to be transferred, split up, combined or exchanged at the principal office of the Warrant Agent, provided that no such surrender is applicable to the Holder of a Book-Entry Warrant Certificate. Any requested transfer of Warrants, whether in book-entry form or certificate form, shall be accompanied by evidence of authority of the party making such request, which evidence shall include a signature guarantee from an eligible guarantor institution participating in a signature guarantee program approved by the Securities Transfer Association, and any other reasonable evidence of authority that may be required by the Warrant Agent. Thereupon the Warrant Agent shall, subject to the last sentence of this first paragraph of Section 6, countersign and deliver to the Person entitled thereto a Warrant Certificate or Warrant Certificates, as the case may be, as so requested. The Company may

require payment from the Holder of a sum sufficient to cover any tax or governmental charge that may be imposed in connection with any transfer, split up, combination or exchange of Warrant Certificates. The Company shall compensate the Warrant Agent per the fee schedule mutually agreed upon by the parties hereto and provided separately on the date hereof.

Upon receipt by the Warrant Agent of evidence reasonably satisfactory to it of the loss, theft, destruction or mutilation of a Warrant Certificate, which evidence shall include an affidavit of loss, or in the case of mutilated certificates, the certificate or portion thereof remaining, and, in case of loss, theft or destruction, of indemnity or security in customary form and amount which shall include a corporate bond of indemnity satisfactory to the Warrant Agent, and satisfaction of any other reasonable requirements established by Section 8-405 of the Uniform Commercial Code as in effect in the State of Delaware, and reimbursement to the Company and the Warrant Agent of all reasonable expenses incidental thereto, and upon surrender to the Warrant Agent and cancellation of the Warrant Certificate if mutilated, the Company will make and deliver a new Warrant Certificate of like tenor to the Warrant Agent for delivery to the Holder in lieu of the Warrant Certificate so lost, stolen, destroyed or mutilated.

Section 7. Exercise of Warrants; Exercise Price; Termination Date.

(a) The Warrants shall be exercisable commencing on the Issue Date. The Warrants shall cease to be exercisable and shall terminate and become void, and all rights thereunder and under this Agreement shall cease, at or prior to the Close of Business on the Termination Date. Subject to the foregoing and to Section 7(b) below, the Holder of a Warrant may exercise the Warrant in whole or in part upon surrender of the Warrant Certificate, if required, with the executed Exercise Notice and payment of the Exercise Price, which may be made, at the option of the holder, by wire transfer or by certified or official bank check in United States dollars, to Computershare at the principal office of the Warrant Agent or to the office of one of its agents as may be designated by the Warrant Agent from time to time. In the case of the Holder of a Book-Entry Warrant Certificate, the Holder shall deliver the executed Exercise Notice and the payment of the Exercise Price as described herein. The Company acknowledges that the bank accounts maintained by Computershare in connection with the services provided under this Agreement will be in its name and that Computershare may receive investment earnings in connection with the investment at Computershare risk and for its benefit of funds held in those accounts from time to time. Neither the Company nor the Holders will receive interest on any deposits or Exercise Price.

(b) Upon receipt of an Exercise Notice for a Cashless Exercise, the Warrant Agent will promptly calculate and transmit to the Company the number of Warrant Shares issuable in connection with such Cashless Exercise and deliver a copy of the Exercise Notice to the Company, which shall approve such number of Warrant Shares issuable in connection with such Cashless Exercise.

(c) Upon the Warrant Agent's receipt of a Warrant Certificate at or prior to the Close of Business on the Termination Date set forth in such Warrant Certificate, with the executed Exercise Notice, accompanied by payment of the Exercise Price for the shares to be purchased (other than in the case of a Cashless Exercise) and an amount equal to any applicable tax, governmental charge or expense reimbursement referred to in Section 6 in cash, or by certified check or bank draft payable to the order of the Company (or, in the case of the holder of a Book-Entry Warrant Certificate, the delivery of the executed Exercise Notice and the payment of the Exercise Price (other than in the case of a Cashless Exercise) and any other applicable amounts as set forth herein), the Warrant Agent shall cause the Warrant Shares underlying such Warrant Certificate or Book-Entry Warrant Certificate to be delivered to or upon the order of the Holder of such Warrant Certificate or Book-Entry Warrant Certificate, registered in such name or names as may be designated by such Holder, no later than the Warrant Share Delivery Date. If the Company is then a participant in the DWAC system of the Depository and either (A) there is an effective registration statement permitting the issuance of the Warrant Shares to or resale of the Warrant Shares by Holder or (B) the Warrant is being exercised via Cashless Exercise, then the certificates for Warrant Shares shall be transmitted by the Warrant Agent to the Holder by crediting the account of the Holder's broker with the Depository through its DWAC system. For the

avoidance of doubt, if the Company becomes obligated to pay any amounts to any Holders pursuant to Section 2(d)(iv) of the Warrant Certificate, such obligation shall be solely that of the Company and not that of the Warrant Agent. Notwithstanding anything else to the contrary in this Agreement, except in the case of a Cashless Exercise, if any Holder fails to duly deliver payment to the Warrant Agent of an amount equal to the aggregate Exercise Price of the Warrant Shares to be purchased upon exercise of such Holder's Warrant as set forth in Section 7(a) hereof, the Warrant Agent will not be obligated to deliver certificates representing any such Warrant Shares (via DWAC or otherwise) until following receipt of such payment, and the applicable Warrant Share Delivery Date shall be deemed extended by one day for each day (or part thereof) until such payment is delivered to the Warrant Agent.

(d) The Warrant Agent shall deposit all funds received by it in payment of the Exercise Price for all Warrants in the account of the Company maintained with the Warrant Agent for such purpose (or to such other account as directed by the Company in writing) and shall advise the Company via telephone at the end of each day on which funds for the exercise of any Warrant are received of the amount so deposited to its account. The Warrant Agent shall promptly confirm such telephonic advice to the Company in writing.

(e) In case the Holder of any Warrant Certificate shall exercise fewer than all Warrants evidenced thereby, a new Warrant Certificate evidencing the number of Warrants equivalent to the number of Warrants remaining unexercised may be issued by the Warrant Agent to the Holder of such Warrant Certificate or to his duly authorized assigns in accordance with Section 2(d)(ii) of the Warrant Certificate, subject to the provisions of Sections 6 and 15 hereof.

**Section 8. Cancellation and Destruction of Warrant Certificates.** All Warrant Certificates surrendered for the purpose of exercise, transfer, split up, combination or exchange shall, if surrendered to the Company or to any of its agents, be delivered to the Warrant Agent for cancellation or in canceled form, or, if surrendered to the Warrant Agent, shall be canceled by it, and no Warrant Certificates shall be issued in lieu thereof except as expressly permitted by any of the provisions of this Agreement. The Company shall deliver to the Warrant Agent for cancellation and retirement, and the Warrant Agent shall so cancel and retire, any other Warrant Certificate purchased or acquired by the Company otherwise than upon the exercise thereof. The Warrant Agent shall deliver all canceled Warrant Certificates to the Company, or shall, at the written request of the Company, destroy such canceled Warrant Certificates, and in such case shall deliver a certificate of destruction thereof to the Company, subject to any applicable law, rule or regulation requiring the Warrant Agent to retain such canceled certificates.

**Section 9. Certain Representations; Reservation and Availability of Shares of Common Stock or Cash.**

(a) This Agreement has been duly authorized, executed and delivered by the Company and, assuming due authorization, execution and delivery hereof by the Warrant Agent, constitutes a valid and legally binding obligation of the Company enforceable against the Company in accordance with its terms, and the Warrants have been duly authorized, executed and issued by the Company and, assuming due authentication thereof by the Warrant Agent pursuant hereto and payment therefor by the Holders as provided in the Registration Statement, constitute valid and legally binding obligations of the Company enforceable against the Company in accordance with their terms and entitled to the benefits hereof; in each case except as enforceability may be limited by bankruptcy, insolvency, reorganization, moratorium and other similar laws relating to or affecting creditors' rights generally or by general equitable principles (regardless of whether such enforceability is considered in a proceeding in equity or at law).

(b) As of the date hereof, the authorized capital stock of the Company consists of (i) 100,000,000 shares of Common Stock, of which 15,842,812 shares of Common Stock are issued and outstanding, 1,279,057 shares of Common Stock are reserved for issuance upon exercise of the Warrants; up to 9,252,677 shares issuable upon the exercise and/or vesting of other outstanding warrants, options and restricted stock units and 1,093,131 shares of Common Stock are reserved for issuance under the Company's 2013 Equity Incentive Plan and (ii) 5,000,000 shares of preferred stock, \$0.001 par value per share, of which 135,000 are designated Series A Convertible Preferred Stock, no shares of which are issued and outstanding. There are no other outstanding obligations, warrants, options or other rights to subscribe for or purchase from the Company any class of capital stock of the Company.

(c) The Company covenants and agrees that it will cause to be reserved and kept available out of its authorized and unissued shares of Common Stock or its authorized and issued shares of Common Stock held in its treasury, free from preemptive rights, the number of shares of Common Stock that will be sufficient to permit the exercise in full of all outstanding Warrants.

(d) The Warrant Agent will create a special account for the issuance of Common Stock upon the exercise of Warrants.

(e) The Company further covenants and agrees that it will pay when due and payable any and all federal and state transfer taxes and charges which may be payable in respect of the original issuance or delivery of the Warrant Certificates or certificates evidencing Common Stock upon exercise of the Warrants. The Company shall not, however, be required to pay any tax or governmental charge which may be payable in respect of any transfer involved in the transfer or delivery of Warrant Certificates or the issuance or delivery of certificates for Common Stock in a name other than that of the Holder of the Warrant Certificate evidencing Warrants surrendered for exercise or to issue

or deliver any certificate for shares of Common Stock upon the exercise of any Warrants until any such tax or governmental charge shall have been paid (any such tax or governmental charge being payable by the holder of such Warrant Certificate at the time of surrender) or until it has been established to the Company's reasonable satisfaction that no such tax or governmental charge is due.

