

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, DC 20549**

FORM 8-K

**CURRENT REPORT
PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

Date of report (Date of earliest event reported): July 18, 2025

ABEONA THERAPEUTICS INC.

(Exact name of registrant as specified in its charter)

Delaware
(State or other jurisdiction
of incorporation)

001-15771
(Commission
File Number)

83-0221517
(I.R.S. Employer
Identification No.)

**6555 Carnegie Ave, 4th Floor
Cleveland, OH 44103**
(Address of principal executive offices) (Zip Code)

(646) 813-4701
(Registrant's telephone number, including area code)

N / A
(Former name or former address, if changed since last report)

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

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

Title of Each Class	Trading Symbol	Name of each exchange on which registered
Common Stock, \$0.01 par value	ABEO	The Nasdaq Capital Market

Securities registered pursuant to Section 12(b) of the Act:

Indicate by check mark whether the registrant is an emerging growth company as defined in Rule 405 of the Securities Act of 1933 (§230.405 of this chapter) or Rule 12b-2 of the Securities Exchange Act of 1934 (§240.12b-2 of this chapter).

Emerging growth company ☐

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Item 1.01 Entry into a Material Definitive Agreement.

On July 18, 2025, Abeona Therapeutics Inc., a Delaware corporation (the “Company”) and its subsidiaries MacroChem Corporation, a Delaware corporation, and Abeona Therapeutics LLC, an Ohio corporation, entered into an amendment (the “Amendment”) to the Loan and Security Agreement (the “Agreement”) and Supplement to the Agreement, both dated January 8, 2024 (collectively, the “Loan Agreement”), with Avenue Venture Opportunities Fund, L.P., a Delaware limited partnership, as administrative agent and collateral agent (“Avenue” and the “Agent”) and Avenue Venture Opportunities Fund II, L.P., a Delaware limited partnership (“Avenue 2”).

The Amendment reduces the interest rate for senior secured term loan owed under the Loan Agreement from 13.5% to a fixed rate of 11.75% per annum.

In connection with the Amendment, the Company issued to each of Avenue and Avenue 2 (collectively, the “Warrantholders”) warrants to purchase up to an aggregate of 16,474 shares of Company common stock (each, a “Warrant” and collectively, the “Warrants”). The Warrants expire on July 18, 2030 (the “Expiration Date”) and have an exercise price per share equal to \$6.07. In addition, upon a change of control where the per share price of the Company common stock is less than or equal to two times that of the exercise price, the Warrantholders would be entitled to receive the shares of common stock underlying the Warrant without payment of the exercise price.

The Warrantholders may exercise the Warrants at any time, or from time to time up to and including the Expiration Date, by making a cash payment equal to the exercise price multiplied by the quantity of shares. The Warrantholders may also exercise the Warrants on a cashless basis by receiving a net number of shares calculated pursuant to the formula set forth in the Warrants. The Warrants are subject to anti-dilution adjustments for stock dividends, stock splits, and reverse stock splits.

The foregoing description of the Amendment and the Warrants does not purport to be complete and is qualified in its entirety by reference to the text of the Amendment and the Warrants, which are filed as Exhibit 10.1, Exhibit 4.1, and Exhibit 4.2 to this Current Report on Form 8-K and are incorporated herein by reference.

Item 2.03. Creation of a Direct Financial Obligation or an Obligation under an Off-Balance Sheet Arrangement of a Registrant.

The information included in Item 1.01 of this Current Report on Form 8-K is incorporated by reference into this Item 2.03 of this Current Report on Form 8-K.

Item 9.01 Financial Statements and Exhibits.**(d) Exhibits.**

Exhibit No.	Description
4.1	Warrant to Purchase Common Stock, by and between Abeona Therapeutics Inc. and Avenue Venture Opportunities Fund, L.P., dated as of July 18, 2025.
4.2	Warrant to Purchase Common Stock, by and between Abeona Therapeutics Inc. and Avenue Venture Opportunities Fund II, L.P., dated as of July 18, 2025
10.1	First Amendment to Loan and Security Agreement and Supplement, by and among Abeona Therapeutics Inc., MacroChem Corporation, Abeona Therapeutics LLC, Avenue Venture Opportunities Fund, L.P., as Agent, and Avenue Venture Opportunities Fund II, L.P., dated as of July 18, 2025.
104	Cover Page Interactive Data File (embedded within the Inline XBRL document)

