

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

**FORM S-8**

REGISTRATION STATEMENT UNDER  
THE SECURITIES ACT OF 1933

**Assembly Biosciences, Inc.**

(Exact Name of Registrant as Specified in Its Charter)

**Delaware**

(State or Other Jurisdiction of  
Incorporation or Organization)

**20-8729264**

(I.R.S. Employer  
Identification No.)

**11711 N. Meridian Street, Suite 310**  
**Carmel, Indiana**  
(Address of Principal Executive Offices)

**46032**  
(Zip Code)

**Non-Qualified Stock Option Agreements dated May 16, 2014**  
(Full Title of the Plan)

**Derek Small**  
**Chief Executive Officer and President**  
**Assembly Biosciences, Inc.**  
**11711 N. Meridian Street, Suite 310**  
**Carmel, Indiana 46032**  
(Name and Address of Agent For Service)

**(317) 210-9311**  
(Telephone Number, Including Area Code, of Agent For Service)

*Copies to:*

**Mitchell S. Bloom, Esq.**  
**Maggie L. Wong, Esq.**  
**Goodwin Procter LLP**  
**100 Northern Avenue**  
**Boston, Massachusetts 02210**  
**(617) 570-1000**

**Elizabeth H. Lacy**  
**General Counsel**  
**Assembly Biosciences, Inc.**  
**11711 N. Meridian Street, Suite 310**  
**Carmel, Indiana 46032**  
**(317) 210-9311**

Indicate by check mark whether the Registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b of the Exchange Act.

Large accelerated filer   
Non-accelerated filer   
(Do not check if a smaller reporting company)

Accelerated filer   
Smaller reporting company

**CALCULATION OF REGISTRATION FEE**

Title of Securities to be Registered	Amount to be Registered(1)	Proposed Maximum Offering Price Per Share	Proposed Maximum Aggregate Offering Price(2)	Amount of Registration Fee
Common Stock, \$0.001 par value per share	621,650(3)	\$2.22	\$1,380,066	\$159.95

- (1) In accordance with Rule 416 under the Securities Act of 1933, as amended (the "Securities Act"), this registration statement shall be deemed to cover any additional securities that may from time to time be offered or issued to prevent dilution resulting from stock splits, stock dividends or similar transactions.
- (2) In accordance with Rule 457(h) under the Securities Act, the proposed maximum aggregate offering prices for the shares of common stock ("Common Stock") of Assembly Biosciences, Inc. (the "Registrant") has been computed based upon the price at which the non-qualified stock options described below may be exercised.

- (3) Represents shares of common stock available for future issuance upon the exercise of non-qualified stock option awards granted to (i) Derek Small, the Registrant's President and Chief Executive Officer, and (ii) Lee Arnold, the Registrant's former Chief Discovery Officer, on May 16, 2014 by Assembly Pharmaceuticals, Inc. ("Assembly Pharma") and assumed by the Registrant in connection with the merger of the Registrant with Assembly Pharma in July 2014.
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## EXPLANATORY NOTE

This Registration Statement on Form S-8 (the "Registration Statement") is being filed for the purpose of registering (i) 466,238 shares of the Registrant's common stock issuable upon the exercise of non-qualified stock options granted to Derek Small, the Registrant's President and Chief Executive Officer, pursuant to that certain Non-Qualified Stock Option Agreement between the Registrant (as successor to Assembly Pharma) and Mr. Small dated May 16, 2014 and (ii) 155,412 shares of the Registrant's common stock issuable upon the exercise of non-qualified stock options granted to Lee Arnold, the Registrant's former Chief Discovery Officer, pursuant to that certain Non-Qualified Stock Option Agreement between the Registrant (as successor to Assembly Pharma) and Mr. Arnold dated May 16, 2014.

### PART I

#### INFORMATION REQUIRED IN THE SECTION 10(a) PROSPECTUS

The information called for in Part I of Form S-8 is not being filed with or included in this Registration Statement (by incorporation by reference or otherwise) in accordance with the rules and regulations of the Securities and Exchange Commission (the "Commission").

### PART II

#### INFORMATION REQUIRED IN THE REGISTRATION STATEMENT

##### Item 3. Incorporation of Documents by Reference.

The following documents, which have been filed with the Commission by the Registrant, pursuant to the Securities Act and the Securities Exchange Act of 1934, as amended (the "Exchange Act"), as applicable, are hereby incorporated by reference in, and shall be deemed to be a part of, this Registration Statement:

- (a) The Registrant's Annual Report on Form 10-K for the year ended December 31, 2016, filed with the Commission on March 2, 2017;
- (b) The Registrant's Current Report on Form 8-K filed with the Commission on January 10, 2017; and
- (c) The description of the Registrant's common stock in the Registrant's registration statement on Form 8-A (File No. 001-350005) filed with the Commission on December 10, 2010, including any amendment or report filed by the Registrant for the purpose of updating such description.

All documents subsequently filed by the Registrant pursuant to Section 13(a), 13(c), 14 or 15(d) of the Exchange Act prior to the filing of a post-effective amendment to the registration statement which indicates that all of the shares of common stock registered hereunder have been sold or which deregisters all of such shares then remaining unsold, shall be deemed to be incorporated by reference into this registration statement and to be a part hereof from the respective dates of filing of such documents, except as to any portion of any future annual or quarterly report to stockholders or document or current report furnished under current Items 2.02 or 7.01 of Form 8-K that is not deemed filed under such provisions. Any statement contained in a document incorporated or deemed to be incorporated by reference herein shall be deemed to be modified or superseded for purposes of this registration statement to the extent that a statement contained herein, or in any other subsequently filed document that also is or is deemed to be incorporated by reference herein, modifies or supersedes such earlier statement. Any such statement so modified or superseded shall not be deemed, except as so modified or superseded, to constitute a part of this registration statement.

##### Item 4. Description of Securities.

Not applicable.

**Item 5. Interests of Named Experts and Counsel.**

None.

**Item 6. Indemnification of Directors and Officers.**

The Registrant is incorporated under the laws of the State of Delaware. Section 145 of the Delaware General Corporation Law (the "DGCL") provides that a Delaware corporation may indemnify any persons who are, or are threatened to be made, parties to any threatened, pending, or completed action, suit, or proceeding, whether civil, criminal, administrative, or investigative (other than an action by or in the right of such corporation), by reason of the fact that such person was an officer, director, employee, or agent of such corporation, or is or was serving at the request of such person as an officer, director, employee, or agent of another corporation or enterprise. The indemnity may include expenses (including attorneys' fees), judgments, fines, and amounts paid in settlement actually and reasonably incurred by such person in connection with such action, suit, or proceeding, provided that such person acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the corporation's best interests and, with respect to any criminal action or proceeding, had no reasonable cause to believe that his or her conduct was illegal.

Section 145 of the DGCL also gives a corporation the power to indemnify any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action or suit by or in the right of the corporation to procure a judgment in its favor by reason of the fact that the person is or was a director, officer, employee or agent of the corporation, or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise against expenses (including attorneys' fees) actually and reasonably incurred by the person in connection with the defense or settlement of such action or suit if the person acted in good faith and in a manner the person reasonably believed to be in or not opposed to the best interests of the corporation and except that no indemnification shall be made in respect of any claim, issue or matter as to which such person shall have been adjudged to be liable to the corporation unless and only to the extent that the Court of Chancery or the court in which such action or suit was brought shall determine upon application that, despite the adjudication of liability but in view of all the circumstances of the case, such person is fairly and reasonably entitled to indemnity for such expenses which the Court of Chancery or such other court shall deem proper. Section 145 further provides that, to the extent that a present or former director or officer of a corporation has been successful on the merits or otherwise in defense of any such action, suit or proceeding, or in defense of any claim, issue or matter therein, such person shall be indemnified against expenses (including attorneys' fees) actually and reasonably incurred by such person in connection therewith.

The Registrant's Amended and Restated Bylaws provide that:

- The Registrant shall indemnify its directors, officers and, in the discretion of its board of directors, certain employees and agents to the fullest extent permitted by the DGCL, as it now exists or may in the future be amended; and
- the Registrant shall advance reasonable expenses, including attorneys' fees, to its directors and officers in connection with legal proceedings relating to their service for or on behalf of the Registrant, subject to limited exceptions.

Section 145 of the DGCL also authorizes a corporation to purchase and maintain insurance on behalf of any person who is or was a director, officer, employee or agent of the corporation, or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, against any liability asserted against him and incurred by him in any such capacity, arising out of his status as such, whether or not the corporation would otherwise have the power to indemnify him under Section 145. The Registrant maintains general liability insurance which covers certain liabilities of its directors and officers arising out of claims based on acts or omissions in their capacities as directors or officers, including liabilities under the Securities Act.

The Registrant has adopted provisions in the Registrant's certificate of incorporation that limit or eliminate the personal liability of the Registrant's directors to the fullest extent permitted by the DGCL, as it now exists or may in the future be amended. Consequently, a director will not be personally liable to the Registrant or its stockholders for monetary damages for breach of fiduciary duty as a director, except for liability for:

- any breach of the director's duty of loyalty to the Registrant or its stockholders;
- any act or omission not in good faith or that involves intentional misconduct or a knowing violation of law;
- any unlawful payments related to dividends or unlawful stock purchases, redemptions or other distributions under Section 174 of the DGCL; or
- any transaction from which the director derived an improper personal benefit.

These limitations of liability do not alter director liability under the federal securities laws and do not affect the availability of equitable remedies such as an injunction or rescission.

**Item 7. Exemption from Registration Claimed.**

Not applicable.

**Item 8. Exhibits.**

See the Exhibit Index on the page immediately preceding the exhibits for a list of exhibits filed as part of this registration statement on Form S-8, which Exhibit Index is incorporated herein by reference.

**Item 9. Undertakings.**

The undersigned Registrant hereby undertakes:

- (1) To file, during any period in which offers or sales are being made, a post-effective amendment to this Registration Statement:
  - i. to include any prospectus required by Section 10(a)(3) of the Securities Act;
  - ii. to reflect in the prospectus any facts or events arising after the effective date of the Registration Statement (or the most recent post-effective amendment thereof) which, individually or in the aggregate, represent a fundamental change in the information set forth in the Registration Statement. Notwithstanding the foregoing, any increase or decrease in volume of securities offered (if the total dollar value of securities offered would not exceed that which was registered) and any deviation from the low or high end of the estimated maximum offering range may be reflected in the form of prospectus filed with the Commission pursuant to Rule 424(b) if, in the aggregate, the changes in volume and price represent no more than 20 percent change in the maximum aggregate offering price set forth in the "Calculation of Registration Fee" table in the effective Registration Statement; and
  - iii. to include any material information with respect to the plan of distribution not previously disclosed in the Registration Statement or any material change to such information in the Registration Statement;

provided, however, that paragraphs (1)(i) and (1)(ii) do not apply if the information required to be included in a post-effective amendment by those paragraphs is contained in reports filed with or furnished to the Commission by the Registrant pursuant to Section 13 or Section 15(d) of the Exchange Act that are incorporated by reference in the Registration Statement.

- (2) That, for the purpose of determining any liability under the Securities Act, each such post-effective amendment shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.
- (3) To remove from registration by means of a post-effective amendment any of the securities being registered which remain unsold at the termination of the offering.

The Registrant hereby undertakes that, for purposes of determining any liability under the Securities Act, each filing of the Registrant's annual report pursuant to Section 13(a) or 15(d) of the Exchange Act (and, where applicable, each filing of an employee benefit plan's annual report pursuant to Section 15(d) of the Exchange Act) that is incorporated by reference in this Registration Statement shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the Registrant pursuant to the provisions described in Item 6 hereof, or otherwise, the Registrant has been advised that in the opinion of the Commission such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the Registrant of expenses incurred or paid by a director, officer or controlling person of the Registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the Registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question whether such indemnification by it is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue.

## SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the Registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-8 and has duly caused this Registration Statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the city of Carmel, state of Indiana, on March 23, 2017.

ASSEMBLY BIOSCIENCES, INC.