Section 10. Common Stock Record Date. Each Person in whose name any certificate for shares of Common Stock is issued (or to whose broker's account is credited shares of Common Stock through the DWAC system) upon the exercise of Warrants shall for all purposes be deemed to have become the holder of record for the Common Stock represented thereby on, and such certificate shall be dated, the date upon which the Warrant Certificate evidencing such Warrant was duly surrendered (but only if required herein) and payment of the Exercise Price (and any applicable transfer taxes) and submission of the Exercise Notice was made; provided, however, that if the date of such surrender (if applicable), payment and submission is a date upon which the Common Stock transfer books of the Company are closed, such Person shall be deemed to have become the record holder of such shares on, and such certificate shall be dated, the next succeeding day on which the Common Stock transfer books of the Company are open.



Section 11. Adjustment of Exercise Price, Number of Shares of Common Stock or Number of the Company Warrants.

The Exercise Price, the number of shares covered by each Warrant and the number of Warrants outstanding are subject to adjustment from time to time as provided in Section 3 of the Warrant Certificate. In the event that at any time, as a result of an adjustment made pursuant to Section 3(a) of the Warrant Certificate, the holder of any Warrant thereafter exercised shall become entitled to receive any shares of capital stock of the Company other than shares of Common Stock, thereafter the number of such other shares so receivable upon exercise of any Warrant shall be subject to adjustment from time to time in a manner and on terms as nearly equivalent as practicable to the provisions with respect to the shares contained in Sections 3(a) and (b) of the Warrant Certificate, and the provisions of Sections 7, 9 and 13 of this Agreement with respect to the shares of Common Stock shall apply on like terms to any such other shares. All Warrants originally issued by the Company subsequent to any adjustment made to the Exercise Price pursuant to the Warrant Certificate shall evidence the right to purchase, at the adjusted Exercise Price, the number of shares of Common Stock purchasable from time to time hereunder upon exercise of the Warrants, all subject to further adjustment as provided herein. The Company agrees that it will not, by amendment of its Certificate of Incorporation or through reorganization, consolidation, merger, dissolution or sale of assets, or by any other voluntary act, avoid or seek to avoid the observance or performance of any of the covenants, stipulations or conditions to be observed or performed hereunder by the Company.

Section 12. Certification of Adjusted Exercise Price or Number of Shares of Common Stock. Whenever the Exercise Price or the number of shares of Common Stock issuable upon the exercise of each Warrant is adjusted as provided in Section 11 or 13, the Company shall (a) promptly prepare a certificate setting forth the Exercise Price of each Warrant as so adjusted, and a brief statement of the facts accounting for such adjustment, (b) promptly file with the Warrant Agent and with each transfer agent for the Common Stock a copy of such certificate and (c) instruct the Warrant Agent to mail a brief summary thereof to each holder of a Warrant Certificate.

Section 14. Fractional Shares of Common Stock.

(a) The Company shall not issue fractions of Warrants or distribute Warrant Certificates which evidence fractional Warrants. Whenever any fractional Warrant would otherwise be required to be issued or distributed, the actual issuance or distribution shall reflect a rounding of such fraction to the nearest whole Warrant (rounded down).

(b) The Company shall not issue fractions of shares of Common Stock upon exercise of Warrants or distribute stock certificates which evidence fractional shares of Common Stock. Whenever any fraction of a share of Common Stock would otherwise be required to be issued or distributed, the actual issuance or distribution in respect thereof shall be made in accordance with Section 2(d)(v) of the Warrant Certificate.

Section 15. [Reserved]

Section 16. [Reserved]

Section 17. [Reserved]

Section 18. Concerning the Warrant Agent. The Company agrees to pay to the Warrant Agent, pursuant to the fee schedule mutually agreed upon by the parties hereto and provided separately on the date hereof, for all services rendered by it hereunder and, from time to time, its reasonable expenses and counsel fees and other disbursements actually incurred in the administration and execution of this Agreement and the exercise and performance of its duties hereunder.

The Company covenants and agrees to indemnify and to hold the Warrant Agent harmless against any costs, expenses (including reasonable fees of its legal counsel), losses or damages, which may be paid, incurred or suffered by or to which it may become subject, arising from or out of, directly or indirectly, any claims or liability resulting from its

actions as Warrant Agent pursuant hereto; provided, that such covenant and agreement does not extend to, and the Warrant Agent shall not be indemnified with respect to, such costs, expenses, losses and damages incurred or suffered by the Warrant Agent as a result of, or arising out of, its gross negligence, bad faith, or willful misconduct.

The Warrant Agent shall be responsible for and shall indemnify and hold the Company harmless from and against any and all losses, damages, costs, charges, counsel fees, payments, expenses and liability arising out of or attributable to the Warrant Agent s

refusal or failure to comply with the terms of this Agreement, or which arise out of the Warrant Agent's gross negligence, bad faith or willful misconduct or which arise out of the breach of any representation or warranty of the Warrant Agent hereunder, for which the Warrant Agent is not entitled to indemnification under this Agreement; provided, however, that Warrant Agent's aggregate liability during any term of this Agreement with respect to, arising from, or arising in connection with this Agreement, or from all services provided or omitted to be provided under this Agreement, whether in contract, or in tort, or otherwise, is limited to, and shall not exceed, the amounts paid under this Agreement by the Company to Warrant Agent as fees and charges, but not including reimbursable expenses.

In order that the indemnification provisions contained in this Section 18 shall apply, upon the assertion of a claim for which one party may be required to indemnify the other, the party seeking indemnification shall promptly notify the other party of such assertion, and shall keep the other party advised with respect to all developments concerning such claim. The indemnifying party shall have the option to participate with the indemnified party in the defense of such claim or to defend against said claim in its own name or the name of the indemnified party. The indemnified party shall in no case confess any claim or make any compromise in any case in which the indemnifying party may be required to indemnify it except with the indemnifying party's prior written consent.

Neither party to this Agreement shall be liable to the other party for any consequential, indirect, special or incidental damages under any provisions of this Agreement or for any consequential, indirect, penal, special or incidental damages arising out of any act or failure to act hereunder even if that party has been advised of or has foreseen the possibility of such damages.

Notwithstanding anything contained herein to the contrary, the rights and obligations of the parties set forth in this Section 18 shall survive termination of this Agreement or the resignation or removal of the Warrant Agent.

Section 19. Purchase or Consolidation or Change of Name of Warrant Agent. Any corporation into which the Warrant Agent or any successor Warrant Agent may be merged or with which it may be consolidated, or any corporation resulting from any merger or consolidation to which the Warrant Agent or any successor Warrant Agent shall be party, or any corporation succeeding to the corporate trust business of the Warrant Agent or any successor Warrant Agent, shall be the successor to the Warrant Agent under this Agreement without the execution or filing of any paper or any further act on the part of any of the parties hereto, provided that such corporation would be eligible for appointment as a successor Warrant Agent under the provisions of Section 21. In case at the time such successor Warrant Agent shall succeed to the agency created by this Agreement any of the Warrant Certificates shall have been countersigned but not delivered, any such successor Warrant Agent may adopt the countersignature of the predecessor Warrant Agent and deliver such Warrant Certificates so countersigned; and in case at that time any of the Warrant Certificates shall not have been countersigned, any successor Warrant Agent may countersign such Warrant Certificates either in the name of the predecessor Warrant Agent or in the name of the successor Warrant Agent; and in all such cases such Warrant Certificates shall have the full force provided in the Warrant Certificates and in this Agreement.

In case at any time the name of the Warrant Agent shall be changed and at such time any of the Warrant Certificates shall have been countersigned but not delivered, the Warrant Agent may adopt the countersignature under its prior name and deliver Warrant Certificates so countersigned; and in case at that time any of the Warrant Certificates shall not have been countersigned, the Warrant Agent may countersign such Warrant Certificates either in its prior name or in its changed name; and in all such cases such Warrant Certificates shall have the full force provided in the Warrant Certificates and in this Agreement.

Section 20. Duties of Warrant Agent. The Warrant Agent undertakes the duties and obligations imposed by this Agreement upon the following terms and conditions, by all of which the Company, by its acceptance hereof, shall be bound:

(a) The Warrant Agent may consult with legal counsel reasonably acceptable to the Company (who may be legal counsel for the Company), and the opinion of such counsel shall be full and complete authorization and protection to the Warrant Agent as to any action taken or omitted by it in good faith and in accordance with such opinion.

(b) Whenever in the performance of its duties under this Agreement the Warrant Agent shall deem it necessary or desirable that any fact or matter be proved or established by the Company prior to taking or suffering any action hereunder, such fact or matter (unless other evidence in respect thereof be herein specifically prescribed) may be deemed to be conclusively proved and established by a certificate signed by the Chief Executive Officer, Chief Financial Officer or Vice President of the Company; and such certificate shall be full authentication to the Warrant Agent for any action taken or suffered in good faith by it under the provisions of this Agreement in reliance upon such certificate.