SIGNATURE

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

Abeona Therapeutics Inc.
(Registrant)

By: /s/ Joseph Vazzano
Name: Joseph Vazzano
Title: Chief Financial Officer

Date: July 18, 2025

THE SECURITIES REPRESENTED BY THIS CERTIFICATE HAVE BEEN ACQUIRED FOR INVESTMENT AND NOT WITH A VIEW TO, OR IN CONNECTION WITH, THE SALE AND DISTRIBUTION THEREOF, AND HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933, AS AMENDED (THE “SECURITIES ACT”) OR ANY STATE SECURITIES LAWS. SUCH SECURITIES MAY NOT BE SOLD OR TRANSFERRED IN THE ABSENCE OF (A) SUCH REGISTRATION, (B) AN OPINION OF COUNSEL IN A FORM REASONABLY ACCEPTABLE TO COMPANY THAT SUCH REGISTRATION IS NOT REQUIRED DUE TO AN EXEMPTION THEREFROM UNDER SAID ACT AND ANY APPLICABLE STATE SECURITIES LAWS OR (C) ABEONA THERAPEUTICS INC. OTHERWISE SATISFIES ITSELF THAT SUCH TRANSACTION IS COMPLIANT WITH SUCH LAWS.

Date of Issuance: July 18, 2025

WARRANT TO PURCHASE
SHARES OF COMMON STOCK OF
ABEONA THERAPEUTICS INC.

(Void after July 18, 2030)

This certifies that AVENUE VENTURE OPPORTUNITIES FUND, L.P., a Delaware limited partnership, or permitted assigns (“Holder”), for value received, is entitled to purchase from ABEONA THERAPEUTICS INC., a Delaware corporation (“Company”), the Applicable Number (hereinafter defined) of fully paid and nonassessable shares of the Company’s Common Stock (the “Common Stock”), for cash, at a purchase price per share equal to the Exercise Price (hereinafter defined). Holder may also exercise this Warrant on a cashless or “net issuance” basis as described in Section 1(b) below, and this Warrant shall be deemed to have been exercised in full on such basis on the Expiration Date (hereinafter defined), to the extent not fully exercised prior to such date. This Warrant is issued in connection with that certain Loan and Security Agreement and Supplement thereto, both of even date herewith (as amended, restated and supplemented from time to time, the “Loan Agreement” and the “Supplement”, respectively), between Company, as borrower, and Holder, as lender (“Lender”). Capitalized terms used herein and not otherwise defined in this Warrant shall have the meaning(s) ascribed to them in the Loan Agreement and the Supplement, unless the context would otherwise require.

In addition to the terms defined elsewhere in this Warrant, the following terms have the meanings indicated below:

“Applicable Number” means the number of shares of Common Stock purchasable hereunder obtained by dividing (x) \$20,000.00 by (y) the Exercise Price.

“Exercise Price” means \$6.07.

“Warrant Shares” means the shares of Common Stock purchased or purchasable hereunder.

Subject to Sections 4.3 and 4.8, this Warrant may be exercised at any time or from time to time up to and including 5:00 p.m. (Pacific time) on July 18, 2030 (the “Expiration Date”), upon surrender to Company at its principal office at 6555 Carnegie Avenue, 4th Floor, Cleveland, OH 44103 (or at such other location as Company may advise Holder in writing) of this Warrant properly endorsed with the Form of Subscription attached hereto duly completed and signed and upon payment in cash or by check of the aggregate Exercise Price for the number of shares for which this Warrant is being exercised determined in accordance with the provisions hereof. The Exercise Price and the number of shares purchasable hereunder are subject to further adjustment as provided in Section 4 of this Warrant.