By: /s/ Derek Small

Derek Small

President and Chief Executive Officer

## POWER OF ATTORNEY AND SIGNATURES

We, the undersigned officers and directors of Assembly Biosciences, Inc., hereby severally constitute and appoint Derek Small and David J. Barrett, and each of them singly (with full power to each of them to act alone), our true and lawful attorneys-in-fact and agents, with full power of substitution and resubstitution in each of them for him and in his name, place and stead, and in any and all capacities, to sign for us and in our names in the capacities indicated below any and all amendments (including post-effective amendments) to this registration statement on Form S-8, and to file the same, with all exhibits thereto and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing requisite or necessary to be done in and about the premises, as full to all intents and purposes as he might or could do in person, hereby ratifying and confirming all that said attorneys-in-fact and agents or any of them, or their or his substitute or substitutes, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1933, this registration statement has been signed by the following persons in the capacities and on the date indicated below.

<b>Signature</b>	<b>Title</b>	<b>Date</b>
<u>/s/ Derek Small</u> Derek Small	Director, President and Chief Executive Officer (Principal executive officer)	March 23, 2017
<u>/s/ David J. Barrett</u> David J. Barrett	Chief Financial Officer (Principal financial and accounting officer)	March 23, 2017
<u>/s/ Anthony E. Altig</u> Anthony E. Altig	Director	March 23, 2017
<u>/s/ Mark Auerbach</u> Mark Auerbach	Director	March 23, 2017
<u>/s/ Richard DiMarchi</u> Richard DiMarchi	Director	March 23, 2017
<u>/s/ Myron Z. Holubiak</u> Myron Z. Holubiak	Director	March 23, 2017
<u>/s/ Alan Lewis</u> Alan Lewis	Director	March 23, 2017
<u>/s/ William Ringo</u> William Ringo	Director	March 23, 2017

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## INDEX TO EXHIBITS

Number	Description
4.1	Amended and Restated Certificate of Incorporation of the Registrant (1)
4.2	Certificate of Amendment to Amended and Restated Certificate of Incorporation of the Registrant (2)
4.3	Amended and Restated Bylaws of the Registrant (3)
4.4	Specimen Common Stock Certificate (4)
5.1*	Opinion of Goodwin Procter LLP, counsel to the Registrant
23.1*	Consent of Goodwin Procter LLP (included in Exhibit 5.1)
23.2*	Consent of Ernst & Young, LLP, Independent Registered Public Accounting Firm
23.3*	Consent of EisnerAmper LLP, Independent Registered Public Accounting Firm
24*	Power of Attorney (included on the signature page of this registration statement)
99.1*	Non-Qualified Stock Option Agreement between the Registrant and Derek Small, dated May 16, 2014
99.2*	First Amendment to Non-Qualified Stock Option Agreement between the Registrant and Derek Small, dated July 11, 2014
99.3*	Second Amendment to Non-Qualified Stock Option Agreement between the Registrant and Derek Small, dated March 21, 2017
99.4*	Non-Qualified Stock Option Agreement between the Registrant and Lee Arnold, dated May 16, 2014
99.5*	First Amendment to Non-Qualified Stock Option Agreement between the Registrant and Lee Arnold, dated July 2014
99.6*	Second Amendment to Non-Qualified Stock Option Agreement between the Registrant and Lee Arnold, dated December 23, 2014
99.7	Separation Agreement between the Registrant and Lee Arnold, dated December 7, 2016 (5)

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\*Filed herewith.

(1) Filed as Exhibit 3.1 to the Registrant's Amendment No. 3 to Registration Statement on Form S-1 (File No. 333-168224), filed on November 16, 2010 and incorporated herein by reference.

(2) Filed as Exhibit 3.1 to the Registrant's Current Report on Form 8-K (File No. 001-35005), filed on July 14, 2014 and incorporated herein by reference.

(3) Filed as Exhibit 3.2 to the Registrant's Registration Statement on Form S-1 (File No. 333-168224), filed on July 20, 2010 and incorporated herein by reference.

(4) Filed as Exhibit 4.1 to the Registrant's Registration Statement on Form S-3 (File No. 333-208806), filed on December 30, 2015 and incorporated herein by reference.

(5) Filed as Exhibit 10.1 to the Registrant's Current Report on Form 8-K (File No. 001-35005), filed on December 9, 2016 and incorporated herein by reference.

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Goodwin Procter LLP  
100 Northern Avenue  
Boston, MA 02210

goodwinlaw.com  
+1 617 570 1000

March 23, 2017

Assembly Biosciences, Inc.  
11711 N. Meridian Street, Suite 310  
Carmel, Indiana 46032

Re: Securities Being Registered under Registration Statement on Form S-8

Ladies and Gentlemen:

We have acted as counsel to you in connection with your filing of a Registration Statement on Form S-8 (the "Registration Statement") pursuant to the Securities Act of 1933, as amended (the "Securities Act"), on or about the date hereof relating to an aggregate of 621,650 shares (the "Shares") of Common Stock, \$0.001 par value per share, of Assembly Biosciences, Inc., a Delaware corporation (the "Company"), that may be issued pursuant to the Company's Non-Qualified Stock Option Agreements with Derek Small and Lee Arnold, each dated May 16, 2014 (collectively, the "Plans").

We have reviewed such documents and made such examination of law as we have deemed appropriate to give the opinions set forth below. We have relied, without independent verification, on certificates of public officials and, as to matters of fact material to the opinion set forth below, on certificates of officers of the Company.

The opinion set forth below is limited to the Delaware General Corporation Law.

For purposes of the opinion set forth below, we have assumed that a sufficient number of authorized but unissued shares of the Company's Common Stock will be available for issuance when the Shares are issued.

Based on the foregoing, we are of the opinion that the Shares have been duly authorized and, upon issuance and delivery against payment therefor in accordance with the terms of the Plans, will be validly issued, fully paid and nonassessable.

We hereby consent to the inclusion of this opinion as Exhibit 5.1 to the Registration Statement. In giving our consent, we do not admit that we are in the category of persons whose consent is required under Section 7 of the Securities Act or the rules and regulations thereunder.

Very truly yours,

/s/ Goodwin Procter LLP

GOODWIN PROCTER LLP

**Consent of Independent Registered Public Accounting Firm**

We consent to the incorporation by reference in this Registration Statement on Form S-8 pertaining to the Non-Qualified Stock Option Agreements, dated May 16, 2014 between the Registrant and certain employees, of our reports dated March 1, 2017, with respect to the consolidated financial statements of Assembly Biosciences, Inc. and the effectiveness of internal control over financial reporting of Assembly Biosciences, Inc. included in its Annual Report (Form 10-K) for the year ended December 31, 2016, filed with the Securities and Exchange Commission.

/s/ Ernst & Young LLP

Stamford, Connecticut  
March 23, 2017

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**Consent of Independent Registered Public Accounting Firm**

We consent to the incorporation by reference in this Registration Statement of Assembly Biosciences, Inc. on Form S-8 (No. 333-xxxxxx) to be filed on or about March 23, 2017 of our report dated March 12, 2015 on our audit of the consolidated financial statements for the year ended December 31, 2014, which report was included in the Annual Report on Form 10-K filed March 2, 2017.

/s/ EisnerAmper LLP

New York, New York  
March 23, 2017

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**NON-QUALIFIED STOCK OPTION AGREEMENT  
ASSEMBLY PHARMACEUTICALS, INC.**

Name of Optionee: Derek Small (the “**Optionee**”)  
No. of Shares: 1,500,000 Shares of Common Stock  
Grant Date: May 16, 2014 (the “**Grant Date**”)  
Expiration Date: May 15, 2024 (the “**Expiration Date**”)  
Option Exercise Price/Share: \$0.689 (the “**Option Exercise Price**”)  
Vesting Commencement Date: January 1, 2014

This Non-Qualified Stock Option Agreement (this “**Agreement**”) is entered into by and between the Optionee named above and Assembly Pharmaceuticals, Inc. (the “**Company**”). Pursuant to this Agreement, the Company hereby grants to the Optionee, who is an officer, employee, director, or consultant of the Company, an option (the “**Stock Option**”) to purchase on or prior to the Expiration Date, or such earlier date as is specified herein, all or any part of the number of shares of Common Stock (“**Common Stock**”) of the Company indicated above (the “**Shares**”), at the Option Exercise Price per share, subject to the terms and conditions set forth in this Agreement. This Stock Option is not intended to qualify as an “incentive stock option” as defined in Section 422(b) of the Internal Revenue Code of 1986, as amended from time to time (the “**Code**”). This Agreement is intended to constitute a compensatory benefit plan for purposes of Rule 701 of the Securities Act.

1. Definitions. For the purposes of this Agreement, the following terms shall have the following respective meanings:

“**Affiliate**” of any Person means a Person that directly or indirectly, through one or more intermediaries, controls, is controlled by or is under common control with the first mentioned Person. A Person shall be deemed to control another Person if such first Person possesses directly or indirectly the power to direct, or cause the direction of, the management and policies of the second Person, whether through the ownership of voting securities, by contract or otherwise.

“**Board**” means the Board of Directors of the Company.

“**Cause**” shall mean (i) the Optionee’s dishonest statements or acts with respect to the Company or any Affiliate of the Company, or any current or prospective customers, suppliers vendors or other third parties with which such entity does business; (ii) the Optionee’s commission of (A) a felony or (B) any misdemeanor involving moral turpitude, deceit, dishonesty or fraud; (iii) the Optionee’s failure to perform his assigned duties and responsibilities to the reasonable satisfaction of the Company which failure continues, in the reasonable judgment of the Company, after written notice given to the Optionee by the Company; (iv) the Optionee’s gross negligence, willful misconduct or insubordination with respect to the Company or any Affiliate of the Company; or (v) the Optionee’s material violation of any provision of any agreement(s) between the Optionee and the Company relating to noncompetition, nonsolicitation, nondisclosure and/or assignment of inventions.

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“**Code**” means the Internal Revenue Code of 1986, as amended, and any successor Code, and related rules, regulations and interpretations.

“**Disability**” means “disability” as defined in Section 422(c) of the Code.

“**Exchange Act**” means the Securities Exchange Act of 1934, as amended, and the rules and regulations thereunder.

“**Fair Market Value**” of the Stock on any given date means the fair market value of the Stock determined in good faith by the Board based on the reasonable application of a reasonable valuation method not inconsistent with Section 409A of the Code. If the Stock is admitted to trade on a national securities exchange, the determination shall be made by reference to the closing price reported on such exchange. If there is no closing price for such date, the determination shall be made by reference to the last date preceding such date for which there is a closing price. If the date for which Fair Market Value is determined is the first day when trading prices for the Stock are reported on a national securities exchange, the Fair Market Value shall be the “Price to the Public” (or equivalent) set forth on the cover page for the final prospectus relating to the Company’s Initial Public Offering.

“**Holder**” means, with respect to the Shares, the Person holding the Shares, including the Purchaser or any Permitted Transferee.

“**Initial Public Offering**” means the consummation of the first firm commitment underwritten public offering pursuant to an effective registration statement under the Securities Act covering the offer and sale by the Company of its equity securities, as a result of or following which the Stock shall be publicly held.

“**Permitted Transferees**” shall mean any of the following to whom a Holder may transfer Shares hereunder (as set forth in Section 6): the Holder’s child, stepchild, grandchild, parent, stepparent, grandparent, spouse, former spouse, sibling, niece, nephew, mother-in-law, father-in-law, son-in-law, daughter-in-law, brother-in-law, or sister-in-law, including adoptive relationships, any person sharing the Holder’s household (other than a tenant or employee), a trust in which these persons have more than fifty percent of the beneficial interest, a foundation in which these persons control the management of assets, and any other entity in which these persons own more than fifty percent of the voting interests; *provided, however*, that any such trust does not require or permit distribution of any Shares during the term of this Agreement unless subject to its terms. Upon the death of the Holder, the term Permitted Transferees shall also include such deceased Holder’s estate, executors, administrators, personal representatives, heirs, legatees and distributees, as the case may be.

“**Person**” shall mean any individual, corporation, partnership (limited or general), limited liability company, limited liability partnership, association, trust, joint venture, unincorporated organization or any similar entity.