- (c) Subject to the limitation set forth in Section 18, the Warrant Agent shall be liable hereunder only for its own gross negligence, bad faith or willful misconduct, or for a breach by it of this Agreement.
- (d) The Warrant Agent shall not be liable for or by reason of any of the statements of fact or recitals contained in this Agreement or in the Warrant Certificates (except its countersignature thereof) by the Company or be required to verify the same, but all such statements and recitals are and shall be deemed to have been made by the Company only.
- (e) The Warrant Agent shall not be under any responsibility in respect of the validity of this Agreement or the execution and delivery hereof (except the due execution hereof by the Warrant Agent) or in respect of the validity or execution of any Warrant Certificate (except its countersignature thereof); nor shall it be responsible for any breach by the Company of any covenant or condition contained in this Agreement or in any Warrant Certificate; nor shall it be responsible for the adjustment of the Exercise Price or the making of any change in the number of shares of Common Stock required under the provisions of Section 11 or 13 or responsible for the manner, method or amount of any such change or the ascertaining of the existence of facts that would require any such adjustment or change (except with respect to the exercise of Warrants evidenced by Warrant Certificates after actual notice of any adjustment of the Exercise Price); nor shall it by any act hereunder be deemed to make any representation or warranty as to the authorization or reservation of any shares of Common Stock to be issued pursuant to this Agreement or any Warrant Certificate or as to whether any shares of Common Stock will, when issued, be duly authorized, validly issued, fully paid and nonassessable.
- (f) Each party hereto agrees that it will perform, execute, acknowledge and deliver or cause to be performed, executed, acknowledged and delivered all such further and other acts, instruments and assurances as may reasonably be required by the other party hereto for the carrying out or performing by any party of the provisions of this Agreement.
- (g) The Warrant Agent is hereby authorized to accept instructions with respect to the performance of its duties hereunder from the Chief Executive Officer, Chief Financial Officer or Vice President of the Company, and to apply to such officers for advice or instructions in connection with its duties, and it shall not be liable and shall be indemnified and held harmless for any action taken or suffered to be taken by it in good faith in accordance with instructions of any such officer, provided Warrant Agent carries out such instructions without gross negligence, bad faith or willful misconduct.
- (h) The Warrant Agent and any shareholder, director, officer or employee of the Warrant Agent may buy, sell or deal in any of the Warrants or other securities of the Company or become pecuniarily interested in any transaction in which the Company may be interested, or contract with or lend money to the Company or otherwise act as fully and freely as though it were not Warrant Agent under this Agreement. Nothing herein shall preclude the Warrant Agent from acting in any other capacity for the Company or for any other legal entity.
- (i) The Warrant Agent may execute and exercise any of the rights or powers hereby vested in it or perform any duty hereunder either itself or by or through its attorney or agents, and the Warrant Agent shall not be answerable or accountable for any act, default, neglect or misconduct of any such attorney or agents or for any loss to the Company resulting from any such act, default, neglect or misconduct, provided reasonable care was exercised in the selection and continued employment thereof.

Section 21. Change of Warrant Agent. The Warrant Agent may resign and be discharged from its duties under this Agreement upon 30 days' notice in writing mailed to the Company and to each transfer agent of the Common Stock by registered or certified mail, and to the holders of the Warrant Certificates by first-class mail. The Company may remove the Warrant Agent or any successor Warrant Agent upon 30 days' notice in writing, mailed to the Warrant Agent or successor Warrant Agent, as the case may be, and to each transfer agent of the Common Stock by registered or certified mail, and to the holders of the Warrant Certificates by first-class mail. If the Warrant Agent shall resign or be removed or shall otherwise become incapable of acting, the Company shall appoint a successor to the Warrant

Agent. If the Company shall fail to make such appointment within a period of 30 days after such removal or after it has been notified in writing of such resignation or incapacity by the resigning or incapacitated Warrant Agent or by the holder of a Warrant Certificate (who shall, with such notice, submit his Warrant Certificate for inspection by the Company), then the Holder of any Warrant Certificate may apply to any court of competent jurisdiction for the appointment of a new Warrant Agent. Any successor Warrant Agent, whether appointed by the Company or by such a court, shall be a corporation organized and doing business under the laws of the United States or of a state thereof, in good standing, which is authorized under such laws to exercise corporate trust powers and is subject to supervision or examination by federal or state authority and which has at the time of its appointment as Warrant Agent a combined capital and surplus of at least \$50,000,000. After appointment, the successor Warrant Agent shall be vested with the same powers, rights, duties and responsibilities as if it had been originally named as Warrant Agent without further act or deed; but the predecessor Warrant Agent shall deliver and transfer to the successor Warrant Agent any property at the time held by it hereunder, and execute and deliver any further assurance, conveyance, act or deed necessary for the purpose. Not later than the

effective date of any such appointment, the Company shall file notice thereof in writing with the predecessor Warrant Agent and each transfer agent of the Common Stock, and mail a notice thereof in writing to the Holders of the Warrant Certificates. However, failure to give any notice provided for in this Section 21, or any defect therein, shall not affect the legality or validity of the resignation or removal of the Warrant Agent or the appointment of the successor Warrant Agent, as the case may be.

Section 22. Issuance of New Warrant Certificates. Notwithstanding any of the provisions of this Agreement or of the Warrants to the contrary, the Company may, at its option, issue new Warrant Certificates evidencing Warrants in such form as may be approved by its Board of Directors to reflect any adjustment or change in the Exercise Price per share and the number or kind or class of shares of stock or other securities or property purchasable under the several Warrant Certificates made in accordance with the provisions of this Agreement.

Section 23. Notices. Notices or demands authorized by this Agreement to be given or made (i) by the Warrant Agent or by the Holder of any Warrant Certificate to or on the Company, (ii) subject to the provisions of Section 21, by the Company or by the Holder of any Warrant Certificate to or on the Warrant Agent or (iii) by the Company or the Warrant Agent to the Holder of any Warrant Certificate, shall be deemed given (x) on the date delivered, if delivered personally, (y) on the first Business Day following the deposit thereof with Federal Express or another recognized overnight courier, if sent by Federal Express or another recognized overnight courier, and (z) on the fourth Business Day following the mailing thereof with postage prepaid, if mailed by registered or certified mail (return receipt requested), in each case to the parties at the following addresses (or at such other address for a party as shall be specified by like notice):

(a) If to the Company, to:  
ARCA biopharma, Inc.  
  
11080 CirclePoint Rd.  
  
Suite 140  
  
Westminster, CO 80020  
  
Attention: Patrick M. Wheeler, Chief Financial Officer  
  
Fax: (720) 208-9261

(b) If to the Warrant Agent, to:  
Computershare Trust Company, N.A.  
  
PO Box 43070  
  
Providence, RI 02940  
  
Attention: Edward Eismont  
  
Fax: (201) 680-4665

(c) If to the Holder of any Warrant Certificate, to the address of such holder as shown on the registry books of the Company. Any notice required to be delivered by the Company to the Holder of any Warrant may be given by the Warrant Agent on behalf of the Company.

Section 24. Supplements and Amendments.

(a) The Company and the Warrant Agent may from time to time supplement or amend this Agreement without the approval of any Holders of Warrant Certificates in order to cure any ambiguity, to correct or supplement any provision contained herein which may be defective or inconsistent with any other provisions herein, or to make any other provisions with regard to matters or questions arising hereunder which the Company and the Warrant Agent may deem necessary or desirable and which shall not adversely affect the interests of the Holders of the Warrants Certificates.

(b) In addition to the foregoing, with the consent of Holders of Warrants entitled, upon exercise thereof, to receive not less than a majority of the shares of Common Stock issuable thereunder, the Company and the Warrant Agent may modify this Agreement for the purpose of adding any provisions to or changing in any manner or eliminating any of the provisions of this Warrant Agreement or modifying in any manner the rights of the holders of the Warrant Certificates; provided, however, that no modification of the terms (including but not limited to the adjustments described in Section 11) upon which the Warrants are exercisable or reducing the



percentage required for consent to modification of this Agreement may be made without the consent of the holder of each outstanding warrant certificate affected thereby. As a condition precedent to the Warrant Agent's execution of any amendment, the Company shall deliver to the Warrant Agent a certificate from a duly authorized officer of the Company that states that the proposed amendment complies with the terms of this Section 24.

Section 25. Successors. All covenants and provisions of this Agreement by or for the benefit of the Company or the Warrant Agent shall bind and inure to the benefit of their respective successors and assigns hereunder.

Section 26. Benefits of this Agreement. Nothing in this Agreement shall be construed to give any Person other than the Company, the Holders of Warrant Certificates and the Warrant Agent any legal or equitable right, remedy or claim under this Agreement; but this Agreement shall be for the sole and exclusive benefit of the Company, the Warrant Agent and the Holders of the Warrant Certificates.

Section 27. Governing Law. This Agreement and each Warrant Certificate issued hereunder shall be governed by, and construed in accordance with, the laws of the State of New York without giving effect to the conflicts of law principles thereof.

Section 28. Counterparts. This Agreement may be executed in any number of counterparts and each of such counterparts shall for all purposes be deemed to be an original, and all such counterparts shall together constitute but one and the same instrument.

Section 29. Captions. The captions of the sections of this Agreement have been inserted for convenience only and shall not control or affect the meaning or construction of any of the provisions hereof.

Section 30. Information. The Company agrees to promptly provide the Holders of the Warrants the information it is required to provide to the holders of the Common Stock.

Section 31. Force Majeure. Notwithstanding anything to the contrary contained herein, Warrant Agent shall not be liable for any delays or failures in performance resulting from acts beyond its reasonable control including, without limitation, acts of God, terrorist acts, shortage of supply, breakdowns or malfunctions, interruptions or malfunction of computer facilities, or loss of data due to power failures or mechanical difficulties with information storage or retrieval systems, labor difficulties, war, or civil unrest.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be duly executed as of the day and year first above written.

ARCA BIOPHARMA, INC.

By: /s/ Patrick M. Wheeler  
Name: Patrick M. Wheeler  
Title: Chief Financial Officer

COMPUTERSHARE INC. and  
COMPUTERSHARE TRUST COMPANY,  
N.A., *collectively*.

By: /s/ Thomas Borbely  
Name: Thomas Borbely  
Title: Manager, Corporate Actions

**Exhibit 1: Form of Warrant Certificate**

**COMMON STOCK PURCHASE WARRANT**

**ARCA BIOPHARMA, INC.**

Warrant Shares: [\*] Issue Date: February , 2014  
THIS COMMON STOCK PURCHASE WARRANT (the Warrant ) certifies that, for value received, (the Holder ) is entitled, upon the terms and subject to the limitations on exercise and the conditions hereinafter set forth, at any time on or after the Issue Date and on or prior to the close of business on the five (5) year anniversary of the Issue Date (the Termination Date ) but not thereafter, to subscribe for and purchase from **ARCA biopharma, Inc.**, a Delaware corporation (the Company ), up to [\*] shares (the Warrant Shares ) of the Company's common stock, par value \$0.001 per share ( Common Stock ). For purposes of clarity only, on the Issue Date, the number of Warrant Shares underlying this Warrant equals the number of shares of Common Stock purchased by the initial Holder in the Company's offering pursuant to a registration statement on Form S-3 (File No. 333-172686) multiplied by 0.25 (rounded down to the nearest whole Warrant Share). The purchase price of one share of Common Stock under this Warrant shall be equal to the Exercise Price, as defined in Section 2(b).