This Warrant is subject to the following terms and conditions:

1. Exercise; Issuance of Certificates; Payment for Shares

(a) Unless an election is made pursuant to clause (b) of this Section 1, this Warrant shall be exercisable at the option of Holder, at any time or from time to time, on or before the Expiration Date for all or any portion of the Warrant Shares (but not for a fraction of a share) which may be purchased hereunder for the Exercise Price multiplied by the number of Warrant Shares to be purchased. Company agrees that the Warrant Shares purchased under this Warrant shall be and are deemed to be issued to Holder as the record owner of such Warrant Shares as of the close of business on the date on which the form of subscription shall have been delivered and payment made for such Warrant Shares. Subject to the provisions of Section 2, certificates for the Warrant Shares so purchased, together with any other securities or property to which Holder is entitled upon such exercise, shall be delivered to Holder by Company at Company’s expense within a reasonable time after the rights represented by this Warrant have been so exercised. Except as provided in clause (b) of this Section 1, in case of a purchase of less than all the Warrant Shares, Company shall cancel this Warrant and execute and deliver a new Warrant or Warrants of like tenor for the balance of the Warrant Shares surrendered upon such purchase to Holder within a reasonable time. Each stock certificate or book-entry statement so delivered shall be in such denominations of Common Stock as may be requested by Holder and shall be registered in the name of such Holder or such other name as shall be designated by such Holder, subject to the limitations contained in Section 2.

(b) Holder, in lieu of exercising this Warrant by the cash payment of the Exercise Price pursuant to clause (a) of this Section 1, may elect, at any time on or before the Expiration Date, to surrender this Warrant and receive that number of shares of Common Stock computed using the following formula:

$$X = \frac{Y(A - B)}{A}$$

Where: X = the number of shares of Common Stock to be issued to Holder.

Y = the number of shares of Common Stock that Holder would otherwise have been entitled to purchase hereunder pursuant to Section 1(a) (or such lesser number of shares as Holder may designate in the case of a partial exercise of this Warrant).

A = the closing price on the last trading day prior to exercise of this Warrant.

B = the Exercise Price then in effect.

Election to exercise under this Section 1(b) may be made by delivering a signed form of subscription to Company via electronic mail or facsimile, to be followed by delivery of this Warrant. Notwithstanding anything to the contrary contained in this Warrant, if as of the close of business on the last business day preceding the Expiration Date this Warrant remains unexercised as to all or a portion of the Warrant Shares purchasable hereunder, then effective at 9:00 a.m. (Pacific time) on the Expiration Date, Holder shall be deemed, automatically and without need for notice to Company, to have elected to exercise this Warrant in full pursuant to the provisions of this Section 1(b), and upon surrender of this Warrant shall be entitled to receive that number of Warrant Shares computed using the above formula, provided that the application of such formula as of the Expiration Date yields a positive number for “X”.

2. Limitation on Transfer.

(a) This Warrant and the Warrant Shares shall not be transferable except upon the conditions specified in this Section 2, which conditions are intended to ensure compliance with the provisions of the Securities Act of 1933, as amended (the “Securities Act”). Each holder of this Warrant or the Warrant Shares issuable hereunder will cause any proposed transferee of the Warrant or the Warrant Shares to agree to take and hold such securities subject to the provisions and upon the conditions specified in this Section 2. Notwithstanding the foregoing and any other provision of this Section 2 but subject to the last sentence of Section 2(c), Holder may freely transfer all or part of this Warrant or the shares issuable upon exercise of this Warrant (or the securities issuable, directly or indirectly, upon conversion of the shares, if any) at any time to any affiliate of Lender under the Loan Agreement, by giving Company notice of the portion of the Warrant being transferred setting forth the name, address and taxpayer identification number of the transferee and surrendering this Warrant to Company for reissuance to the transferees(s) (and Holder, if applicable).

(b) Each certificate representing (i) this Warrant, (ii) the Warrant Shares, and (iii) any other securities issued in respect of the Warrant Shares issued upon any stock split, stock dividend, recapitalization, merger, consolidation or similar event, shall (unless otherwise permitted by the provisions of this Section 2 or unless such securities have been registered under the Securities Act or sold under Rule 144) be stamped or otherwise imprinted with a legend substantially in the following form (in addition to any legend required under applicable state securities laws):