“**Sale Event**” means the consummation of (i) the dissolution or liquidation of the Company, (ii) the sale of all or substantially all of the assets of the Company on a consolidated basis to an unrelated person or entity, (iii) a merger, reorganization or consolidation pursuant to which the holders of the Company’s outstanding voting power immediately prior to such transaction do not own a majority of the outstanding voting power of the surviving or resulting entity (or its ultimate parent, if applicable), (iv) the acquisition of all or a majority of the outstanding voting stock of the Company in a single transaction or a series of related transactions by a Person or group of Persons, or (v) any other acquisition of the business of the Company, as determined by the Board; *provided, however*, that the Company’s Initial Public Offering, any subsequent public offering or another capital raising event, or a merger effected solely to change the Company’s domicile shall not constitute a “Sale Event”; and *provided, further*, that the acquisition of the Company by Ventrus Biosciences, Inc. as contemplated pursuant to that certain Agreement and Plan of Merger and Reorganization by and among the Company, Ventrus Biosciences, Inc. and Assembly Acquisition, Inc. dated May 16, 2014, as amended, shall not constitute a “Sale Event.”

“**Section 409A**” means Section 409A of the Code and the regulations and other guidance promulgated thereunder.

“**Securities Act**” means the Securities Act of 1933, as amended, and the rules and regulations thereunder.

“**Service Relationship**” means the Purchaser’s relationship as a part-time employee, director or other key person (including a Consultant) of the Company or any Subsidiary or any successor entity (e.g., a Service Relationship shall be deemed to continue without interruption in the event an individual’s status change from part-time employee to Consultant).

“**Stock**” means the Common Stock, par value \$0.00001 per share, of the Company.

“**Subsidiary**” means any corporation or other entity (other than the Company) in which the Company has more than a 50 percent interest, either directly or indirectly.

“**Termination Event**” means the termination of the Purchaser’s Service Relationship with the Company and its Subsidiaries for any reason whatsoever, regardless of the circumstances thereof, and including, without limitation, upon death, disability, retirement, discharge or resignation for any reason, whether voluntarily or involuntarily. The following shall not constitute a Termination Event: (i) a transfer to the service of the Company from a Subsidiary or from the Company to a Subsidiary, or from one Subsidiary to another Subsidiary or (ii) an approved leave of absence for military service or sickness, or for any other purpose approved by the Board, if the individual’s right to re-employment is guaranteed either by a statute or by contract or under the policy pursuant to which the leave of absence was granted or if the Board otherwise so provides in writing.

2. Vesting, Exercisability and Termination.

(a) No portion of this Stock Option may be exercised until such portion shall have vested and become exercisable.

(b) Except as set forth below, and subject to the determination of the Board in its sole discretion to accelerate the vesting schedule hereunder, this Stock Option shall be vested and exercisable on the respective dates indicated below:

(i) This Stock Option shall vest and become exercisable in accordance with the following schedule:

(A)  $1/36^{\text{th}}$  of the Shares underlying this Stock Option shall vest on a monthly basis beginning on the date one month after the Vesting Commencement Date such that all Shares will be fully vested on the date three (3) years after the Vesting Commencement Date; provided, that the Optionee continues to have a Service Relationship with the Company at such time; and provided, further, that all unvested Shares underlying this Stock Option will vest in full immediately prior to the consummation of a Sale Event so long as the Optionee continues to have a Service Relationship with the Company at such time.

(c) Termination. Except as may otherwise be provided by the Board, if the Optionee's Service Relationship is terminated, the period within which to exercise this Stock Option will be subject to earlier termination as set forth below (and if not exercised within such period, shall thereafter terminate subject, in each case, to Section 4 below):

(i) Termination Due to Death or Disability. If the Optionee's Service Relationship terminates by reason of such Optionee's death or Disability, this Stock Option may be exercised, to the extent exercisable on the date of such termination, by the Optionee, the Optionee's legal representative or legatee for a period of 12 months from the date of death or Disability or until the Expiration Date, if earlier.

(ii) Other Termination. If the Optionee's Service Relationship terminates for any reason other than death or Disability, and unless otherwise determined by the Board, this Stock Option may be exercised, to the extent exercisable on the date of termination, for a period of 90 days from the date of termination or until the Expiration Date, if earlier; provided however, if the Optionee's Service Relationship is terminated for Cause, this Stock Option shall terminate immediately upon the date of such termination.

For purposes hereof, the Board's determination of the reason for termination of the Optionee's Service Relationship shall be conclusive and binding on the Optionee and his or her representatives or legatees and any Permitted Transferee. Any portion of this Stock Option that is not vested and exercisable on the date of termination of the Service Relationship shall terminate immediately and be null and void.

3. Exercise of Stock Option.

(a) The Optionee may exercise this Stock Option only in the following manner: Prior to the Expiration Date, the Optionee may deliver a Stock Option exercise notice (an “**Exercise Notice**”) in the form of Appendix A hereto indicating his or her election to purchase some or all of the Shares with respect to which this Stock Option is then exercisable. Such notice shall specify the number of Shares to be purchased. Payment of the purchase price may be made by one or more of the methods described in this Section 4, subject to the limitations contained below.

(b) Notwithstanding any other provision hereof, no portion of this Stock Option shall be exercisable after the Expiration Date.

(c) Payment of the purchase price upon exercise may be made by one or more of the following methods (or any combination thereof):

(i) In cash, by certified or bank check, by wire transfer of immediately available funds, or other instrument acceptable to the Board;

(ii) If the Initial Public Offering has occurred (or the Stock otherwise becomes publicly-traded), through the delivery (or attestation to the ownership) of Shares that have been purchased by the Optionee on the open market or that are beneficially owned by the Optionee and are not then subject to restrictions. To the extent required to avoid variable accounting treatment under ASC 718 or other applicable accounting rules, such surrendered Shares if originally purchased from the Company shall have been owned by the Optionee for at least six months. Such surrendered Shares shall be valued at Fair Market Value on the exercise date;

(iii) If the Initial Public Offering has occurred (or the Stock otherwise becomes publicly-traded), by the Optionee delivering to the Company a properly executed exercise notice together with irrevocable instructions to a broker to promptly deliver to the Company cash or a check payable and acceptable to the Company for the purchase price; provided that in the event the Optionee chooses to pay the purchase price as so provided, the Optionee and the broker shall comply with such procedures and enter into such agreements of indemnity and other agreements as the Board shall prescribe as a condition of such payment procedure; or

(iv) By a “net exercise” arrangement pursuant to which the Company will reduce the number of Shares issuable upon exercise by the largest whole number of Shares with a Fair Market Value that does not exceed the aggregate exercise price



Payment instruments will be received subject to collection. No certificates for Shares so purchased will be issued to the Optionee or, with respect to uncertificated Stock, no transfer to the Optionee on the records of the Company will take place, until the Company has completed all steps it has deemed necessary to satisfy legal requirements relating to the issuance and sale of the Shares, which steps may include, without limitation, (i) receipt of a representation from the Optionee at the time of exercise of the Stock Option that the Optionee is purchasing the Shares for the Optionee's own account and not with a view to any sale or distribution of the Shares or other representations relating to compliance with applicable law governing the issuance of securities, (ii) the legending of the certificate (or notation on any book entry) representing the Shares to evidence the foregoing restrictions, and (iii) obtaining from Optionee payment or provision for all withholding taxes due as a result of the exercise of the Stock Option. The delivery of certificates representing the shares of Stock (or the transfer to the Optionee on the records of the Company with respect to uncertificated Stock) to be purchased pursuant to the exercise of the Stock Option will be contingent upon (A) receipt from the Optionee (or a purchaser acting in his or her stead in accordance with the provisions of the Stock Option) by the Company of the full purchase price for such Shares and the fulfillment of any other requirements contained in this Agreement or applicable provisions of laws and (B) if required by the Company, the Optionee shall have entered into any stockholders agreements or other agreements with the Company and/or certain other of the Company's stockholders relating to the Stock. In the event the Optionee chooses to pay the purchase price by previously-owned Shares through the attestation method, the number of Shares transferred to the Optionee upon the exercise of the Stock Option shall be net of the number of Shares attested to.

4. Mergers and Other Transactions.

(a) Changes in Stock. If, as a result of any reorganization, recapitalization, reclassification, stock dividend, stock split, reverse stock split or other similar change in the Company's capital stock, the Shares are increased or decreased or are exchanged for a different number or kind of shares or other securities of the Company, or additional shares of capital stock or new or different shares or other securities of the Company or other non-cash assets are distributed with respect to the Shares, in each case, without the receipt of consideration by the Company, or, if, as a result of any merger or consolidation, or sale of all or substantially all of the assets of the Company, the Shares are converted into or exchanged for other securities of the Company or any successor entity (or a parent or subsidiary thereof), the Board shall make an appropriate and proportionate adjustment in (i) the number and kind of securities subject to the Shares and (ii) the repurchase price per Share.

(b) Sale Events.

(i) Acceleration of Unvested Shares in Sale Event. In the case of and subject to the consummation of a Sale Event, 100% of the Shares that are unvested shall automatically be deemed vested in full immediately prior to the consummation of such Sale Event.

(ii) In the case of and subject to the consummation of a Sale Event, the Stock Option shall terminate upon the effective time of any such Sale Event unless assumed or continued by the successor entity, or a new stock option or other award of the successor entity or parent thereof is substituted therefor, with an equitable or proportionate adjustment as to the number and kind of shares and, if appropriate, the per share exercise prices, as such parties shall agree (after taking into account any acceleration hereunder).

(iii) In the event of the termination of the Stock Option, the Holder shall be permitted, within a period of time prior to the consummation of the Sale Event as specified by the Board, to exercise all the Stock Option that is then exercisable or will become exercisable as of the effective time of the Sale Event; *provided, however*, that the exercise of the Stock Option not exercisable prior to the Sale Event shall be subject to the consummation of the Sale Event.

(iv) Notwithstanding anything to the contrary in Section 4(b)(ii), in the event of a Sale Event, the Company shall have the right, but not the obligation, to make or provide for a cash payment to the Holder, without any consent of the Holder, in exchange for the cancellation thereof, in an amount equal to the difference between (A) the value as determined by the Board of the consideration payable per share of Stock pursuant to the Sale Event (the “**Sale Price**”) times the number of Shares subject to outstanding Stock Option being cancelled (to the extent then vested and exercisable, including by reason of acceleration in connection with such Sale Event, at prices not in excess of the Sale Price) and (B) the aggregate exercise price of all such outstanding vested and exercisable Options

5. Transferability of Stock Option. This Stock Option is personal to the Optionee and is not transferable by the Optionee in any manner other than by will or by the laws of descent and distribution. The Stock Option may be exercised during the Optionee’s lifetime only by the Optionee (or by the Optionee’s guardian or personal representative in the event of the Optionee’s incapacity). The Optionee may elect to designate a beneficiary by providing written notice of the name of such beneficiary to the Company, and may revoke or change such designation at any time by filing written notice of revocation or change with the Company; such beneficiary may exercise the Optionee’s Stock Option in the event of the Optionee’s death to the extent provided herein. If the Optionee does not designate a beneficiary, or if the designated beneficiary predeceases the Optionee, the legal representative of the Optionee may exercise this Stock Option to the extent provided herein in the event of the Optionee’s death.

6. Transfer Restrictions; Company Right of First Refusal.

(a) Restrictions on Transfer.

(i) Non-Transferability of Stock Options. The Stock Option and, prior to exercise, the Shares issuable upon exercise of the Stock Option, shall not be transferable by the Optionee otherwise than by will, or by the laws of descent and distribution, and the Stock Option shall be exercisable, during the Optionee’s lifetime, only by the Optionee, or by the Optionee’s legal representative or guardian in the event of the Optionee’s incapacity. Notwithstanding the foregoing, the Optionee may transfer by gift, without consideration for the transfer, his or her Non-Qualified Stock Options to his or her family members (as defined in Rule 701 of the Securities Act), to trusts for the benefit of such family members, or to partnerships in which such family members are the only partners (to the extent such trusts or partnerships are considered “family members” for purposes of Rule 701 of the Securities Act), provided that the transferee agrees in writing with the Company to be bound by all of the terms and conditions of this Agreement, including the execution of a stock power upon the issuance of Shares. The Stock Option, and the Shares issuable upon exercise of the Stock Option, shall be restricted as to any pledge, hypothecation, or other transfer, including any short position, any “put equivalent position” (as defined in the Exchange Act) or any “call equivalent position” (as defined in the Exchange Act) prior to exercise.