Section 1. Definitions. Capitalized terms used and not otherwise defined herein shall have the meanings set forth in that certain Warrant Agency Agreement between the Company and Computershare Trust Company, N.A. (the Warrant Agent ), dated as of February 3, 2014 (the Warrant Agency Agreement ).

Section 2. Exercise.

a) Exercise of Warrant. Exercise of the purchase rights represented by this Warrant may be made, in whole or in part, at any time or times on or after the Issue Date and on or before the Termination Date by delivery (whether via facsimile or otherwise) to the Company (or the Warrant Agent or such other office or agency of the Company as it may designate by notice in writing to the registered Holder at the address of the Holder appearing on the books of the Company or the Warrant Agent) of a duly executed copy of the Notice of Exercise form annexed hereto. No ink-original Notice of Exercise shall be required, nor shall any medallion guarantee (or other type of guarantee or notarization) of any Notice of Exercise form be required. Within two (2) Trading Days following an exercise of this Warrant as aforesaid (the Price Delivery Date ), the Holder shall deliver payment to the Warrant Agent or the Company of an amount equal to the aggregate Exercise Price of the Warrant Shares thereby purchased by wire transfer or cashier's check drawn on a United States bank or, if available, pursuant to the Cashless Exercise procedure specified in Section 2(c) below. Notwithstanding anything herein to the contrary, the Holder shall not be required to physically surrender this Warrant to the Company or the Warrant Agent until the Holder has purchased all of the Warrant Shares available hereunder and the Warrant has been exercised in full, in which case, the Holder shall surrender this Warrant to the Company or the Warrant Agent for cancellation within

three (3) Trading Days after the date the final Notice of Exercise is delivered to the Company or Warrant Agent. Partial exercises of this Warrant resulting in purchases of a portion of the total number of Warrant Shares available hereunder shall have the effect of lowering the outstanding number of Warrant Shares purchasable hereunder in an amount equal to the applicable number of Warrant Shares purchased. The Holder and the Company or the Warrant Agent shall maintain records showing the number of Warrant Shares purchased and the date of such purchases. The Company or the Warrant Agent shall deliver any objection to any Notice of Exercise form within 1 Business Day of receipt of the applicable Notice of Exercise. **The Holder and any assignee, by acceptance of this Warrant, acknowledge and agree that, by reason of the provisions of this paragraph, following the purchase of a portion of the Warrant Shares hereunder, the number of Warrant Shares available for purchase hereunder at any given time may be less than the amount stated on the face hereof.**

b) Exercise Price. The exercise price per share of the Common Stock under this Warrant shall be \$2.125, subject to adjustment as provided hereunder (the Exercise Price ).

c) Cashless Exercise. If at the time of exercise hereof there is no effective registration statement registering, or the prospectus contained therein is not available for, the issuance of the Warrant Shares to the Holder, then this Warrant may only be exercised, in whole or in part, at such time by means of a cashless exercise (a Cashless Exercise ) in which the Holder shall be entitled to receive a certificate for the number of Warrant Shares equal to the quotient obtained by dividing [(A-B) (X)] by (A), where:

(A) = the VWAP on the Trading Day immediately preceding the date on which Holder elects to exercise this Warrant by means of a Cashless Exercise, as set forth in the applicable Notice of Exercise;

(B) = the Exercise Price of this Warrant, as adjusted hereunder; and

(X) = the number of Warrant Shares that would be issuable upon exercise of this Warrant in accordance with the terms of this Warrant if such exercise were by means of a cash exercise at the Exercise Price rather than a Cashless Exercise.

Trading Day means a day on which the principal Trading Market is open for trading.

Trading Market means any of the following markets or exchanges on which the Common Stock is listed or quoted for trading on the date in question: the NYSE MKT, the Nasdaq Capital Market, the Nasdaq Global Market, the Nasdaq Global Select Market or the New York Stock Exchange (or any successors to any of the foregoing).

VWAP means, for any date, the price determined by the first of the following clauses that applies: (a) if the Common Stock is then listed or quoted on a Trading Market, the daily volume weighted average price of the Common Stock for such date (or the nearest preceding date) on the Trading Market on which the Common

Stock is then listed or quoted as reported by Bloomberg L.P. (based on a Trading Day from 9:30 a.m. (New York City time) to 4:02 p.m. (New York City time), (b) if the OTC Bulletin Board is not a Trading Market, the volume weighted average price of the Common Stock for such date (or the nearest preceding date) on the OTC Bulletin Board, (c) if the Common Stock is not then listed or quoted for trading on the OTC Bulletin Board and if prices for the Common Stock are then reported in the Pink Sheets published by OTC Markets Group, Inc. (or a similar organization or agency succeeding to its functions of reporting prices), the most recent bid price per share of the Common Stock so reported, or (d) in all other cases, the fair market value of a share of Common Stock as determined by an independent appraiser selected in good faith by the Holders of a majority in interest of the Warrants then outstanding and reasonably acceptable to the Company, the fees and expenses of which shall be paid by the Company.

d) Mechanics of Exercise.

i. Delivery of Certificates Upon Exercise. Certificates for shares purchased hereunder shall be transmitted by the Warrant Agent to the Holder by crediting the account of the Holder's prime broker with The Depository Trust Company (DTC) through its Deposit/Withdrawal at Custodian (DWAC) system if the Company is then a participant in such system and either (A) there is an effective registration statement permitting the issuance of the Warrant Shares to Holder or (B) this Warrant is being exercised via Cashless Exercise, and otherwise by physical delivery to the address specified by the Holder in the Notice of Exercise by the date that is three (3) Trading Days after the receipt by the Company or the Warrant Agent of the Notice of Exercise (provided that payment of the Exercise Price has then been received by the Company or the Warrant Agent) (such date, the Warrant Share Delivery Date). This Warrant shall be deemed to have been exercised upon delivery of the Notice of Exercise and payment of the Exercise Price. The Warrant Shares shall be deemed to have been issued, and Holder or any other person so designated to be named therein shall be deemed to have become a holder of record of such shares for all purposes, as of the date the Warrant has been exercised. Notwithstanding anything else to the contrary in this Warrant, if the Holder fails to duly deliver payment to the Company or the Warrant Agent of an amount equal to the aggregate Exercise Price of the Warrant Shares to be purchased upon exercise of this Warrant by the applicable Price Delivery Date as set forth in Section 2(a) hereof, the Company will not be obligated to deliver or cause the Warrant Agent to deliver certificates representing any such Warrant Shares (via DWAC or otherwise) until following receipt of such payment, and the applicable Warrant Share Delivery Date shall be deemed extended by one day for each day (or part thereof) that after the Price Delivery Date until such payment is delivered to the Company or the Warrant Agent.

ii. Delivery of New Warrants Upon Exercise. If this Warrant shall have been exercised in part, the Company shall (or shall direct the Warrant Agent to), at the request of a Holder and upon surrender of this Warrant certificate, at the time of delivery of the certificate or certificates representing Warrant Shares, deliver to Holder a new Warrant evidencing the rights of Holder to purchase the unpurchased Warrant Shares called for by this Warrant, which new Warrant shall in all other respects be identical with this Warrant.

iii. Rescission Rights. If the Company fails to cause the Warrant Agent to transmit to the Holder a certificate or the certificates representing the Warrant Shares pursuant to Section 2(d)(i) by the Warrant Share Delivery Date, then, the Holder will have the right to rescind such exercise.

iv. Compensation for Buy-In on Failure to Timely Deliver Certificates Upon Exercise. In addition to any other rights available to the Holder, if the Company fails to cause the Warrant Agent to transmit to the Holder a certificate or the certificates representing the Warrant Shares pursuant to an exercise on or before the Warrant Share Delivery Date, and if after such date the Holder is required by its broker to purchase (in an open market transaction or otherwise) or the Holder's brokerage firm otherwise purchases, shares of Common Stock to deliver in satisfaction of a sale by the Holder of the Warrant Shares which the Holder anticipated receiving upon such exercise (a Buy-In ), then the Company shall (or shall direct the Warrant Agent to), within three (3) Trading Days after the Holder's request and in the Holder's discretion, either (i) pay cash to the Holder in an amount equal to the Holder's total purchase price (including brokerage commissions, if any) for the shares of Common Stock so purchased (the Buy-In Price ), at which point the Company's and the Warrant Agent's obligation to deliver such certificate (and to issue such Warrant Shares or credit such Holder's balance account with DTC) shall terminate, or (ii) promptly honor its obligation to deliver to the Holder a certificate or certificates representing such Warrant Shares or credit such Holder's balance account with DTC and pay cash to the Holder in an amount equal to the excess (if any) of the Buy-In Price over the product of (A) such number of shares of Common Stock, times (B) the VWAP on the date of exercise.

v. No Fractional Shares or Scrip. No fractional shares or scrip representing fractional shares shall be issued upon the exercise of this Warrant. As to any fraction of a share which the Holder would otherwise be entitled to purchase upon such exercise, the Company shall (or shall direct the Warrant Agent to), at its election, either pay a cash adjustment in respect of such final fraction in an amount equal to such fraction multiplied by the Exercise Price or round (up or down) to the nearest whole share.

vi. Charges, Taxes and Expenses. Issuance of certificates for Warrant Shares shall be made without charge to the Holder for any issue or transfer tax or other incidental expense in respect of the issuance of such certificate, all of which taxes and expenses shall be paid by the Company, and such certificates shall be issued in the name of the Holder or in such name or names as may be directed by the Holder; provided, however, that in the event certificates for Warrant Shares are to be issued in a name other than the name of the Holder, this Warrant when surrendered for exercise shall be accompanied by the Assignment Form attached hereto duly executed by the Holder and the Company or the Warrant Agent may require, as a condition thereto, the payment of a sum sufficient to reimburse it for any transfer tax incidental thereto.