THE SECURITIES REPRESENTED BY THIS CERTIFICATE HAVE BEEN ACQUIRED FOR INVESTMENT AND NOT WITH A VIEW TO, OR IN CONNECTION WITH, THE SALE AND DISTRIBUTION THEREOF, AND HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OR ANY STATE SECURITIES LAWS. SUCH SECURITIES MAY NOT BE SOLD OR TRANSFERRED IN THE ABSENCE OF (A) SUCH REGISTRATION, (B) AN OPINION OF COUNSEL IN A FORM REASONABLY ACCEPTABLE TO COMPANY THAT SUCH REGISTRATION IS NOT REQUIRED DUE TO AN EXEMPTION THEREFROM UNDER SAID ACT AND ANY APPLICABLE STATE SECURITIES LAWS OR (C) ABEONA THERAPEUTICS INC. OTHERWISE SATISFIES ITSELF THAT SUCH TRANSACTION IS COMPLIANT WITH SUCH LAWS.

(c) Holder of this Warrant and each person to whom this Warrant is subsequently transferred represents and warrants to Company and agrees (by acceptance of such transfer) that it will not transfer this Warrant (or securities issuable upon exercise hereof unless a registration statement under the Securities Act was in effect with respect to such securities at the time of issuance thereof) unless (i) there is an effective registration statement under the Securities Act and applicable state securities laws covering any such transaction, (ii) pursuant to Rule 144 under the Securities Act (or any other rule under the Securities Act relating to the disposition of securities), (iii) Company receives an opinion of counsel, reasonably satisfactory to Company, that an exemption from such registration is available or (iv) the Company otherwise satisfies itself that such transaction is exempt from registration. Notwithstanding the foregoing or any other provision of this Section 2, Holder shall not transfer this Warrant (or securities issuable upon exercise hereof, or securities issuable, directly or indirectly, upon conversion of such securities, if any) to any competitor of Company, as determined in good faith by the Board of Directors of Company (the “Board”), without the prior written consent of Company.

3. Shares to be Fully Paid; Reservation of Shares. Company covenants and agrees that all Warrant Shares will, upon issuance, be duly authorized, validly issued, fully paid and nonassessable and free from all preemptive rights of any stockholder and free of all taxes, liens and charges with respect to the issue thereof. Company further covenants and agrees that during the period within which the rights represented by this Warrant may be exercised, Company will at all times have authorized and reserved, for the purpose of issue or transfer upon exercise of the subscription rights evidenced by this Warrant, a sufficient number of shares of authorized but unissued Common Stock, or other securities and property, when and as required to provide for the exercise of the rights represented by this Warrant. Company will take all such action as may be necessary to assure that such shares of Common Stock may be issued as provided herein without violation of any applicable law or regulation, or of any requirements of any domestic securities exchange upon which the Common Stock may be listed. Company will not take any action which would result in any adjustment of the Exercise Price (as described in Section 4 hereof) (i) if the total number of Warrant Shares issuable after such action upon exercise of all outstanding warrants, together with all shares of Common Stock then outstanding and all shares of Common Stock then issuable upon exercise of all options and upon the conversion of all convertible securities then outstanding, would exceed the total number of shares of Common Stock then authorized by Company’s Certificate of Incorporation, as amended and restated from time to time (the “Charter”) or (ii) if the par value per share of the Common Stock would exceed the Exercise Price.

4. Adjustment of Exercise Price and Number of Shares. The Exercise Price and the number of shares purchasable upon the exercise of this Warrant shall be subject to adjustment from time to time upon the occurrence of certain events described in this Section 4. Upon each adjustment of the Exercise Price, Holder of this Warrant shall thereafter be entitled to purchase, at the Exercise Price resulting from such adjustment, the number of Warrant Shares obtained by multiplying the Exercise Price in effect immediately prior to such adjustment by the number of Warrant Shares purchasable pursuant hereto immediately prior to such adjustment, and dividing the product thereof by the Exercise Price resulting from such adjustment.

4.1 Subdivision or Combination of Stock. In case Company shall at any time subdivide its outstanding shares of Common Stock into a greater number of shares, the Exercise Price in effect immediately prior to such subdivision shall be proportionately reduced, and conversely, in case the outstanding shares of Common Stock of Company shall be combined into a smaller number of shares, the Exercise Price in effect immediately prior to such combination shall be proportionately increased.