(ii) Shares. No Shares shall be sold, assigned, transferred, pledged, hypothecated, given away or in any other manner disposed of or encumbered, whether voluntarily or by operation of law, unless (i) the transfer is in compliance with the terms of this Agreement and all applicable securities laws (including, without limitation, the Securities Act), (ii) the transfer does not cause the Company to become subject to the reporting requirements of the Exchange Act, and (iii) the transferee consents in writing to be bound by the provisions of this Agreement, including this Section 6. In connection with any proposed transfer, the Board may require the transferor to provide at the transferor's own expense an opinion of counsel to the transferor, satisfactory to the Board, that such transfer is in compliance with all foreign, federal and state securities laws (including, without limitation, the Securities Act). Any attempted transfer of Shares not in accordance with the terms and conditions of this Section 6 shall be null and void, and the Company shall not reflect on its records any change in record ownership of any Shares as a result of any such transfer, shall otherwise refuse to recognize any such transfer and shall not in any way give effect to any such transfer of Shares. The Company shall be entitled to seek protective orders, injunctive relief and other remedies available at law or in equity including, without limitation, seeking specific performance or the rescission of any transfer not made in strict compliance with the provisions of this Section 6. Subject to the foregoing general provisions, Shares may be transferred pursuant to the following specific terms and conditions:

(A) Transfers to Permitted Transferees. The Holder may transfer any or all of the Shares to one or more Permitted Transferees; *provided, however*, that following such transfer, such Shares shall continue to be subject to the terms of this Agreement (including this Section 6) and such Permitted Transferee(s) shall, as a condition to any such transfer, deliver a written acknowledgment to that effect to the Company and shall deliver a stock power to the Company with respect to the Shares. Notwithstanding the foregoing, the Holder may not transfer any of the Shares to a Person whom the Company reasonably determines is a direct competitor or a potential competitor of the Company or any of its Subsidiaries.

(B) Transfers Upon Death. Upon the death of the Holder, any Shares then held by the Holder at the time of such death and any Shares acquired after the Holder's death by the Holder's legal representative shall be subject to the provisions of this Agreement, and the Holder's estate, executors, administrators, personal representatives, heirs, legatees and distributees shall be obligated to convey such Shares to the Company or its assigns under the terms contemplated by this Agreement.

(b) Right of First Refusal. In the event that a Holder desires at any time to sell or otherwise transfer all or any part of his or her Shares, the Holder first shall give written notice to the Company of the Holder's intention to make such transfer. Such notice shall state the number of Shares that the Holder proposes to sell (the "**Offered Shares**"), the price and the terms at which the proposed sale is to be made and the name and address of the proposed transferee. At any time within 30 days after the receipt of such notice by the Company, the Company or its assigns may elect to purchase all or any portion of the Offered Shares at the price and on the terms offered by the proposed transferee and specified in the notice. The Company or its assigns shall exercise this right by mailing or delivering written notice to the Holder within the foregoing 30-day period. If the Company or its assigns elect to exercise its purchase rights under this Section 6(b), the closing for such purchase shall, in any event, take place within 45 days after the receipt by the Company of the initial notice from the Holder. In the event that the Company or its assigns do not elect to exercise such purchase right, or in the event that the Company or its assigns do not pay the full purchase price within such 45-day period, the Holder shall be required to pay a transaction processing fee of \$10,000 to the Company (unless waived by the Board) and then may, within 60 days thereafter, sell the Offered Shares to the proposed transferee and at the same price and on the same terms as specified in the Holder's notice. Any Shares not sold to the proposed transferee shall remain subject to this Agreement. If the Holder is a party to any stockholders agreements or other agreements with the Company and/or certain other of the Company's stockholders relating to the Shares, (i) the transferring Holder shall comply with the requirements of such stockholders agreements or other agreements relating to any proposed transfer of the Offered Shares, and (ii) any proposed transferee that purchases Offered Shares shall enter into such stockholders agreements or other agreements with the Company and/or certain of the Company's stockholders relating to the Offered Shares on the same terms and in the same capacity as the transferring Holder.

(c) Lockup Provision. If requested by the Company, a Holder shall not sell or otherwise transfer or dispose of any Shares (including, without limitation, pursuant to Rule 144 under the Securities Act) held by him or her for such period following the effective date of a public offering by the Company of Shares as the Company shall specify reasonably and in good faith. If requested by the underwriter engaged by the Company, each Holder shall execute a separate letter confirming his or her agreement to comply with this Section.

(d) Adjustments for Changes in Capital Structure. If, as a result of any reorganization, recapitalization, reclassification, stock dividend, stock split, reverse stock split or other similar change in the Common Stock, the outstanding Shares are increased or decreased or are exchanged for a different number or kind of securities of the Company, the restrictions contained in this Section 6 shall apply with equal force to additional and/or substitute securities, if any, received by Holder in exchange for, or by virtue of his or her ownership of, Shares.

(e) Termination. The terms and provisions of Section 6(b) shall terminate upon the closing of the Company's Initial Public Offering or upon consummation of any Sale Event, in either case as a result of which Shares are registered under Section 12 of the Exchange Act and publicly-traded on any national security exchange.

#### 7. Miscellaneous Provisions.

(a) Equitable Relief. The parties hereto agree and declare that legal remedies may be inadequate to enforce the provisions of this Agreement and that equitable relief, including specific performance and injunctive relief, may be used to enforce the provisions of this Agreement.

- (b) Adjustments for Changes in Capital Structure. If, as a result of any reorganization, recapitalization, reincorporation, reclassification, stock dividend, stock split, reverse stock split or other similar change in the Common Stock, the outstanding shares of Common Stock are increased or decreased or are exchanged for a different number or kind of securities of the Company, the restrictions contained in this Agreement shall apply with equal force to additional and/or substitute securities, if any, received by the Optionee in exchange for, or by virtue of his or her ownership of, this Stock Option or Shares acquired pursuant thereto.
- (c) Change and Modifications. This Agreement may not be orally changed, modified or terminated, nor shall any oral waiver of any of its terms be effective. This Agreement may be changed, modified or terminated only by an agreement in writing signed by the Company and the Optionee.
- (d) Governing Law. This Agreement shall be governed by and construed in accordance with the General Corporation Law of the State of Delaware as to matters within the scope thereof, and as to all other matters shall be governed by and construed in accordance with the internal laws of Indiana, without regard to conflict of law principles that would result in the application of any law other than the law of the state of Indiana.
- (e) Headings. The headings are intended only for convenience in finding the subject matter and do not constitute part of the text of this Agreement and shall not be considered in the interpretation of this Agreement.
- (f) Saving Clause. If any provision(s) of this Agreement shall be determined to be illegal or unenforceable, such determination shall in no manner affect the legality or enforceability of any other provision hereof.
- (g) Notices. All notices, requests, consents and other communications shall be in writing and be deemed given when delivered personally, by telex or facsimile transmission or when received if mailed by first class registered or certified mail, postage prepaid. Notices to the Company or the Optionee shall be addressed as set forth underneath their signatures below, or to such other address or addresses as may have been furnished by such party in writing to the other.
- (h) Benefit and Binding Effect. This Agreement shall be binding upon and shall inure to the benefit of the parties hereto, their respective successors, assigns, and legal representatives. The Company has the right to assign this Agreement, and such assignee shall become entitled to all the rights of the Company hereunder to the extent of such assignment.
- (i) Counterparts. For the convenience of the parties and to facilitate execution, this Agreement may be executed in two or more counterparts, each of which shall be deemed an original, but all of which shall constitute one and the same document.
- (j) Integration. This Agreement constitutes the entire agreement between the parties with respect to this Stock Option and supersedes all prior agreements and discussions between the parties concerning such subject matter.

8. Dispute Resolution.

(a) Except as provided below, any dispute arising out of or relating to the Stock Option, this Agreement, or the breach, termination or validity of the Stock Option or this Agreement, shall be finally settled by binding arbitration conducted expeditiously in accordance with the J.A.M.S./Endispute Comprehensive Arbitration Rules and Procedures (the "J.A.M.S. Rules"). The arbitration shall be governed by the United States Arbitration Act, 9 U.S.C. Sections 1-16, and judgment upon the award rendered by the arbitrators may be entered by any court having jurisdiction thereof. The place of arbitration shall be Indianapolis, Indiana.

(b) The arbitration shall commence within 60 days of the date on which a written demand for arbitration is filed by any party hereto. In connection with the arbitration proceeding, the arbitrator shall have the power to order the production of documents by each party and any third-party witnesses. In addition, each party may take up to three depositions as of right, and the arbitrator may in his or her discretion allow additional depositions upon good cause shown by the moving party. However, the arbitrator shall not have the power to order the answering of interrogatories or the response to requests for admission. In connection with any arbitration, each party to the arbitration shall provide to the other, no later than seven business days before the date of the arbitration, the identity of all persons that may testify at the arbitration and a copy of all documents that may be introduced at the arbitration or considered or used by a party's witness or expert. The arbitrator's decision and award shall be made and delivered within six months of the selection of the arbitrator. The arbitrator's decision shall set forth a reasoned basis for any award of damages or finding of liability. The arbitrator shall not have power to award damages in excess of actual compensatory damages and shall not multiply actual damages or award punitive damages, and each party hereby irrevocably waives any claim to such damages.

(c) The Company, the Optionee, each party to the Agreement and any other holder of Shares issued pursuant to this Agreement (each, a "Party") covenants and agrees that such party will participate in the arbitration in good faith. This Section 8 applies equally to requests for temporary, preliminary or permanent injunctive relief, except that in the case of temporary or preliminary injunctive relief any party may proceed in court without prior arbitration for the limited purpose of avoiding immediate and irreparable harm.

(d) Each Party (i) hereby irrevocably submits to the jurisdiction of any United States District Court of competent jurisdiction for the purpose of enforcing the award or decision in any such proceeding, (ii) hereby waives, and agrees not to assert, by way of motion, as a defense, or otherwise, in any such suit, action or proceeding, any claim that it is not subject personally to the jurisdiction of the above named courts, that its property is exempt or immune from attachment or execution (except as protected by applicable law), that the suit, action or proceeding is brought in an inconvenient forum, that the venue of the suit, action or proceeding is improper or that this Agreement or the subject matter hereof may not be enforced in or by such court, and (iii) hereby waives and agrees not to seek any review by any court of any other jurisdiction which may be called upon to grant an enforcement of the judgment of any such court. Each Party hereby consents to service of process by registered mail at the address to which notices are to be given. Each Party agrees that its, his or her submission to jurisdiction and its, his or her consent to service of process by mail is made for the express benefit of each other Party. Final judgment against any Party in any such action, suit or proceeding may be enforced in other jurisdictions by suit, action or proceeding on the judgment, or in any other manner provided by or pursuant to the laws of such other jurisdiction.

[SIGNATURE PAGE FOLLOWS]

The foregoing Agreement is hereby accepted and the terms and conditions thereof hereby agreed to by the undersigned as of the date first above written.

**ASSEMBLY PHARMACEUTICALS, INC.**

By: /s/ James Schulz  
Name: James Schulz  
Title: Chief Financial Officer

Address:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**OPTIONEE:**

/s/ Derek Small  
Name: Derek Small

Address:  
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**Appendix A**

**STOCK OPTION EXERCISE NOTICE**

Assembly Pharmaceuticals, Inc.  
Attention: [\_\_\_\_\_]  
\_\_\_\_\_  
\_\_\_\_\_

Pursuant to the terms of the stock option agreement between the undersigned and Assembly Pharmaceuticals, Inc. (the "Company") dated \_\_\_\_\_ (the "Agreement"), I, [Insert Name] \_\_\_\_\_, hereby [Circle One] partially/fully exercise such option by including herein payment in the amount of \$ \_\_\_\_\_ representing the purchase price for [Fill in number of Shares] \_\_\_\_\_ Shares. I have chosen the following form(s) of payment:

- 1. Cash
- 2. Certified or bank check payable to Assembly Pharmaceuticals, Inc.
- 3. Other (as referenced in the Agreement (please describe))  
\_\_\_\_\_.