vii. Closing of Books. The Company will not close its stockholder books or records in any manner which prevents the timely exercise of this Warrant, pursuant to the terms hereof.

e) Holder's Exercise Limitations. Notwithstanding anything to the contrary contained in this Warrant, this Warrant shall not be exercisable by the Holder hereof to the extent (but only to the extent) that the Holder or any of its Affiliates would beneficially own in excess of 4.99% of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock issuable upon exercise of this Warrant (the Maximum Percentage ). The Holder, upon not less than 61 days prior notice to the Company, may increase or decrease the Maximum Percentage provisions of this Section 2(e), provided that the Maximum Percentage in no event exceeds 9.99% of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock upon exercise of this Warrant held by the Holder and the provisions of this Section 2(e) shall continue to apply. Any such increase or decrease will not be effective until the 61<sup>st</sup> day after such notice is delivered to the Company. For purposes of this Section 2(e), the number of shares of Common Stock beneficially owned by the Holder and its Affiliates shall include the number of Warrant Shares which are subject to the Notice of Exercise with respect to which such determination is being made, but shall exclude the number of shares of Common Stock which are issuable upon (i) exercise of the remaining, unexercised portion of this Warrant and beneficially owned by the Holder or any of its Affiliates, and (ii) exercise or conversion of the unexercised or unconverted portion of any other securities of the Company beneficially owned by the Holder or any of its Affiliates that are subject to a limitation on conversion or exercise similar to the limitation contained herein. To the extent the above limitation applies, the determination of whether this Warrant shall be exercisable (vis-à-vis other convertible, exercisable or exchangeable securities owned by the Holder or any of its Affiliates) and of which such securities shall be exercisable (as among all such securities owned by the Holder) shall, subject to such Maximum Percentage limitation, be determined by the Holder, and the Company shall have no responsibility for determining the accuracy of the Holder's determination. No prior inability to exercise this Warrant pursuant to this paragraph shall have any effect on the applicability of the provisions of this paragraph with respect to any subsequent determination of exercisability. For the purposes of this paragraph, beneficial ownership and all determinations and calculations (including, without limitation, with respect to calculations of percentage ownership) shall be determined in accordance with Section 13(d) of the Exchange Act and the rules and regulations promulgated thereunder. The provisions of this paragraph shall be implemented in a manner otherwise than in strict conformity with the terms of this paragraph to correct this paragraph (or any portion hereof) which may be defective or inconsistent with the intended Maximum Percentage beneficial ownership limitation herein contained or to make changes or supplements necessary or desirable to properly give effect to such Maximum Percentage limitation. The limitations contained in this paragraph shall apply to a successor Holder of this Warrant. The holders of Common Stock shall be third party beneficiaries of this paragraph and the Company may not waive this paragraph without the consent of holders of a majority of its Common Stock. For any reason at any time, upon the written or oral request of the Holder, the Company shall within one (1) Business Day confirm orally and



in writing to the Holder the number of shares of Common Stock then outstanding, including by virtue of any prior conversion or exercise of convertible or exercisable securities into Common Stock, including, without limitation, pursuant to this Warrant.

Section 3. Certain Adjustments.

a) Stock Dividends and Splits. If the Company, at any time while this Warrant is outstanding: (i) pays a stock dividend or otherwise makes a distribution or distributions on shares of its Common Stock or any other equity or equity equivalent securities payable in shares of Common Stock (which, for avoidance of doubt, shall not include any shares of Common Stock issued by the Company upon exercise of this Warrant), (ii) subdivides outstanding shares of Common Stock into a larger number of shares, (iii) combines (including by way of reverse stock split) outstanding shares of Common Stock into a smaller number of shares, or (iv) issues by reclassification of shares of the Common Stock any shares of capital stock of the Company (collectively with the actions described in (i), (ii), (iii) and (iv), a Share Reorganization ), then in each case the Exercise Price shall be multiplied by a fraction of which the numerator shall be the number of shares of Common Stock (excluding treasury shares, if any) outstanding immediately before such event and of which the denominator shall be the number of shares of Common Stock outstanding immediately after such event, and the number of shares issuable upon exercise of this Warrant shall be proportionately adjusted such that the aggregate Exercise Price of this Warrant shall remain unchanged. Any adjustment made pursuant to this Section 3(a) shall become effective immediately after the record date for the determination of stockholders entitled to receive such dividend or distribution and shall become effective immediately after the effective date in the case of a subdivision, combination or re-classification, but if the Company shall legally abandon any such dividend, distribution, subdivision, combination or reclassification prior to effecting such action, no adjustment shall be made pursuant to this Section 3(a) in respect of such action.

b) Pro Rata Distributions. If the Company, at any time while this Warrant is outstanding, shall distribute to all holders of Common Stock (and not to the Holders) evidences of its indebtedness or assets (including cash and cash dividends) or rights or warrants to subscribe for or purchase any security other than a Share Reorganization, then in each such case the Exercise Price shall be adjusted by multiplying the Exercise Price in effect immediately prior to the record date fixed for determination of stockholders entitled to receive such distribution by a fraction of which the denominator shall be the VWAP determined as of the record date mentioned above, and of which the numerator shall be such VWAP on such record date less the then per share fair market value at such record date of the portion of such assets or evidence of indebtedness so distributed applicable to one outstanding share of the Common Stock as determined by the Board of Directors in good faith; provided that in no event shall the Exercise Price be increased as a result of the application of this Section 3(b). Simultaneously with any adjustment to the Exercise Price pursuant to this Section 3(b), the number of Warrant Shares that may be purchased upon exercise of this Warrant shall be increased proportionately, so that after such adjustment the aggregate Exercise Price payable hereunder for the adjusted number of Warrant Shares shall be the same as the aggregate Exercise Price in effect immediately

prior to such adjustment (without regard to any limitations on exercise contained herein). In either case the adjustments shall be described in a statement provided to the Holder of the portion of assets or evidences of indebtedness so distributed or such subscription rights applicable to one share of Common Stock. Such adjustments shall be made whenever any such distribution is made and shall become effective immediately after the record date mentioned above, but if the Company shall legally abandon any such distribution prior to effecting such distribution, no adjustments shall be made pursuant to this Section 3(b) in respect of such action.

c) Fundamental Transaction. If, at any time while this Warrant is outstanding, (i) the Company, directly or indirectly, in one or more related transactions effects any merger or consolidation with or into another Person, (ii) the Company, directly or indirectly, effects any sale, lease, license, assignment, transfer, conveyance or other disposition of all or substantially all of its assets in one or a series of related transactions, (iii) any, direct or indirect, purchase offer, tender offer or exchange offer (whether by the Company or another Person) is completed pursuant to which holders of Common Stock are permitted to sell, tender or exchange their shares for other securities, cash or property and has been accepted by the holders of 50% or more of the outstanding Common Stock, (iv) the Company, directly or indirectly, in one or more related transactions effects any reclassification, reorganization or recapitalization of the Common Stock or any compulsory share exchange pursuant to which the Common Stock is effectively converted into or exchanged for other securities, cash or property, or (v) the Company, directly or indirectly, in one or more related transactions consummates a stock or share purchase agreement or other business combination (including, without limitation, a reorganization, recapitalization, spin-off or scheme of arrangement) with another Person whereby such other Person acquires more than 50% of the outstanding shares of Common Stock (not including any shares of Common Stock held by the other Person or other Persons making or party to, or associated or affiliated with the other Persons making or party to, such stock or share purchase agreement or other business combination) (each a Fundamental Transaction ), then, upon any subsequent exercise of this Warrant, the Holder shall have the right to receive, for each Warrant Share that would have been issuable upon such exercise immediately prior to the occurrence of such Fundamental Transaction (without regard to any limitation in Section 2(e) on the exercise of this Warrant), the number of shares of Common Stock of the successor or acquiring corporation or of the Company, if it is the surviving corporation, and any additional consideration (the Alternate Consideration ) receivable as a result of such Fundamental Transaction by a holder of the number of shares of Common Stock for which this Warrant is exercisable immediately prior to such Fundamental Transaction (without regard to any limitation in Section 2(e) on the exercise of this Warrant). For purposes of any such exercise, the determination of the Exercise Price shall be appropriately adjusted to apply to such Alternate Consideration based on the amount of Alternate Consideration issuable in respect of one share of Common Stock in such Fundamental Transaction, and the Company shall apportion the Exercise Price among the Alternate Consideration in a reasonable manner reflecting the relative value of any different components of the Alternate Consideration. If holders of Common Stock are given any choice as to the securities, cash or property to be received in a Fundamental Transaction, then the Holder shall be given the same choice as to the Alternate Consideration it receives upon any

exercise of this Warrant following such Fundamental Transaction. Any such payment of such amount of such Alternative Consideration shall be made in the same form of consideration (whether securities, cash or property) as is given to the holders of Common Stock in such Fundamental Transaction, and if multiple forms of consideration are given, the consideration shall be paid to the Holder in the same proportion as such consideration is paid to the holders of Common Stock. The terms of any agreement pursuant to which a Fundamental Transaction is effected shall include terms requiring any such successor or surviving entity to comply with the provisions of this Section 3(c) and insuring that this Warrant (or any such replacement security) will be similarly adjusted upon any subsequent transaction analogous to a Fundamental Transaction.

d) Calculations. All calculations under this Section 3 shall be made to the nearest cent or the nearest whole share, as the case may be. For purposes of this Section 3, any calculation of the number of shares of Common Stock deemed to be issued and outstanding as of a given date shall not include treasury shares, if any. Notwithstanding anything to the contrary in this Section 3, no adjustment in the Exercise Price shall be required unless such adjustment would require an increase or decrease of at least 1% in such price; provided however, that any adjustments which by reason of the immediately preceding sentence are not required to be made shall be carried forward and taken into account in any subsequent adjustment. In any case in which this Section 3 shall require that an adjustment in the Exercise Price be made effective as of a record date for a specified event, if Holder exercises this Warrant after such record date, the Company may elect to defer, until the occurrence of such event, the issuance of the shares of Common Stock and other capital stock of the Company in excess of the shares of Common Stock and other capital stock of the Company, if any, issuable upon such exercise on the basis of the Exercise Price in effect prior to such adjustment; provided, however, that in such case the Company or the Warrant Agent shall deliver to Holder a due bill or other appropriate instrument evidencing Holder's right to receive such additional shares and/or other capital securities upon the occurrence of the event requiring such adjustment.