4.2 Dividends. If at any time or from time to time the holders of Common Stock (or any shares of stock or other securities at the time receivable upon the exercise of this Warrant) shall have received or become entitled to receive,

(a) Common Stock, or any shares of stock or other securities whether or not such securities are at any time directly or indirectly convertible into or exchangeable for Common Stock, or any rights or options to subscribe for, purchase or otherwise acquire any of the foregoing by way of dividend or other distribution,

(b) any cash paid or payable including as a cash dividend, or

(c) Common Stock or other or additional stock or other securities or property (including cash) by way of spin off, split-up, reclassification, combination of shares or similar corporate rearrangement, (other than shares of Common Stock issued as a stock split, adjustments in respect of which shall be covered by the terms of Section 4.1 above),

then and in each such case, Holder hereof shall, upon the exercise of this Warrant, be entitled to receive, in addition to the number of shares of Common Stock receivable thereupon, and without payment of any additional consideration therefor, the amount of stock and other securities and property (including cash in the cases referred to in clauses (b) and (c) above) which such Holder would hold on the date of such exercise had it been the holder of record of such Common Stock as of the date on which holders of Common Stock received or became entitled to receive such shares and/or all other additional stock and other securities and property.

4.3 Change of Control. In the event of a Change of Control (as hereinafter defined) where the per share price of the Company’s Common Stock is less than or equal to two (2) times the Exercise Price, immediately prior to the consummation of such Change of Control, this Warrant shall be automatically exchanged for a number of shares of Company’s securities, such number of shares being equal to the maximum number of shares issuable pursuant to the terms hereof (after taking into account all adjustments described herein) had Holder elected to exercise this Warrant immediately prior to the closing of such Change of Control and purchased all such shares pursuant to the cash exercise provision set forth in Section 1(a) hereof (as opposed to the cashless exercise provision set forth in Section 1(b)). Company acknowledges and agrees that Holder shall not be required to make any payment (cash or otherwise) for such shares as further consideration for their issuance pursuant to the terms of the preceding sentence. “Change of Control” shall mean any sale, license, or other disposition of all or substantially all of the assets of Company, any reorganization, consolidation, merger or other

transaction involving Company where the holders of Company's securities before the transaction beneficially own less than 50% of the outstanding voting securities of the surviving entity after the transaction; provided that an issuance of equity securities for the primary purpose of raising capital shall not be considered a Change of Control under this Warrant. This Warrant shall terminate upon Holder's receipt of the number of shares of Company's equity securities described in this Section 4.3.

4.4 Reserved.

4.5 Notice of Adjustment. Upon any adjustment of the Exercise Price, and/or any increase or decrease in the number of Warrant Shares purchasable upon the exercise of this Warrant, Company shall give written notice thereof to Holder pursuant to Section 12. The notice, which may be substantially in the form of Exhibit "A" attached hereto, shall be signed by Company's chief financial officer and shall state the Exercise Price resulting from such adjustment and the increase or decrease, if any, in the number of Warrant Shares purchasable at such price upon the exercise of this Warrant, setting forth in reasonable detail the method of calculation and the facts upon which such calculation is based.

4.6 Other Notices. If at any time:

- (a) Company shall declare any cash dividend upon its Common Stock;
- (b) Company shall declare any dividend upon its Common Stock payable in stock or make any special dividend or other distribution to the holders of its Common Stock;
- (c) Company shall offer for subscription pro rata to the holders of its Common Stock any additional shares of stock of any class or other rights;
- (d) there shall be any capital reorganization or reclassification of the capital stock of Company, or consolidation or merger of Company with, or sale of all or substantially all of its assets to, another entity;
- (e) there shall be a voluntary or involuntary dissolution, liquidation or winding-up of Company; or
- (f) Company shall take or propose to take any other action, notice of which is actually provided to holders of the Common Stock;

then, in any one or more of said cases, Company shall give Holder, pursuant to Section 12, (i) at least 15 days' prior written notice of the date on which the books of Company shall close or a record shall be taken for such dividend, distribution or subscription rights or for determining rights to vote in respect of any such reorganization, reclassification, consolidation, merger, sale, dissolution, liquidation or winding-up, or other action and (ii) in the case of any such reorganization, reclassification, consolidation, merger, sale, dissolution, liquidation or winding-up, or other action, at least 15 days' written notice of the date when the same shall take place. Any notice given in accordance with the foregoing clause (i) shall also specify, in the case of any such dividend, distribution or subscription rights, the date on which the holders of Common Stock shall be entitled thereto. Any notice given in accordance with the foregoing clause (ii) shall also specify the date on which the holders of Common Stock shall be entitled to exchange their Common Stock for securities or other property deliverable upon such reorganization, reclassification, consolidation, merger, sale, dissolution, liquidation or winding-up, or other action as the case may be.