In connection with my exercise of the option as set forth above, I hereby represent and warrant to the Company as follows:

- (i) I am purchasing the Shares for my own account for investment only, and not for resale or with a view to the distribution thereof.
- (ii) I have had such an opportunity as I have deemed adequate to obtain from the Company such information as is necessary to permit me to evaluate the merits and risks of my investment in the Company and have consulted with my own advisers with respect to my investment in the Company.
- (iii) I have sufficient experience in business, financial and investment matters to be able to evaluate the risks involved in the purchase of the Shares and to make an informed investment decision with respect to such purchase.
- (iv) I can afford a complete loss of the value of the Shares and am able to bear the economic risk of holding such Shares for an indefinite period of time.
- (v) I understand that the Shares may not be registered under the Securities Act of 1933 (it being understood that the Shares are being issued and sold in reliance on the exemption provided in Rule 701 thereunder) or any applicable state securities or "blue sky" laws and may not be sold or otherwise transferred or disposed of in the absence of an effective registration statement under the Securities Act of 1933 and under any applicable state securities or "blue sky" laws (or exemptions from the registration requirement thereof). I further acknowledge that certificates representing Shares will bear restrictive legends reflecting the foregoing and/or that book entries for uncertificated Shares will include similar restrictive notations.



(vi) I have read and understand the stock option agreement and acknowledge and agree that the Shares are subject to all of the relevant terms of the stock option agreement, including without limitation, the transfer restrictions set forth in Section 6 of the Agreement.

(vii) I understand and agree that the Company has a right of first refusal with respect to the Shares pursuant to Section 6(b) of the Agreement.

(viii) I understand and agree that I may not sell or otherwise transfer or dispose of the Shares for a period of time following the effective date of a public offering by the Company as described in Section 6(c) of the Agreement.

Sincerely yours,

\_\_\_\_\_  
Name:

Address:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**FIRST AMENDMENT TO NON-QUALIFIED STOCK OPTION AGREEMENT**

THIS FIRST AMENDMENT TO NON-QUALIFIED STOCK OPTION AGREEMENT (the "**Amendment**"), dated July 11, 2014, is entered into by and among Assembly Biosciences, Inc., a Delaware corporation formerly known as Ventrus Biosciences, Inc. ("**Parent**") and Derek Small ("**Optionee**").

**RECITALS**

**WHEREAS**, Assembly Pharmaceuticals, Inc. ("Assembly") granted an option to Optionee to purchase 1,500,000 shares of the common stock of Assembly (the "**Option**"), pursuant to, and in accordance with the terms and conditions of, the Non-Qualified Stock Option Agreement dated May 16, 2014, by and between Assembly and Optionee (the "**Option Agreement**"; capitalized terms used but not otherwise defined herein shall have the meanings set forth in the Option Agreement);

**WHEREAS**, Parent, Assembly Acquisition, Inc., a Delaware corporation ("**Merger Sub**"), and Assembly entered into that certain Agreement and Plan of Merger and Reorganization, dated as of May 16, 2014, as amended by that certain First Amendment to Agreement and Plan of Merger and Reorganization, dated July 9, 2014 (as amended, the "**Merger Agreement**");

**WHEREAS**, pursuant to Section 5.12 of the Merger Agreement, upon consummation of the transactions contemplated by the Merger Agreement, the Option was converted into and became an option to purchase common stock of Parent, and Parent assumed the Option in accordance with the terms of the Option Agreement;

**WHEREAS**, Parent, Merger Sub and Assembly consummated the transactions contemplated by the Merger Agreement on July 11, 2014;

**WHEREAS**, immediately after consummation of the transactions contemplated by the Merger Agreement, Parent effected a 1-for-5 reverse stock split of its common stock (the "**Stock Split**");

**WHEREAS**, pursuant to Section 6(d) of the Option Agreement, the shares subject to the Option are adjusted accordingly in the event of a stock split; and

**WHEREAS**, Assembly and Optionee desire to amend to Option Agreement pursuant to Section 7(c) of the Option Agreement to (a) update, for record purposes only, the number of shares of common stock of Parent to which the Option may be converted, after taking into account the Stock Split and the consummation of the transactions contemplated by the Merger Agreement, and (b) replace Assembly as a party thereto with Parent, and Parent desires to, in accordance with the terms of the Option Agreement and the Merger Agreement, succeed to all rights and obligations of Assembly under the Option Agreement.

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## AGREEMENT

**NOW, THEREFORE**, in consideration of the mutual covenants contained herein, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assembly, Optionee and Parent hereby agree as follows.

1. Amendments.

1.1. No. of Shares and Option Exercise Price. The number of shares of common stock of Parent underlying the Option is 466,260 and the exercise price of such Option is \$2.22 per share.

1.2. The Company. Any and all references to "Company" under the Option Agreement shall be to Assembly Biosciences, Inc. (as a successor to Assembly Pharmaceuticals, Inc.).

2. Miscellaneous.

2.1 Counterparts. This Amendment may be executed in multiple counterparts, each of which shall be deemed an original, and all of which together shall constitute one and the same document. Any facsimile or other electronic transmission (including pdf) of a signed counterpart shall be deemed to be an original counterpart and any signature appearing thereon shall be deemed to be an original signature.

2.2 Option Agreement; Governing Provisions. Except as otherwise modified by this Amendment, the Option Agreement remains in full force and effect without modification or waiver. Except as otherwise provided herein, the terms of the Option Agreement shall govern this Amendment.

*[Remainder of Page Intentionally Left Blank]*

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**IN WITNESS WHEREOF**, each of the parties has caused this First Amendment to Non-Qualified Stock Option Agreement to be duly executed on its behalf as of the day and year first above written.

**ASSEMBLY BIOSCIENCES, INC.**

**By:** /s/ David J. Barrett

**Name:** David Barrett

**Title:** CFO/COO

**DEREK SMALL**

/s/ Derek Small

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## SECOND AMENDMENT TO NON-QUALIFIED STOCK OPTION AGREEMENT

THIS SECOND AMENDMENT TO NON-QUALIFIED STOCK OPTION AGREEMENT (the "**Amendment**"), dated March 21, 2017, is entered into by and among Assembly Biosciences, Inc., a Delaware corporation formerly known as Ventrus Biosciences, Inc. ("**Parent**") and Derek Small ("**Optionee**").

**RECITALS**

**WHEREAS**, Assembly Pharmaceuticals, Inc. ("Assembly") granted an option to Optionee to purchase 1,500,000 shares of the common stock of Assembly (the "**Option**"), pursuant to, and in accordance with the terms and conditions of, the Non-Qualified Stock Option Agreement dated May 16, 2014, by and between Assembly and Optionee (the "**Option Agreement**"; capitalized terms used but not otherwise defined herein shall have the meanings set forth in the Option Agreement);

**WHEREAS**, Parent, Assembly Acquisition, Inc., a Delaware corporation ("**Merger Sub**"), and Assembly entered into that certain Agreement and Plan of Merger and Reorganization, dated as of May 16, 2014, as amended by that certain First Amendment to Agreement and Plan of Merger and Reorganization, dated July 9, 2014 (as amended, the "**Merger Agreement**");

**WHEREAS**, pursuant to Section 5.12 of the Merger Agreement, upon consummation of the transactions contemplated by the Merger Agreement, the Option was converted into and became an option to purchase common stock of Parent, and Parent assumed the Option in accordance with the terms of the Option Agreement;

**WHEREAS**, Parent, Merger Sub and Assembly consummated the transactions contemplated by the Merger Agreement on July 11, 2014;

**WHEREAS**, immediately after consummation of the transactions contemplated by the Merger Agreement, Parent effected a 1-for-5 reverse stock split of its common stock (the "**Stock Split**");

**WHEREAS**, pursuant to Section 6(d) of the Option Agreement, the shares subject to the Option are adjusted accordingly in the event of a stock split; and

**WHEREAS**, Assembly and Optionee desire to amend to Option Agreement pursuant to Section 7(c) of the Option Agreement to update, for record purposes only, the number of shares of common stock of Parent to which the Option may be converted, after taking into account the Stock Split and the consummation of the transactions contemplated by the Merger Agreement.

**AGREEMENT**

**NOW, THEREFORE**, in consideration of the mutual covenants contained herein, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Optionee and Parent hereby agree as follows.

1. Amendments.

1.1. No. of Shares and Option Exercise Price. The number of shares of common stock of Parent underlying the Option is 466,238 and the exercise price of such Option is \$2.22 per share.

2. Miscellaneous.

2.1 Counterparts. This Amendment may be executed in multiple counterparts, each of which shall be deemed an original, and all of which together shall constitute one and the same document. Any facsimile or other electronic transmission (including pdf) of a signed counterpart shall be deemed to be an original counterpart and any signature appearing thereon shall be deemed to be an original signature.

2.2 Option Agreement; Governing Provisions. Except as otherwise modified by this Amendment, the Option Agreement remains in full force and effect without modification or waiver. Except as otherwise provided herein, the terms of the Option Agreement shall govern this Amendment.

*[Remainder of Page Intentionally Left Blank]*

**IN WITNESS WHEREOF**, each of the parties has caused this Second Amendment to Non-Qualified Stock Option Agreement to be duly executed on its behalf as of the day and year first above written.

**ASSEMBLY BIOSCIENCES, INC.**

**By:** /s/ David J. Barrett

Name: David J. Barrett

Its: Chief Operating Officer and Chief Financial Officer

**DEREK SMALL**

/s/ Derek Small

**NON-QUALIFIED STOCK OPTION AGREEMENT  
ASSEMBLY PHARMACEUTICALS, INC.**

Name of Optionee: Lee Arnold (the “**Optionee**”)  
 No. of Shares: 500,000 Shares of Common Stock  
 Grant Date: May 16, 2014 (the “**Grant Date**”)  
 Expiration Date: May 15, 2024 (the “**Expiration Date**”)  
 Option Exercise Price/Share: \$0.689 (the “**Option Exercise Price**”)  
 Vesting Commencement Date: April 15, 2014

This Non-Qualified Stock Option Agreement (this “**Agreement**”) is entered into by and between the Optionee named above and Assembly Pharmaceuticals, Inc. (the “**Company**”). Pursuant to this Agreement, the Company hereby grants to the Optionee, who is an officer, employee, director, or consultant of the Company, an option (the “**Stock Option**”) to purchase on or prior to the Expiration Date, or such earlier date as is specified herein, all or any part of the number of shares of Common Stock (“**Common Stock**”) of the Company indicated above (the “**Shares**”), at the Option Exercise Price per share, subject to the terms and conditions set forth in this Agreement. This Stock Option is not intended to qualify as an “incentive stock option” as defined in Section 422(b) of the Internal Revenue Code of 1986, as amended from time to time (the “**Code**”). This Agreement is intended to constitute a compensatory benefit plan for purposes of Rule 701 of the Securities Act.

1. **Definitions.** For the purposes of this Agreement, the following terms shall have the following respective meanings:

“**Affiliate**” of any Person means a Person that directly or indirectly, through one or more intermediaries, controls, is controlled by or is under common control with the first mentioned Person. A Person shall be deemed to control another Person if such first Person possesses directly or indirectly the power to direct, or cause the direction of, the management and policies of the second Person, whether through the ownership of voting securities, by contract or otherwise.

“**Board**” means the Board of Directors of the Company.