e) Notice to Holder.

i. Adjustment to Exercise Price. Whenever the Exercise Price or number of Warrant Shares is adjusted pursuant to any provision of this Section 3, the Company shall (or cause the Warrant Agent to) promptly mail to the Holder a notice setting forth the Exercise Price and number of Warrant Shares after such adjustment and setting forth a brief statement of the facts requiring such adjustment.

ii. Notice to Allow Exercise by Holder. After the Issue Date and on or prior to the Termination Date, if (A) the Company shall declare a dividend (or any other distribution in whatever form) on the Common Stock, (B) the Company shall declare a special nonrecurring cash dividend on or a redemption of the Common Stock, (C) the Company shall authorize the granting to all holders of the Common Stock rights or warrants to subscribe for or purchase any shares of capital stock of any

class or of any rights, (D) the approval of any stockholders of the Company shall be required in connection with any reclassification of the Common Stock, any consolidation or merger to which the Company is a party, any sale or transfer of all or substantially all of the assets of the Company, or any compulsory share exchange whereby the Common Stock is converted into other securities, cash or property, or (E) the Company shall authorize the voluntary or involuntary dissolution, liquidation or winding up of the affairs of the Company, then, in each case, the Company shall cause to be mailed to the Holder at its last address as it shall appear upon the Warrant Register, at least 20 calendar days prior to the applicable record or effective date hereinafter specified, a notice stating (x) the date on which a record is to be taken for the purpose of such dividend, distribution, redemption, rights or warrants, or if a record is not to be taken, the date as of which the holders of the Common Stock of record to be entitled to such dividend, distributions, redemption, rights or warrants are to be determined or (y) the date on which such reclassification, consolidation, merger, sale, transfer or share exchange is expected to become effective or close, and the date as of which it is expected that holders of the Common Stock of record shall be entitled to exchange their shares of the Common Stock for securities, cash or other property deliverable upon such reclassification, consolidation, merger, sale, transfer or share exchange; provided that the failure to mail such notice or any defect therein or in the mailing thereof shall not affect the validity of the corporate action required to be specified in such notice. To the extent that any notice provided hereunder constitutes, or contains, material, non-public information regarding the Company, the Company shall simultaneously file such notice with the Commission pursuant to a Current Report on Form 8-K. The Holder shall remain entitled to exercise this Warrant during the period commencing on the date of such notice to the effective date of the event triggering such notice except as may otherwise be expressly set forth herein.

Section 4. Transfer of Warrant.

a) Transferability. Subject to compliance with any applicable securities laws, this Warrant and all rights hereunder (including, without limitation, any registration rights) are transferable, in whole or in part, upon surrender of this Warrant at the principal office of the Company or the Warrant Agent (or other designated agent), together with a written assignment of this Warrant substantially in the form attached hereto duly executed by the Holder or its agent or attorney and funds sufficient to pay any transfer taxes payable upon the making of such transfer. Upon such surrender and, if required, such payment, the Company shall execute and deliver a new Warrant or Warrants in the name of the assignee or assignees, as applicable, and in the denomination or denominations specified in such instrument of assignment, and shall issue to the assignor a new Warrant evidencing the portion of this Warrant not so assigned, and this Warrant shall promptly be cancelled. The Warrant, if properly assigned in accordance herewith, may be exercised by a new holder for the purchase of Warrant Shares without having a new Warrant issued.

b) New Warrants. Subject to and in accordance with Section 6 the Warrant Agency Agreement, this Warrant may be divided or combined with other Warrants upon presentation hereof at the aforesaid office of the Company or the Warrant Agent (or other designated agent), together with a written notice specifying the names and denominations in which new Warrants are to be issued, signed by the Holder or its agent or attorney. Subject to compliance with Section 4(a), as to any transfer which may be involved in such division or combination, the Company shall execute and deliver (or cause the Warrant Agent to deliver) a new Warrant or Warrants in exchange for the Warrant or Warrants to be divided or combined in accordance with such notice. All Warrants issued on transfers or exchanges shall be dated the initial issuance date set forth on the first page of this Warrant and shall be identical with this Warrant except as to the number of Warrant Shares issuable pursuant thereto.

c) Warrant Register. This Warrant shall be issuable in book entry form (the Book-Entry Warrant Certificate ) and shall initially be represented by one or more Book-Entry Warrant Certificates deposited with the DTC and registered in the name of Cede & Co., a nominee of the DTC, or as otherwise directed by the DTC. Ownership of beneficial interests in this Warrant shall be shown on, and the transfer of such ownership shall be effected through, records maintained by (i) the DTC or its nominee for each Book-Entry Warrant Certificate or (ii) institutions that have accounts with the DTC (the Warrant Register ). If the DTC subsequently ceases to make its book-entry settlement system available for this Warrant, the Company may instruct the Warrant Agent regarding other arrangements for book-entry settlement. In the event that this Warrant is not eligible for, or it is no longer necessary to have this Warrant available in, book-entry form, the Warrant Agent shall provide written instructions to the DTC to deliver to the Warrant Agent for cancellation each Book-Entry Warrant Certificate, and the Company shall cause the Warrant Agent to deliver to the Holder a physical certificate in the form of this Warrant and the Company or the Warrant Agent shall, thereafter, register this Warrant, upon records to be maintained by the Company for that purpose, in the name of the record Holder hereof from time to time. The Company may deem and treat the registered Holder of this Warrant as the absolute owner hereof for the purpose of any exercise hereof or any distribution to the Holder, and for all other purposes, absent actual notice to the contrary.

#### Section 5. Miscellaneous.

a) No Rights as Stockholder Until Exercise. This Warrant does not entitle the Holder to any voting rights, dividends or other rights as a stockholder of the Company prior to the exercise hereof as set forth in Section 2(d)(i).

b) Loss, Theft, Destruction or Mutilation of Warrant. The Company covenants that upon receipt by the Company or the Warrant Agent of evidence reasonably satisfactory to them of the loss, theft, destruction or mutilation of this Warrant or any stock certificate relating to the Warrant Shares, and in case of loss, theft or

destruction, of indemnity or security reasonably satisfactory to it, and upon surrender and cancellation of such Warrant or stock certificate, if mutilated, the Company will make and deliver (or cause the Warrant Agent to deliver) a new Warrant or stock certificate of like tenor and dated as of such cancellation, in lieu of such Warrant or stock certificate.

c) Saturdays, Sundays, Holidays, etc. If the last or appointed day for the taking of any action or the expiration of any right required or granted herein shall not be a Business Day, then, such action may be taken or such right may be exercised on the next succeeding Business Day.

d) Authorized Shares.

The Company covenants that, during the period the Warrant is outstanding, it will reserve from its authorized and unissued Common Stock a sufficient number of shares to provide for the issuance of the Warrant Shares upon the exercise of any purchase rights under this Warrant (without regard to any limitations on exercise contained herein). The Company further covenants that its issuance of this Warrant shall constitute full authority to its officers who are charged with the duty of executing stock certificates to execute and issue the necessary certificates for the Warrant Shares upon the exercise of the purchase rights under this Warrant. The Company will take all such reasonable action as may be necessary to assure that such Warrant Shares may be issued as provided herein without violation of any applicable law or regulation, or of any requirements of the Trading Market upon which the Common Stock may be listed. The Company covenants that all Warrant Shares which may be issued upon the exercise of the purchase rights represented by this Warrant will, upon exercise of the purchase rights represented by this Warrant and payment for such Warrant Shares in accordance herewith, be duly authorized, validly issued, fully paid and nonassessable and free from all taxes, liens and charges created by the Company in respect of the issue thereof (other than taxes in respect of any transfer occurring contemporaneously with such issue).

Except and to the extent as waived or consented to by the Holder, the Company shall not by any action, including, without limitation, amending its certificate of incorporation or through any reorganization, transfer of assets, consolidation, merger, dissolution, issue or sale of securities or any other voluntary action, avoid or seek to avoid the observance or performance of any of the terms of this Warrant, but will at all times in good faith assist in the carrying out of all such terms and in the taking of all such actions as may be necessary or appropriate to protect the rights of Holder as set forth in this Warrant against impairment. Without limiting the generality of the foregoing, the Company will (i) not increase the par value of any Warrant Shares above the amount payable therefor upon such exercise immediately prior to such increase in par value, (ii) take all such action as may be necessary or appropriate in order that the Company may validly and legally issue fully paid and nonassessable Warrant Shares upon the exercise of this Warrant and (iii) use commercially reasonable efforts to obtain all such authorizations, exemptions or consents from any public regulatory body having jurisdiction thereof, as may be, necessary to enable the Company to perform its obligations under this Warrant.