4.7 Certain Events. If any change in the outstanding Common Stock of Company or any other event occurs as to which the other provisions of this Section 4 are not strictly applicable or if strictly applicable would not fairly effect the adjustments to this Warrant in accordance with the essential intent and principles of such provisions, then the Board shall make in good faith an adjustment in the number and class of shares issuable under this Warrant, the Exercise Price and/or the application of such provisions, in accordance with such essential intent and principles, so as to protect such purchase rights as aforesaid. The adjustment shall be such as will give Holder of this Warrant upon exercise for the same aggregate Exercise Price the total number, class and kind of shares as Holder would have owned had this Warrant been exercised prior to the event and had Holder continued to hold such shares until after the event requiring adjustment.

4.8 Holder's Exercise Limitations. The Company shall not effect any exercise of this Warrant, and a Holder shall not have the right to exercise any portion of this Warrant, pursuant to Section 1 or otherwise, to the extent that after giving effect to such issuance after exercise as set forth on the applicable notice of exercise, the Holder (together with the Holder's Affiliates, and any other Persons acting as a group together with the Holder or any of the Holder's Affiliates (such Persons, "Attribution Parties")), would beneficially own in excess of the Beneficial Ownership Limitation (as defined below). For purposes of the foregoing sentence, the number of shares of Common Stock beneficially owned by the Holder and its Affiliates and Attribution Parties shall include the number of Warrant Shares issuable upon exercise of this Warrant with respect to which such determination is being made, but shall exclude the number of shares of Common Stock which would be issuable upon (i) exercise of the remaining, nonexercised portion of this Warrant beneficially owned by the Holder or any of its Affiliates or Attribution Parties and (ii) exercise or conversion of the unexercised or nonconverted portion of any other securities of the Company (including, without limitation, the Conversion Option set forth in the Supplement) subject to a limitation on conversion or exercise analogous to the limitation contained herein beneficially owned by the Holder or any of its Affiliates or Attribution Parties. Except as set forth in the preceding sentence, for purposes of this Section 4.8, beneficial ownership shall be calculated in accordance with Section 13(d) of the Exchange Act and the rules and regulations promulgated thereunder, it being acknowledged by the Holder that the Company is not representing to the Holder that such calculation is in compliance with Section 13(d) of the Exchange Act and the Holder is solely responsible for any schedules required to be filed in accordance therewith. To the extent that the limitation contained in this Section 4.8 applies, the determination of whether this Warrant is exercisable (in relation to other securities owned by the Holder together with any Affiliates and Attribution Parties) and of which portion of this Warrant is exercisable shall be in the sole discretion of the Holder, and the submission of a notice of exercise shall be deemed to be the Holder's determination of whether this Warrant is exercisable (in relation to other securities owned by the Holder together with any Affiliates and Attribution Parties) and of which portion of this Warrant is exercisable, in each case subject to the Beneficial Ownership Limitation, and the Company shall have no obligation to verify or confirm the accuracy of such determination. In addition, a determination as to any group status as contemplated above shall be determined in accordance with Section 13(d) of the Exchange Act and the rules and regulations promulgated thereunder. For purposes of this Section 4.8, in determining the number of outstanding shares of Common Stock, a Holder may rely on the number of outstanding shares of Common Stock as reflected in (A) the Company's most recent periodic or annual report filed with the SEC, as the case may be, (B) a more recent public announcement by the Company or (C) a more recent written notice by the Company or the transfer agent setting forth the number of shares of Common Stock outstanding. Upon the written request of a Holder, the Company shall within one trading day confirm in writing to the Holder the number of shares of Common Stock then outstanding. In any case, the number of outstanding shares of Common Stock shall be determined after giving effect to the conversion or exercise of securities of the Company, including this Warrant, by the Holder or its Affiliates or Attribution Parties since the date as of which such number of outstanding shares of Common Stock was reported. The "Beneficial Ownership Limitation" shall be 4.99% (or, upon written election by Holder which is delivered to the Company prior to the issuance of any Warrant Shares to such Holder, 9.99%) of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock issuable upon exercise of this Warrant. The Holder, upon notice to the Company, may increase or decrease the Beneficial Ownership Limitation provisions of this Section 4.8, provided that the Beneficial Ownership Limitation in no event exceeds 9.99% of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock upon exercise of this Warrant held by the Holder and the provisions of this Section 4.8 shall continue to apply. Any increase in the Beneficial Ownership Limitation will not be effective until the 61st day after such notice is delivered to the Company. The provisions of this paragraph shall be construed and implemented in a manner otherwise than in strict conformity with the terms of this Section 4.8 to correct this paragraph (or any portion hereof) which may be defective or inconsistent with the intended Beneficial Ownership Limitation herein contained or to make changes or supplements necessary or desirable to properly give effect to such limitation. The limitations contained in this paragraph shall apply to a successor holder of this Warrant.