“**Cause**” shall mean (i) the Optionee’s dishonest statements or acts with respect to the Company or any Affiliate of the Company, or any current or prospective customers, suppliers vendors or other third parties with which such entity does business; (ii) the Optionee’s commission of (A) a felony or (B) any misdemeanor involving moral turpitude, deceit, dishonesty or fraud; (iii) the Optionee’s failure to perform his assigned duties and responsibilities to the reasonable satisfaction of the Company which failure continues, in the reasonable judgment of the Company, after written notice given to the Optionee by the Company; (iv) the Optionee’s gross negligence, willful misconduct or insubordination with respect to the Company or any Affiliate of the Company; or (v) the Optionee’s material violation of any provision of any agreement(s) between the Optionee and the Company relating to noncompetition, nonsolicitation, nondisclosure and/or assignment of inventions.

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“**Code**” means the Internal Revenue Code of 1986, as amended, and any successor Code, and related rules, regulations and interpretations.

“**Disability**” means “disability” as defined in Section 422(c) of the Code.

“**Exchange Act**” means the Securities Exchange Act of 1934, as amended, and the rules and regulations thereunder.

“**Fair Market Value**” of the Stock on any given date means the fair market value of the Stock determined in good faith by the Board based on the reasonable application of a reasonable valuation method not inconsistent with Section 409A of the Code. If the Stock is admitted to trade on a national securities exchange, the determination shall be made by reference to the closing price reported on such exchange. If there is no closing price for such date, the determination shall be made by reference to the last date preceding such date for which there is a closing price. If the date for which Fair Market Value is determined is the first day when trading prices for the Stock are reported on a national securities exchange, the Fair Market Value shall be the “Price to the Public” (or equivalent) set forth on the cover page for the final prospectus relating to the Company’s Initial Public Offering.

“**Holder**” means, with respect to the Shares, the Person holding the Shares, including the Purchaser or any Permitted Transferee.

“**Initial Public Offering**” means the consummation of the first firm commitment underwritten public offering pursuant to an effective registration statement under the Securities Act covering the offer and sale by the Company of its equity securities, as a result of or following which the Stock shall be publicly held.

“**Permitted Transferees**” shall mean any of the following to whom a Holder may transfer Shares hereunder (as set forth in Section 6): the Holder’s child, stepchild, grandchild, parent, stepparent, grandparent, spouse, former spouse, sibling, niece, nephew, mother-in-law, father-in-law, son-in-law, daughter-in-law, brother-in-law, or sister-in-law, including adoptive relationships, any person sharing the Holder’s household (other than a tenant or employee), a trust in which these persons have more than fifty percent of the beneficial interest, a foundation in which these persons control the management of assets, and any other entity in which these persons own more than fifty percent of the voting interests; *provided, however*, that any such trust does not require or permit distribution of any Shares during the term of this Agreement unless subject to its terms. Upon the death of the Holder, the term Permitted Transferees shall also include such deceased Holder’s estate, executors, administrators, personal representatives, heirs, legatees and distributees, as the case may be.

“**Person**” shall mean any individual, corporation, partnership (limited or general), limited liability company, limited liability partnership, association, trust, joint venture, unincorporated organization or any similar entity.

“**Sale Event**” means the consummation of (i) the dissolution or liquidation of the Company, (ii) the sale of all or substantially all of the assets of the Company on a consolidated basis to an unrelated person or entity, (iii) a merger, reorganization or consolidation pursuant to which the holders of the Company’s outstanding voting power immediately prior to such transaction do not own a majority of the outstanding voting power of the surviving or resulting entity (or its ultimate parent, if applicable), (iv) the acquisition of all or a majority of the outstanding voting stock of the Company in a single transaction or a series of related transactions by a Person or group of Persons, or (v) any other acquisition of the business of the Company, as determined by the Board; *provided, however*, that the Company’s Initial Public Offering, any subsequent public offering or another capital raising event, or a merger effected solely to change the Company’s domicile shall not constitute a “Sale Event”; and *provided, further*, that the acquisition of the Company by Ventrus Biosciences, Inc. as contemplated pursuant to that certain Agreement and Plan of Merger and Reorganization by and among the Company, Ventrus Biosciences, Inc. and Assembly Acquisition, Inc. dated May 16, 2014, as amended, shall not constitute a “Sale Event.”

“**Section 409A**” means Section 409A of the Code and the regulations and other guidance promulgated thereunder.

“**Securities Act**” means the Securities Act of 1933, as amended, and the rules and regulations thereunder.

“**Service Relationship**” means the Purchaser’s relationship as a part-time employee, director or other key person (including a Consultant) of the Company or any Subsidiary or any successor entity (e.g., a Service Relationship shall be deemed to continue without interruption in the event an individual’s status change from part-time employee to Consultant).

“**Stock**” means the Common Stock, par value \$0.00001 per share, of the Company.

“**Subsidiary**” means any corporation or other entity (other than the Company) in which the Company has more than a 50 percent interest, either directly or indirectly.

“**Termination Event**” means the termination of the Purchaser’s Service Relationship with the Company and its Subsidiaries for any reason whatsoever, regardless of the circumstances thereof, and including, without limitation, upon death, disability, retirement, discharge or resignation for any reason, whether voluntarily or involuntarily. The following shall not constitute a Termination Event: (i) a transfer to the service of the Company from a Subsidiary or from the Company to a Subsidiary, or from one Subsidiary to another Subsidiary or (ii) an approved leave of absence for military service or sickness, or for any other purpose approved by the Board, if the individual’s right to re-employment is guaranteed either by a statute or by contract or under the policy pursuant to which the leave of absence was granted or if the Board otherwise so provides in writing.

2. Vesting, Exercisability and Termination.

(a) No portion of this Stock Option may be exercised until such portion shall have vested and become exercisable.

(b) Except as set forth below, and subject to the determination of the Board in its sole discretion to accelerate the vesting schedule hereunder, this Stock Option shall be vested and exercisable on the respective dates indicated below:

(i) This Stock Option shall vest and become exercisable in accordance with the following schedule:

(A)  $1/36^{\text{th}}$  of the Shares underlying this Stock Option shall vest on a monthly basis beginning on the date one month after the Vesting Commencement Date such that all Shares will be fully vested on the date three (3) years after the Vesting Commencement Date; provided, that the Optionee continues to have a Service Relationship with the Company at such time; and provided, further, that all unvested Shares underlying this Stock Option will vest in full immediately prior to the consummation of a Sale Event so long as the Optionee continues to have a Service Relationship with the Company at such time.

(c) Termination. Except as may otherwise be provided by the Board, if the Optionee's Service Relationship is terminated, the period within which to exercise this Stock Option will be subject to earlier termination as set forth below (and if not exercised within such period, shall thereafter terminate subject, in each case, to Section 4 below):

(i) Termination Due to Death or Disability. If the Optionee's Service Relationship terminates by reason of such Optionee's death or Disability, this Stock Option may be exercised, to the extent exercisable on the date of such termination, by the Optionee, the Optionee's legal representative or legatee for a period of 12 months from the date of death or Disability or until the Expiration Date, if earlier.

(ii) Other Termination. If the Optionee's Service Relationship terminates for any reason other than death or Disability, and unless otherwise determined by the Board, this Stock Option may be exercised, to the extent exercisable on the date of termination, for a period of 90 days from the date of termination or until the Expiration Date, if earlier; provided however, if the Optionee's Service Relationship is terminated for Cause, this Stock Option shall terminate immediately upon the date of such termination.

For purposes hereof, the Board's determination of the reason for termination of the Optionee's Service Relationship shall be conclusive and binding on the Optionee and his or her representatives or legatees and any Permitted Transferee. Any portion of this Stock Option that is not vested and exercisable on the date of termination of the Service Relationship shall terminate immediately and be null and void.

3. Exercise of Stock Option.

(a) The Optionee may exercise this Stock Option only in the following manner: Prior to the Expiration Date, the Optionee may deliver a Stock Option exercise notice (an “**Exercise Notice**”) in the form of Appendix A hereto indicating his or her election to purchase some or all of the Shares with respect to which this Stock Option is then exercisable. Such notice shall specify the number of Shares to be purchased. Payment of the purchase price may be made by one or more of the methods described in this Section 4, subject to the limitations contained below.

(b) Notwithstanding any other provision hereof, no portion of this Stock Option shall be exercisable after the Expiration Date.

(c) Payment of the purchase price upon exercise may be made by one or more of the following methods (or any combination thereof):

(i) In cash, by certified or bank check, by wire transfer of immediately available funds, or other instrument acceptable to the Board;

(ii) If the Initial Public Offering has occurred (or the Stock otherwise becomes publicly-traded), through the delivery (or attestation to the ownership) of Shares that have been purchased by the Optionee on the open market or that are beneficially owned by the Optionee and are not then subject to restrictions. To the extent required to avoid variable accounting treatment under ASC 718 or other applicable accounting rules, such surrendered Shares if originally purchased from the Company shall have been owned by the Optionee for at least six months. Such surrendered Shares shall be valued at Fair Market Value on the exercise date;

(iii) If the Initial Public Offering has occurred (or the Stock otherwise becomes publicly-traded), by the Optionee delivering to the Company a properly executed exercise notice together with irrevocable instructions to a broker to promptly deliver to the Company cash or a check payable and acceptable to the Company for the purchase price; provided that in the event the Optionee chooses to pay the purchase price as so provided, the Optionee and the broker shall comply with such procedures and enter into such agreements of indemnity and other agreements as the Board shall prescribe as a condition of such payment procedure; or

(iv) By a “net exercise” arrangement pursuant to which the Company will reduce the number of Shares issuable upon exercise by the largest whole number of Shares with a Fair Market Value that does not exceed the aggregate exercise price

Payment instruments will be received subject to collection. No certificates for Shares so purchased will be issued to the Optionee or, with respect to uncertificated Stock, no transfer to the Optionee on the records of the Company will take place, until the Company has completed all steps it has deemed necessary to satisfy legal requirements relating to the issuance and sale of the Shares, which steps may include, without limitation, (i) receipt of a representation from the Optionee at the time of exercise of the Stock Option that the Optionee is purchasing the Shares for the Optionee's own account and not with a view to any sale or distribution of the Shares or other representations relating to compliance with applicable law governing the issuance of securities, (ii) the legending of the certificate (or notation on any book entry) representing the Shares to evidence the foregoing restrictions, and (iii) obtaining from Optionee payment or provision for all withholding taxes due as a result of the exercise of the Stock Option. The delivery of certificates representing the shares of Stock (or the transfer to the Optionee on the records of the Company with respect to uncertificated Stock) to be purchased pursuant to the exercise of the Stock Option will be contingent upon (A) receipt from the Optionee (or a purchaser acting in his or her stead in accordance with the provisions of the Stock Option) by the Company of the full purchase price for such Shares and the fulfillment of any other requirements contained in this Agreement or applicable provisions of laws and (B) if required by the Company, the Optionee shall have entered into any stockholders agreements or other agreements with the Company and/or certain other of the Company's stockholders relating to the Stock. In the event the Optionee chooses to pay the purchase price by previously-owned Shares through the attestation method, the number of Shares transferred to the Optionee upon the exercise of the Stock Option shall be net of the number of Shares attested to.

4. Mergers and Other Transactions.

(a) Changes in Stock. If, as a result of any reorganization, recapitalization, reclassification, stock dividend, stock split, reverse stock split or other similar change in the Company's capital stock, the Shares are increased or decreased or are exchanged for a different number or kind of shares or other securities of the Company, or additional shares of capital stock or new or different shares or other securities of the Company or other non-cash assets are distributed with respect to the Shares, in each case, without the receipt of consideration by the Company, or, if, as a result of any merger or consolidation, or sale of all or substantially all of the assets of the Company, the Shares are converted into or exchanged for other securities of the Company or any successor entity (or a parent or subsidiary thereof), the Board shall make an appropriate and proportionate adjustment in (i) the number and kind of securities subject to the Shares and (ii) the repurchase price per Share.

(b) Sale Events.

(i) Acceleration of Unvested Shares in Sale Event. In the case of and subject to the consummation of a Sale Event, 100% of the Shares that are unvested shall automatically be deemed vested in full immediately prior to the consummation of such Sale Event.