Before taking any action which would result in an adjustment in the number of Warrant Shares for which this Warrant is exercisable or in the Exercise Price, the Company shall obtain all such authorizations or exemptions thereof, or consents thereto, as may be necessary from any public regulatory body or bodies having jurisdiction thereof.

e) Governing Law. This Warrant shall be governed by, and construed in accordance with, the laws of the State of New York without giving effect to the conflicts of law principles thereof.

f) Nonwaiver and Expenses. No course of dealing or any delay or failure to exercise any right hereunder on the part of Holder shall operate as a waiver of such right or otherwise prejudice Holder's rights, powers or remedies. Without limiting any other provision of this Warrant, if the Company willfully and knowingly fails to comply with any provision of this Warrant, which results in any material damages to the Holder, the Company shall pay to Holder such amounts as shall be sufficient to cover any costs and expenses including, but not limited to, reasonable attorneys' fees, including those of appellate proceedings, incurred by Holder in collecting any amounts due pursuant hereto or in otherwise enforcing any of its rights, powers or remedies hereunder.

g) Notices. Any notice, request or other document required or permitted to be given or delivered to the Holder by the Company shall be delivered in accordance with the notice provisions of the Warrant Agency Agreement.

h) Limitation of Liability. No provision hereof, in the absence of any affirmative action by Holder to exercise this Warrant to purchase Warrant Shares, and no enumeration herein of the rights or privileges of Holder, shall give rise to any liability of Holder for the purchase price of any Common Stock or as a stockholder of the Company, whether such liability is asserted by the Company or by creditors of the Company.

i) Remedies. The Holder, in addition to being entitled to exercise all rights granted by law, including recovery of damages, will be entitled to specific performance of its rights under this Warrant. The Company agrees that monetary damages would not be adequate compensation for any loss incurred by reason of a breach by it of the provisions of this Warrant and hereby agrees to waive and not to assert the defense in any action for specific performance that a remedy at law would be adequate.

j) Successors and Assigns. Subject to applicable securities laws, this Warrant and the rights and obligations evidenced hereby shall inure to the benefit of and be binding upon the successors and permitted assigns of the Company and the successors and permitted assigns of Holder. The provisions of this Warrant are intended to be for the benefit of any Holder from time to time of this Warrant and shall be enforceable by the Holder or holder of Warrant Shares.

k) Amendment. This Warrant may be modified or amended or the provisions hereof waived with the written consent of the Company and the Holder.

l) Severability. Wherever possible, each provision of this Warrant shall be interpreted in such manner as to be effective and valid under applicable law, but if any provision of this Warrant shall be prohibited by or invalid under applicable law, such provision shall be ineffective to the extent of such prohibition or invalidity, without invalidating the remainder of such provisions or the remaining provisions of this Warrant.

m) Confidentiality. The Holder agrees to keep confidential any proprietary information relating to the Company delivered by the Company or the Warrant Agent hereunder; provided that nothing herein shall prevent the Holder from disclosing such information: (i) to any holder of Warrants or Warrant Shares, (ii) to any Affiliate of any holder of Warrants or Warrant Shares or any actual or potential transferee of the rights or obligations hereunder that agrees to be bound by this Section 5(m), (iii) upon order, subpoena, or other process of any court or administrative agency or otherwise required by law, (iv) upon the request or demand of any regulatory agency or authority having jurisdiction over such party, (v) which has been publicly disclosed without breach of any obligation to the Company, (vi) which has been obtained from any Person that is not a party hereto or an Affiliate of any such party without any breach of any obligation to the Company, (vii) in connection with the exercise of any remedy, or the resolution of any dispute hereunder, (viii) to the legal counsel or certified public accountants for any holder of Warrants or Warrant Shares, or (ix) as otherwise expressly contemplated by this Warrant. Notwithstanding the foregoing, the Company shall not provide material, non-public information or confidential or proprietary information to the Holder without such Holder's written consent.

n) Headings. The headings used in this Warrant are for the convenience of reference only and shall not, for any purpose, be deemed a part of this Warrant.

\*\*\*\*\*

*(Signature Pages Follow)*



IN WITNESS WHEREOF, the Company has caused this Warrant to be executed by its officer thereunto duly authorized as of the date first above indicated.

**ARCA BIOPHARMA, INC.**

By:

Name: Patrick M. Wheeler

Title: Chief Financial Officer

**NOTICE OF EXERCISE**

TO: ARCA BIOPHARMA, INC.

(1) The undersigned hereby elects to purchase \_\_\_\_\_ Warrant Shares of the Company pursuant to the terms of the attached Warrant (only if exercised in full), and tenders herewith payment of the exercise price in full, together with all applicable transfer taxes, if any.

(2) Payment shall take the form of (check applicable box):

[  ] in lawful money of the United States; or

[  ] (if permitted) the cancellation of such number of Warrant Shares as is necessary, in accordance with the formula set forth in subsection 2(c), to exercise this Warrant with respect to the maximum number of Warrant Shares purchasable pursuant to the Cashless Exercise procedure set forth in subsection 2(c).

(3) Please issue a certificate or certificates representing said Warrant Shares in the name of the undersigned or in such other name as is specified below:

The Warrant Shares shall be delivered to the following DWAC Account Number or by physical delivery of a certificate to:

[SIGNATURE OF HOLDER]

Name of Investing Entity:

*Signature of Authorized Signatory of Investing Entity:*

Name of Authorized Signatory:

Title of Authorized Signatory:

Date:

---

**ASSIGNMENT FORM**

(To assign the foregoing warrant, execute  
this form and supply required information.

Do not use this form to exercise the warrant.)

FOR VALUE RECEIVED, [            ] all of or [            ] shares of the foregoing Warrant and all rights evidenced  
thereby are hereby assigned to

whose address is

\_\_\_\_\_  
\_\_\_\_\_

Dated: \_\_\_\_\_, \_\_\_\_

Holder s Signature:

Holder s Address:

NOTE: The signature to this Assignment Form must correspond with the name as it appears on the face of the  
Warrant, without alteration or enlargement or any change whatsoever.

Brent D. Fassett

(720) 566-4025

fassettbd@cooley.com

February 4, 2014

ARCA biopharma, Inc.

8001 Arista Place, Suite 200

Broomfield, CO 80021

Ladies and Gentlemen:

We have acted as counsel to ARCA biopharma, Inc., a Delaware corporation (the *Company*), and you have requested our opinion with respect to certain matters in connection with the offering by the Company of 5,116,228 shares (the *Shares*) of the Company's common stock, par value \$0.001 (the *Common Stock*), plus warrants (the *Warrants*) to purchase an additional 1,279,057 shares of the Company's common stock (the *Warrant Shares*) pursuant to a Registration Statement on Form S-3 (Registration Statement No. 333-172686) (the *Registration Statement*), filed with the Securities and Exchange Commission (the *Commission*) under the Securities Act of 1933, as amended (the *Act*), the prospectus dated April 4, 2011 (the *Base Prospectus*), and the prospectus supplement dated February 4, 2014, filed with the Commission pursuant to Rule 424(b) under the Act (the *Prospectus Supplement*). (The Base Prospectus and the Prospectus Supplement are collectively referred to as the *Prospectus*.) The Shares, the Warrants and the Warrant Shares are to be sold by the Company as described in the Registration Statement and the Prospectus.

In connection with this opinion, we have examined and relied upon the Registration Statement, the Prospectus, the Company's certificate of incorporation and bylaws, as currently in effect, and the originals or copies certified to our satisfaction of such records, documents, certificates, memoranda and other instruments as in our judgment are necessary or appropriate to enable us to render the opinion expressed below. We have assumed the genuineness and authenticity of all documents submitted to us as originals, and the conformity to originals of all documents submitted to us as copies thereof. With regard to our opinion regarding the Warrants and the Warrant Shares, (i) we have assumed that the exercise price of the Warrants at the time of exercise is equal to or greater than the par value of the Common Stock, and (ii) we express no opinion to the extent that, notwithstanding its current reservation of shares of Common Stock, future issuances of securities, including the Warrant Shares, of the Company and/or antidilution adjustments to outstanding securities of the Company, including the Warrants, cause the Warrants to be exercisable for more shares of Common Stock than the number that then remain authorized but unissued.

Our opinion herein is expressed solely with respect to the General Corporation Law of the State of Delaware and, as to the Warrants constituting valid and legally binding obligations of the Company, with respect to the laws of the State of New York. Our opinion is based on these laws as in effect on the date hereof. We express no opinion as to whether the laws of any particular jurisdiction are applicable to the subject matter hereof. We are not rendering any opinion as to compliance with any federal or state antifraud law, rule or regulation relating to securities, or to the sale or issuance thereof.

380 INTERLOCKEN CRESCENT, SUITE 900, BROOMFIELD, CO 80021-8023 T: (720) 566-4000 F: (720)  
566-4099 WWW.COOLEY.COM

ARCA biopharma, Inc.

Page Two

On the basis of the foregoing, and in reliance thereon, we are of the opinion that (i) the Shares, when sold in accordance with the Registration Statement and the Prospectus, will be validly issued, fully paid and nonassessable, (ii) provided that the Warrants have been duly executed and delivered by the Company and duly delivered to the purchasers thereof against payment therefor, the Warrants, when issued and sold as contemplated in the Registration Statement and the Prospectus will be valid and legally binding obligations of the Company, enforceable against the Company in accordance with their terms, except as enforcement thereof may be limited by bankruptcy, insolvency, fraudulent transfer, reorganization, moratorium or other similar laws relating to or affecting creditors' rights generally and by general equitable principles and limitations on availability of equitable relief, including specific performance (regardless of whether such enforceability is considered in a proceeding at law or in equity), and (iii) the Warrant Shares, when issued and paid for in accordance with the terms of the Warrants, will be validly issued, fully paid and nonassessable.

We consent to the reference to our firm under the caption "Legal Matters" in the Prospectus, the filing of this opinion as an exhibit to a current report on Form 8-K of the Company and the incorporation by reference of this opinion in the Registration Statement.

Very truly yours,

Cooley llp

By: /s/ Brent D. Fassett  
Brent D. Fassett, Partner

380 INTERLOCKEN CRESCENT, SUITE 900, BROOMFIELD, CO 80021-8023 T: (720) 566-4000 F: (720)  
566-4099 WWW.COOLEY.COM

## ARCA BIOPHARMA ANNOUNCES PROPOSED PUBLIC OFFERING OF COMMON STOCK AND WARRANTS

*Westminster, CO, February 3, 2014* ARCA biopharma, Inc. (Nasdaq: ABIO), a biopharmaceutical company developing genetically-targeted therapies for cardiovascular diseases, today announced that it intends to offer and sell common stock and warrants in a public offering. The offering is subject to market and other conditions, and there can be no assurance as to whether or when the offering may be completed, or as to the actual size or terms of the offering. The shares and warrants are being offered under the Company's effective shelf registration statement previously filed with the Securities and Exchange Commission (SEC) and declared effective on April 4, 2011 (Registration No. 333-172686). The Company intends to use the net proceeds of the offering for general corporate purposes, including working capital and operational purposes.