(ii) In the case of and subject to the consummation of a Sale Event, the Stock Option shall terminate upon the effective time of any such Sale Event unless assumed or continued by the successor entity, or a new stock option or other award of the successor entity or parent thereof is substituted therefor, with an equitable or proportionate adjustment as to the number and kind of shares and, if appropriate, the per share exercise prices, as such parties shall agree (after taking into account any acceleration hereunder).

(iii) In the event of the termination of the Stock Option, the Holder shall be permitted, within a period of time prior to the consummation of the Sale Event as specified by the Board, to exercise all the Stock Option that is then exercisable or will become exercisable as of the effective time of the Sale Event; *provided, however*, that the exercise of the Stock Option not exercisable prior to the Sale Event shall be subject to the consummation of the Sale Event.

(iv) Notwithstanding anything to the contrary in Section 4(b)(ii), in the event of a Sale Event, the Company shall have the right, but not the obligation, to make or provide for a cash payment to the Holder, without any consent of the Holder, in exchange for the cancellation thereof, in an amount equal to the difference between (A) the value as determined by the Board of the consideration payable per share of Stock pursuant to the Sale Event (the “**Sale Price**”) times the number of Shares subject to outstanding Stock Option being cancelled (to the extent then vested and exercisable, including by reason of acceleration in connection with such Sale Event, at prices not in excess of the Sale Price) and (B) the aggregate exercise price of all such outstanding vested and exercisable Options

5. Transferability of Stock Option. This Stock Option is personal to the Optionee and is not transferable by the Optionee in any manner other than by will or by the laws of descent and distribution. The Stock Option may be exercised during the Optionee’s lifetime only by the Optionee (or by the Optionee’s guardian or personal representative in the event of the Optionee’s incapacity). The Optionee may elect to designate a beneficiary by providing written notice of the name of such beneficiary to the Company, and may revoke or change such designation at any time by filing written notice of revocation or change with the Company; such beneficiary may exercise the Optionee’s Stock Option in the event of the Optionee’s death to the extent provided herein. If the Optionee does not designate a beneficiary, or if the designated beneficiary predeceases the Optionee, the legal representative of the Optionee may exercise this Stock Option to the extent provided herein in the event of the Optionee’s death.

6. Transfer Restrictions; Company Right of First Refusal.

(a) Restrictions on Transfer.

(i) Non-Transferability of Stock Options. The Stock Option and, prior to exercise, the Shares issuable upon exercise of the Stock Option, shall not be transferable by the Optionee otherwise than by will, or by the laws of descent and distribution, and the Stock Option shall be exercisable, during the Optionee’s lifetime, only by the Optionee, or by the Optionee’s legal representative or guardian in the event of the Optionee’s incapacity. Notwithstanding the foregoing, the Optionee may transfer by gift, without consideration for the transfer, his or her Non-Qualified Stock Options to his or her family members (as defined in Rule 701 of the Securities Act), to trusts for the benefit of such family members, or to partnerships in which such family members are the only partners (to the extent such trusts or partnerships are considered “family members” for purposes of Rule 701 of the Securities Act), provided that the transferee agrees in writing with the Company to be bound by all of the terms and conditions of this Agreement, including the execution of a stock power upon the issuance of Shares. The Stock Option, and the Shares issuable upon exercise of the Stock Option, shall be restricted as to any pledge, hypothecation, or other transfer, including any short position, any “put equivalent position” (as defined in the Exchange Act) or any “call equivalent position” (as defined in the Exchange Act) prior to exercise.

(ii) Shares. No Shares shall be sold, assigned, transferred, pledged, hypothecated, given away or in any other manner disposed of or encumbered, whether voluntarily or by operation of law, unless (i) the transfer is in compliance with the terms of this Agreement and all applicable securities laws (including, without limitation, the Securities Act), (ii) the transfer does not cause the Company to become subject to the reporting requirements of the Exchange Act, and (iii) the transferee consents in writing to be bound by the provisions of this Agreement, including this Section 6. In connection with any proposed transfer, the Board may require the transferor to provide at the transferor's own expense an opinion of counsel to the transferor, satisfactory to the Board, that such transfer is in compliance with all foreign, federal and state securities laws (including, without limitation, the Securities Act). Any attempted transfer of Shares not in accordance with the terms and conditions of this Section 6 shall be null and void, and the Company shall not reflect on its records any change in record ownership of any Shares as a result of any such transfer, shall otherwise refuse to recognize any such transfer and shall not in any way give effect to any such transfer of Shares. The Company shall be entitled to seek protective orders, injunctive relief and other remedies available at law or in equity including, without limitation, seeking specific performance or the rescission of any transfer not made in strict compliance with the provisions of this Section 6. Subject to the foregoing general provisions, Shares may be transferred pursuant to the following specific terms and conditions:

(A) Transfers to Permitted Transferees. The Holder may transfer any or all of the Shares to one or more Permitted Transferees; *provided, however*, that following such transfer, such Shares shall continue to be subject to the terms of this Agreement (including this Section 6) and such Permitted Transferee(s) shall, as a condition to any such transfer, deliver a written acknowledgment to that effect to the Company and shall deliver a stock power to the Company with respect to the Shares. Notwithstanding the foregoing, the Holder may not transfer any of the Shares to a Person whom the Company reasonably determines is a direct competitor or a potential competitor of the Company or any of its Subsidiaries.

(B) Transfers Upon Death. Upon the death of the Holder, any Shares then held by the Holder at the time of such death and any Shares acquired after the Holder's death by the Holder's legal representative shall be subject to the provisions of this Agreement, and the Holder's estate, executors, administrators, personal representatives, heirs, legatees and distributees shall be obligated to convey such Shares to the Company or its assigns under the terms contemplated by this Agreement.

(b) Right of First Refusal. In the event that a Holder desires at any time to sell or otherwise transfer all or any part of his or her Shares, the Holder first shall give written notice to the Company of the Holder's intention to make such transfer. Such notice shall state the number of Shares that the Holder proposes to sell (the "**Offered Shares**"), the price and the terms at which the proposed sale is to be made and the name and address of the proposed transferee. At any time within 30 days after the receipt of such notice by the Company, the Company or its assigns may elect to purchase all or any portion of the Offered Shares at the price and on the terms offered by the proposed transferee and specified in the notice. The Company or its assigns shall exercise this right by mailing or delivering written notice to the Holder within the foregoing 30-day period. If the Company or its assigns elect to exercise its purchase rights under this Section 6(b), the closing for such purchase shall, in any event, take place within 45 days after the receipt by the Company of the initial notice from the Holder. In the event that the Company or its assigns do not elect to exercise such purchase right, or in the event that the Company or its assigns do not pay the full purchase price within such 45-day period, the Holder shall be required to pay a transaction processing fee of \$10,000 to the Company (unless waived by the Board) and then may, within 60 days thereafter, sell the Offered Shares to the proposed transferee and at the same price and on the same terms as specified in the Holder's notice. Any Shares not sold to the proposed transferee shall remain subject to this Agreement. If the Holder is a party to any stockholders agreements or other agreements with the Company and/or certain other of the Company's stockholders relating to the Shares, (i) the transferring Holder shall comply with the requirements of such stockholders agreements or other agreements relating to any proposed transfer of the Offered Shares, and (ii) any proposed transferee that purchases Offered Shares shall enter into such stockholders agreements or other agreements with the Company and/or certain of the Company's stockholders relating to the Offered Shares on the same terms and in the same capacity as the transferring Holder.

(c) Lockup Provision. If requested by the Company, a Holder shall not sell or otherwise transfer or dispose of any Shares (including, without limitation, pursuant to Rule 144 under the Securities Act) held by him or her for such period following the effective date of a public offering by the Company of Shares as the Company shall specify reasonably and in good faith. If requested by the underwriter engaged by the Company, each Holder shall execute a separate letter confirming his or her agreement to comply with this Section.

(d) Adjustments for Changes in Capital Structure. If, as a result of any reorganization, recapitalization, reclassification, stock dividend, stock split, reverse stock split or other similar change in the Common Stock, the outstanding Shares are increased or decreased or are exchanged for a different number or kind of securities of the Company, the restrictions contained in this Section 6 shall apply with equal force to additional and/or substitute securities, if any, received by Holder in exchange for, or by virtue of his or her ownership of, Shares.

(e) Termination. The terms and provisions of Section 6(b) shall terminate upon the closing of the Company's Initial Public Offering or upon consummation of any Sale Event, in either case as a result of which Shares are registered under Section 12 of the Exchange Act and publicly-traded on any national security exchange.

#### 7. Miscellaneous Provisions.

(a) Equitable Relief. The parties hereto agree and declare that legal remedies may be inadequate to enforce the provisions of this Agreement and that equitable relief, including specific performance and injunctive relief, may be used to enforce the provisions of this Agreement.



- (b) Adjustments for Changes in Capital Structure. If, as a result of any reorganization, recapitalization, reincorporation, reclassification, stock dividend, stock split, reverse stock split or other similar change in the Common Stock, the outstanding shares of Common Stock are increased or decreased or are exchanged for a different number or kind of securities of the Company, the restrictions contained in this Agreement shall apply with equal force to additional and/or substitute securities, if any, received by the Optionee in exchange for, or by virtue of his or her ownership of, this Stock Option or Shares acquired pursuant thereto.
- (c) Change and Modifications. This Agreement may not be orally changed, modified or terminated, nor shall any oral waiver of any of its terms be effective. This Agreement may be changed, modified or terminated only by an agreement in writing signed by the Company and the Optionee.
- (d) Governing Law. This Agreement shall be governed by and construed in accordance with the General Corporation Law of the State of Delaware as to matters within the scope thereof, and as to all other matters shall be governed by and construed in accordance with the internal laws of Indiana, without regard to conflict of law principles that would result in the application of any law other than the law of the state of Indiana.
- (e) Headings. The headings are intended only for convenience in finding the subject matter and do not constitute part of the text of this Agreement and shall not be considered in the interpretation of this Agreement.
- (f) Saving Clause. If any provision(s) of this Agreement shall be determined to be illegal or unenforceable, such determination shall in no manner affect the legality or enforceability of any other provision hereof.
- (g) Notices. All notices, requests, consents and other communications shall be in writing and be deemed given when delivered personally, by telex or facsimile transmission or when received if mailed by first class registered or certified mail, postage prepaid. Notices to the Company or the Optionee shall be addressed as set forth underneath their signatures below, or to such other address or addresses as may have been furnished by such party in writing to the other.
- (h) Benefit and Binding Effect. This Agreement shall be binding upon and shall inure to the benefit of the parties hereto, their respective successors, assigns, and legal representatives. The Company has the right to assign this Agreement, and such assignee shall become entitled to all the rights of the Company hereunder to the extent of such assignment.
- (i) Counterparts. For the convenience of the parties and to facilitate execution, this Agreement may be executed in two or more counterparts, each of which shall be deemed an original, but all of which shall constitute one and the same document.
- (j) Integration. This Agreement constitutes the entire agreement between the parties with respect to this Stock Option and supersedes all prior agreements and discussions between the parties concerning such subject matter.

8. Dispute Resolution.

(a) Except as provided below, any dispute arising out of or relating to the Stock Option, this Agreement, or the breach, termination or validity of the Stock Option or this Agreement, shall be finally settled by binding arbitration conducted expeditiously in accordance with the J.A.M.S./Endispute Comprehensive Arbitration Rules and Procedures (the "J.A.M.S. Rules"). The arbitration shall be governed by the United States Arbitration Act, 9 U.S.C. Sections 1-16, and judgment upon the award rendered by the arbitrators may be entered by any court having jurisdiction thereof. The place of arbitration shall be Indianapolis, Indiana.

(b) The arbitration shall commence within 60 days of the date on which a written demand for arbitration is filed by any party hereto. In connection with the arbitration proceeding, the arbitrator shall have the power to order the production of documents by each party and any third-party witnesses. In addition, each party may take up to three depositions as of right, and the arbitrator may in his or her discretion allow additional depositions upon good cause shown by the moving party. However, the arbitrator shall not have the power to order the answering of interrogatories or the response to requests for admission. In connection with any arbitration, each party to the arbitration shall provide to the other, no later than seven business days before the date of the arbitration, the identity of all persons that may testify at the arbitration and a copy of all documents that may be introduced at the arbitration or considered or used by a party's witness or expert. The arbitrator's decision and award shall be made and delivered within six months of the selection of the arbitrator. The arbitrator's decision shall set forth a reasoned basis for any award of damages or finding of liability. The arbitrator shall not have power to award damages in excess of actual compensatory damages and shall not multiply actual damages or award punitive damages, and each party hereby irrevocably waives any claim to such damages.

(c) The Company, the Optionee, each party to the Agreement and any other holder of Shares issued pursuant to this Agreement (each, a "**Party**") covenants and agrees that such party will participate in the arbitration in good faith. This Section 8 applies equally to requests for temporary, preliminary or permanent injunctive relief, except that in the case of temporary or preliminary injunctive relief any party may proceed in court without prior arbitration for the limited purpose of avoiding immediate and irreparable harm.

(d) Each Party (i) hereby irrevocably submits to the jurisdiction of any United States District Court of competent jurisdiction for the purpose of enforcing the award or decision in any such proceeding, (ii) hereby waives, and agrees not to assert, by way of motion, as a defense, or otherwise, in any such suit, action or proceeding, any claim that it is not subject personally to the jurisdiction of the above named courts, that its property is exempt or immune from attachment or execution (except as protected by applicable law), that the suit, action or proceeding is brought in an inconvenient forum, that the venue of the suit, action or proceeding is improper or that this Agreement or the subject matter hereof may not be enforced in or by such court, and (iii) hereby waives and agrees not to seek any review by any court of any other jurisdiction which may be called upon to grant an enforcement of the judgment of any such court. Each Party hereby consents to service of process by registered mail at the address to which notices are to be given. Each Party agrees that its, his or her submission to jurisdiction and its, his or her consent to service of process by mail is made for the express benefit of each other Party. Final judgment against any Party in any such action, suit or proceeding may be enforced in other jurisdictions by suit, action or proceeding on the judgment, or in any other manner provided by or pursuant to the laws of such other jurisdiction.

[SIGNATURE PAGE FOLLOWS]

The foregoing Agreement is hereby accepted and the terms and conditions thereof hereby agreed to by the undersigned as of the date first above written.

**ASSEMBLY PHARMACEUTICALS, INC.**

By: /s/ Derek Small

Name: Derek Small

Title: Executive Chairman

Address:

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OPTIONEE:

/s/ Lee Arnold

Name: Lee Arnold

Address:

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**Appendix A**

**STOCK OPTION EXERCISE NOTICE**

Assembly Pharmaceuticals, Inc.  
Attention: [\_\_\_\_\_]  
\_\_\_\_\_  
\_\_\_\_\_

Pursuant to the terms of the stock option agreement between the undersigned and Assembly Pharmaceuticals, Inc. (the "Company") dated \_\_\_\_\_ (the "Agreement"), I, [Insert Name] \_\_\_\_\_, hereby [Circle One] partially/fully exercise such option by including herein payment in the amount of \$ \_\_\_\_\_ representing the purchase price for [Fill in number of Shares] \_\_\_\_\_ Shares. I have chosen the following form(s) of payment:

- 1. Cash
  - 2. Certified or bank check payable to Assembly Pharmaceuticals, Inc.
  - 3. Other (as referenced in the Agreement (please describe))
- \_\_\_\_\_.

In connection with my exercise of the option as set forth above, I hereby represent and warrant to the Company as follows:

- (i) I am purchasing the Shares for my own account for investment only, and not for resale or with a view to the distribution thereof.
- (ii) I have had such an opportunity as I have deemed adequate to obtain from the Company such information as is necessary to permit me to evaluate the merits and risks of my investment in the Company and have consulted with my own advisers with respect to my investment in the Company.
- (iii) I have sufficient experience in business, financial and investment matters to be able to evaluate the risks involved in the purchase of the Shares and to make an informed investment decision with respect to such purchase.
- (iv) I can afford a complete loss of the value of the Shares and am able to bear the economic risk of holding such Shares for an indefinite period of time.
- (v) I understand that the Shares may not be registered under the Securities Act of 1933 (it being understood that the Shares are being issued and sold in reliance on the exemption provided in Rule 701 thereunder) or any applicable state securities or "blue sky" laws and may not be sold or otherwise transferred or disposed of in the absence of an effective registration statement under the Securities Act of 1933 and under any applicable state securities or "blue sky" laws (or exemptions from the registration requirement thereof). I further acknowledge that certificates representing Shares will bear restrictive legends reflecting the foregoing and/or that book entries for uncertificated Shares will include similar restrictive notations.

(vi) I have read and understand the stock option agreement and acknowledge and agree that the Shares are subject to all of the relevant terms of the stock option agreement, including without limitation, the transfer restrictions set forth in Section 6 of the Agreement.

(vii) I understand and agree that the Company has a right of first refusal with respect to the Shares pursuant to Section 6(b) of the Agreement.

(viii) I understand and agree that I may not sell or otherwise transfer or dispose of the Shares for a period of time following the effective date of a public offering by the Company as described in Section 6(c) of the Agreement.

Sincerely yours,

\_\_\_\_\_  
Name:

Address:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**FIRST AMENDMENT TO NON-QUALIFIED STOCK OPTION AGREEMENT**

THIS FIRST AMENDMENT TO NON-QUALIFIED STOCK OPTION AGREEMENT (the “**Amendment**”), dated July 2014, is entered into by and among Assembly Biosciences, Inc., a Delaware corporation formerly known as Ventrus Biosciences, Inc. (“**Parent**”), Assembly Pharmaceuticals, Inc., a Delaware corporation (“**Assembly**”), and Lee Arnold (“**Optionee**”).

**RECITALS**

**WHEREAS**, Assembly granted an option to Optionee to purchase 500,000 shares of the common stock of Assembly (the “**Option**”), pursuant to, and in accordance with the terms and conditions of, the Non-Qualified Stock Option Agreement dated May 16, 2014, by and between Assembly and Optionee (the “**Option Agreement**”; capitalized terms used but not otherwise defined herein shall have the meanings set forth in the Option Agreement);

**WHEREAS**, Parent, Assembly Acquisition, Inc., a Delaware corporation (“**Merger Sub**”), and Assembly entered into that certain Agreement and Plan of Merger and Reorganization, dated as of May 16, 2014, as amended by that certain First Amendment to Agreement and Plan of Merger and Reorganization, dated July 9, 2014 (as amended, the “**Merger Agreement**”);

**WHEREAS**, pursuant to Section 5.12 of the Merger Agreement, upon consummation of the transactions contemplated by the Merger Agreement, the Option was converted into and became an option to purchase common stock of Parent, and Parent assumed the Option in accordance with the terms of the Option Agreement;

**WHEREAS**, Parent, Merger Sub and Assembly consummated the transactions contemplated by the Merger Agreement on July 11, 2014;

**WHEREAS**, immediately after consummation of the transactions contemplated by the Merger Agreement, Parent effected a 1-for-5 reverse stock split of its common stock (the “**Stock Split**”);

**WHEREAS**, pursuant to Section 6(d) of the Option Agreement, the shares subject to the Option are adjusted accordingly in the event of a stock split; and

**WHEREAS**, Assembly and Optionee desire to amend to Option Agreement pursuant to Section 7(c) of the Option Agreement to (a) update, for record purposes only, the number of shares of common stock of Parent to which the Option may be converted, after taking into account the Stock Split and the consummation of the transactions contemplated by the Merger Agreement, and (b) replace Assembly as a party thereto with Parent, and Parent desires to, in accordance with the terms of the Option Agreement and the Merger Agreement, succeed to all rights and obligations of Assembly under the Option Agreement.

**AGREEMENT**

**NOW, THEREFORE**, in consideration of the mutual covenants contained herein, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assembly, Optionee and Parent hereby agree as follows.

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1. Amendments.

1.1. No. of Shares and Option Exercise Price. The number of shares of common stock of Parent underlying the Option is 155,420 and the exercise price of such Option is \$2.22 per share.

1.2. The Company. Any and all references to “Company” under the Option Agreement shall be to Assembly Biosciences, Inc. (as a successor to Assembly Pharmaceuticals, Inc.).

2. Miscellaneous.

2.1 Counterparts. This Amendment may be executed in multiple counterparts, each of which shall be deemed an original, and all of which together shall constitute one and the same document. Any facsimile or other electronic transmission (including pdf) of a signed counterpart shall be deemed to be an original counterpart and any signature appearing thereon shall be deemed to be an original signature.

2.2 Option Agreement; Governing Provisions. Except as otherwise modified by this Amendment, the Option Agreement remains in full force and effect without modification or waiver. Except as otherwise provided herein, the terms of the Option Agreement shall govern this Amendment.

*[Remainder of Page Intentionally Left Blank]*

**IN WITNESS WHEREOF**, each of the parties has caused this First Amendment to Non-Qualified Stock Option Agreement to be duly executed on its behalf as of the day and year first above written.

**ASSEMBLY BIOSCIENCES, INC.**

By: /s/ Russell H. Ellison

Name: Russell H. Ellison

Title: CEO

**ASSEMBLY PHARMACEUTICALS, INC.**

By: /s/ Derek A. Small

Name: Derek A. Small

Title: Chairman, CEO

**LEE ARNOLD**

/s/ Lee Arnold

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**SECOND AMENDMENT TO NON-QUALIFIED STOCK OPTION AGREEMENT**

THIS SECOND AMENDMENT TO NON-QUALIFIED STOCK OPTION AGREEMENT (the “**Amendment**”), dated December 23, 2014, is entered into by and among Assembly Biosciences, Inc., a Delaware corporation (“**Assembly**”), and Lee Arnold (“**Optionee**”).

**RECITALS**

**WHEREAS**, Assembly’s predecessor, Assembly Pharmaceuticals, Inc. (“**Pharma**”) granted an option to Optionee to purchase 500,000 shares of the common stock of Pharma (the “**Option**”), pursuant to, and in accordance with the terms and conditions of, the Non-Qualified Stock Option Agreement dated May 16, 2014, by and between Assembly and Optionee (the “**Option Agreement**”; capitalized terms used but not otherwise defined herein shall have the meanings set forth in the Option Agreement);

**WHEREAS**, in connection with the transaction between Assembly and Pharma the Option is now exercisable for 155,420 shares of the common stock of Assembly;

**WHEREAS**, Optionee desires to use the Option as collateral for a loan from the Israel Discount Bank (the “**Loan**”); and

**WHEREAS**, the Compensation Committee of the Board of Directors of Assembly desires to modify the Option to permit Optionee to use the Option as collateral.

**AGREEMENT**

**NOW, THEREFORE**, in consideration of the mutual covenants contained herein, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Assembly, Optionee and Parent hereby agree as follows.

1. **Amendment**. Notwithstanding anything to the contrary in the Option, the Option is hereby amended and modified as necessary to allow Optionee to pledge the Option as collateral for the Loan and the lender will have all rights of any creditor under the Uniform Commercial Code to foreclose on and sell the collateral as provided in the loan agreements and applicable law; provided that in the event of foreclosure, the creditor has 10 days to exercise the Option and, in the event the Option has not been exercised during such period, the Option is automatically cancelled.

2. **Miscellaneous**. This Amendment may be executed in multiple counterparts, each of which shall be deemed an original, and all of which together shall constitute one and the same document. Any facsimile or other electronic transmission (including pdf) of a signed counterpart shall be deemed to be an original counterpart and any signature appearing thereon shall be deemed to be an original signature. Except as otherwise modified by this Amendment, the Option Agreement remains in full force and effect without modification or waiver. Except as otherwise provided herein, the terms of the Option Agreement shall govern this Amendment.

*[Remainder of Page Intentionally Left Blank]*

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**IN WITNESS WHEREOF**, each of the parties has caused this Second Amendment to Non-Qualified Stock Option Agreement to be duly executed on its behalf as of the day and year first above written.

**ASSEMBLY BIOSCIENCES, INC.**

By:           /s/ Russell H. Ellison          

Name:           Russell H. Ellison          

Title:           CEO          

**LEE ARNOLD**

          /s/ Lee Arnold          

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