This press release shall not constitute an offer to sell or the solicitation of an offer to buy these securities, nor shall there be any sale of these securities in any jurisdiction in which such offer, solicitation or sale would be unlawful prior to the registration or qualification under the securities laws of any such jurisdiction.

Dawson James Securities, Inc. is acting as the sole book-running manager for the offering.

A preliminary prospectus supplement and accompanying prospectus relating to the offering will be filed with the SEC and will be available on the SEC's website located at [www.sec.gov](http://www.sec.gov). Copies of the preliminary prospectus supplement and accompanying prospectus may also be obtained by contacting Dawson James Securities, Inc., Attention: Prospectus Department, 1 North Federal Highway, 5<sup>th</sup> Floor, Boca Raton, FL 33432, e-mail: [mmaclaren@dawsonjames.com](mailto:mmaclaren@dawsonjames.com) or toll free at (866) 928-0928. Before you invest, you should read the preliminary prospectus supplement and accompanying prospectus and other documents the Company has filed with the SEC for more complete information about ARCA biopharma, Inc. You may obtain these documents for free by visiting the SEC web site at [www.sec.gov](http://www.sec.gov).

### About ARCA biopharma

ARCA biopharma is dedicated to developing genetically-targeted therapies for cardiovascular diseases. The Company's lead product candidate, Gencar<sup>TM</sup> (bucindolol hydrochloride), is an investigational, pharmacologically unique beta-blocker and mild vasodilator being developed for atrial fibrillation. ARCA has identified common genetic variations that it believes predict individual patient response to Gencar, giving it the potential to be the first genetically-targeted atrial fibrillation prevention treatment. ARCA has a collaboration with Medtronic, Inc. for support of the GENETIC-AF trial. For more information please visit [www.arcabiopharma.com](http://www.arcabiopharma.com).

**Safe Harbor Statement**

This press release contains forward-looking statements for purposes of the safe harbor provided by the Private Securities Litigation Reform Act of 1995. These statements include, but are not limited to, statements regarding the sufficiency of the Company's capital to support its operations, the potential for genetic variations to predict individual patient response to Gencaro, Gencaro's potential to treat atrial fibrillation, future treatment options for patients with atrial fibrillation, and the potential for Gencaro to be the first genetically-targeted atrial fibrillation prevention treatment. Such statements are based on management's current expectations and involve risks and uncertainties. Actual results and performance could differ materially from those projected in the forward-looking statements as a result of many factors, including, without limitation, the risks and uncertainties associated with: the Company's financial resources and whether they will be sufficient to meet the Company's business objectives and operational requirements; results of earlier clinical trials may not be confirmed in future trials, the protection and market exclusivity provided by the Company's intellectual property; risks related to the drug discovery and the regulatory approval process; and, the impact of competitive products and technological changes. These and other factors are identified and described in more detail in ARCA's filings with the SEC, including without limitation the Company's annual report on Form 10-K for the year ended December 31, 2012, and subsequent filings. The Company disclaims any intent or obligation to update these forward-looking statements.

**Investor & Media Contact:**

Derek Cole

720.940.2163

[derek.cole@arcabiopharma.com](mailto:derek.cole@arcabiopharma.com)

###



**ARCA BIOPHARMA ANNOUNCES PRICING OF \$9 MILLION PUBLIC OFFERING OF COMMON STOCK AND WARRANTS**

*Westminster, CO, February 4, 2014* ARCA biopharma, Inc. (Nasdaq: ABIO), a biopharmaceutical company developing genetically-targeted therapies for cardiovascular diseases, today announced that it has priced its previously announced public offering of common stock and warrants at a price of \$1.70 for each share of common stock and a related warrant to purchase 0.25 shares of common stock, for gross proceeds of \$8.7 million, prior to deducting underwriting discounts and commissions and offering expenses of the Company. The purchase price represents a 9.6% discount to the closing price of the Company's common stock on the Nasdaq Capital Market on February 3, 2014. The warrants are immediately exercisable, have a term of 5 years and an exercise price of \$2.125. The offering is expected to close on or about February 7, 2014, subject to the satisfaction of customary closing conditions.

The Company intends to use the net proceeds of the offering for general corporate purposes, including working capital and operational purposes. The Company anticipates that its cash and cash equivalents balance of approximately \$16.8 million at December 31, 2013, along with the estimated net proceeds from this offering, will be sufficient to fund its operations, at its projected cost structure, through at least 2015. However, changing circumstances may cause the Company to consume capital significantly faster or slower than it currently anticipates. The Company has based these estimates on assumptions that may prove to be wrong, and the Company could exhaust its available financial resources sooner than it currently anticipates.

This press release shall not constitute an offer to sell or the solicitation of an offer to buy these securities, nor shall there be any sale of these securities in any jurisdiction in which such offer, solicitation or sale would be unlawful prior to the registration or qualification under the securities laws of any such jurisdiction.

Dawson James Securities, Inc. is acting as the sole book-running manager for the offering.

The shares and warrants are being offered under the Company's effective shelf registration statement previously filed with the Securities and Exchange Commission (SEC) and declared effective on April 4, 2011 (Registration No. 333-172686).

A preliminary prospectus supplement and accompanying prospectus relating to the offering has been filed with the SEC and is available on the SEC's website located at [www.sec.gov](http://www.sec.gov). Copies of the preliminary prospectus supplement and accompanying prospectus may also be obtained by contacting Dawson James Securities, Inc., Attention: Prospectus Department, 1 North Federal Highway, 5<sup>th</sup> Floor, Boca Raton, FL 33432, e-mail: [mmaclaren@dawsonjames.com](mailto:mmaclaren@dawsonjames.com) or toll free at (866) 928-0928 Before you invest, you should read the preliminary prospectus supplement and accompanying prospectus and other documents the Company has filed with the SEC for more complete information about ARCA biopharma, Inc. You may obtain these documents for free by visiting the SEC web site at [www.sec.gov](http://www.sec.gov).

## **About ARCA biopharma**

ARCA biopharma is dedicated to developing genetically-targeted therapies for cardiovascular diseases. The Company's lead product candidate, Gencaro™ (bucindolol hydrochloride), is an investigational, pharmacologically unique beta-blocker and mild vasodilator being developed for atrial fibrillation. ARCA has identified common genetic variations that it believes predict individual patient response to Gencaro, giving it the potential to be the first genetically-targeted atrial fibrillation prevention treatment. ARCA has a collaboration with Medtronic, Inc. for support of the GENETIC-AF trial. For more information please visit [www.arcabiopharma.com](http://www.arcabiopharma.com).

## **Safe Harbor Statement**

This press release contains forward-looking statements for purposes of the safe harbor provided by the Private Securities Litigation Reform Act of 1995. These statements include, but are not limited to, statements regarding, potential timing for patient enrollment in the GENETIC-AF trial, the sufficiency of the Company's capital to support its operations, the potential for genetic variations to predict individual patient response to Gencaro, Gencaro's potential to treat atrial fibrillation, future treatment options for patients with atrial fibrillation, the role of AF burden in diagnosis and treatment of atrial fibrillation and the potential for Gencaro to be the first genetically-targeted atrial fibrillation prevention treatment. Such statements are based on management's current expectations and involve risks and uncertainties. Actual results and performance could differ materially from those projected in the forward-looking statements as a result of many factors, including, without limitation, the risks and uncertainties associated with: the Company's financial resources and whether they will be sufficient to meet the Company's business objectives and operational requirements; results of earlier clinical trials may not be confirmed in future trials, the protection and market exclusivity provided by the Company's intellectual property; risks related to the drug discovery and the regulatory approval process; and, the impact of competitive products and technological changes. These and other factors are identified and described in more detail in ARCA's filings with the SEC, including without limitation the Company's annual report on Form 10-K for the year ended December 31, 2012, and subsequent filings. The Company disclaims any intent or obligation to update these forward-looking statements.

## **Investor & Media Contact:**

Derek Cole

720.940.2163

[derek.cole@arcabiopharma.com](mailto:derek.cole@arcabiopharma.com)

###

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

**FORM 8-K/A**

**CURRENT REPORT**

**Pursuant to Section 13 or 15(d)**  
**of the Securities Exchange Act of 1934**

**Date of Report (Date of earliest event reported): February 10, 2014 (September 17, 2013)**

**ARCA BIOPHARMA, INC.**

**(Exact name of registrant as specified in its charter)**

**Delaware**  
**(State or other jurisdiction**

**of incorporation)**

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

**File Number)**

**36-3855489**  
**(IRS Employer**

**Identification No.)**

**ARCA biopharma, Inc.**

**80020**

**11080 CirclePoint Road, Suite 140**  
**Westminster, Colorado**  
**(Address of principal executive offices) (Zip Code)**  
**Registrant's telephone number, including area code: (720) 940-2200**

**Not applicable**

**(Former name or former address, if changed since last report)**

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

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

## EXPLANATORY NOTE

This Current Report on Form 8-K/A is being filed as an amendment to the Current Report on Form 8-K filed by ARCA biopharma, Inc. (the **Company** ) on September 23, 2013 (the **Original Report** ) with the U.S. Securities and Exchange Commission. The sole purpose of this amendment is to disclose the Company's decision regarding the frequency of future stockholder advisory votes on the compensation of its named executive officers. No other changes have been made to the Original Report.

### **Section 5 Corporate Governance and Management**

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

(d) At the Company's 2013 Annual Meeting of Stockholders held on September 17, 2013, the Company's stockholders voted on a proposal regarding the frequency of future stockholder advisory votes on the compensation of the Company's named executive officers. As reported in the Original Report, a frequency of every three years received the highest number of votes on the proposal. In light of, and consistent with, the vote of the Company's stockholders, the Company will conduct future stockholder advisory votes on named executive officer compensation every three years until the next advisory vote on the frequency of such votes, which will occur no later than 2019.

**SIGNATURES**

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

**ARCA BIOPHARMA, INC.**

Date: February 10, 2014

By: /s/ Patrick M. Wheeler  
Patrick M. Wheeler

Chief Financial Officer