5. Issue Tax. The issuance of certificates for shares of Common Stock upon the exercise of this Warrant shall be made without charge to Holder of this Warrant for any issue tax in respect thereof; provided, however, that Company shall not be required to pay any tax which may be payable in respect of any transfer involved in the issuance and delivery of any certificate in a name other than that of the then Holder of this Warrant being exercised.

6. Closing of Books. Company will at no time close its transfer books against the transfer of this Warrant or of any Warrant Shares issued or issuable upon the exercise of this Warrant in any manner which interferes with the timely exercise of this Warrant.

7. No Voting Rights; Limitation of Liability. Nothing contained in this Warrant shall be construed as conferring upon Holder hereof the right to vote or to consent as a stockholder in respect of meetings of stockholders for the election of directors of Company or any other matters or any rights whatsoever as a stockholder of Company. No dividends or interest shall be payable in respect of this Warrant or the interest represented hereby or the shares purchasable hereunder until, and only to the extent that, this Warrant shall have been exercised; provided, however, that if any dividends are due or paid at any time on the underlying securities for which this Warrant is exercisable, then upon exercise, the securities issued to Holder shall be deemed to have accrued dividends and be paid identical dividends from the date of this Warrant. No provisions hereof, in the absence of affirmative action by Holder to purchase shares of Common Stock, and no mere enumeration herein of the rights or privileges of Holder hereof, shall give rise to any liability of such Holder for the Exercise Price or as a stockholder of Company, whether such liability is asserted by Company or by its creditors.

8. Amendment of Charter. Unless Holder consents thereto in writing, Company shall not amend its Charter prior to the exercise of this Warrant if the Common Stock would be adversely affected by such amendment in a manner that would be more adverse to Holder with respect to the shares of Common Stock issuable upon the exercise of this Warrant than, and substantially dissimilar to, such amendment's effect on the other holders of Common Stock.

9. Registration Rights. If Company proposes to file a new registration statement under the Securities Act for purposes of effecting an underwritten offering of its equity securities for its own account or for the account of any other persons (other than (i) a registration of securities solely relating to an offering and sale to employees or directors of the Company pursuant to any employee stock plan or other employee benefit plan arrangement, and (ii) a registration of securities filed on Form S-4 or Form S-8 or any successor thereto), Holder shall be entitled to piggyback registration rights, and Company shall afford Holder an opportunity to include in that registration all or any part of the Warrant Shares issued upon exercise hereof, provided, however, that the Company's underwriters may limit the number of shares included in such underwritten offering if the underwriters determine that marketing factors require a limitation of the number of shares to be underwritten which may impact the number of Holder's Warrant Shares eligible to be registered in such offering.

10. Rights and Obligations Survive Exercise of Warrant. The rights and obligations of Company, of Holder of this Warrant and of the holder of Warrant Shares contained in Sections 6, 8, 9 and 18 shall survive the exercise of this Warrant.

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11. Modification and Waiver. This Warrant and any provision hereof may be changed, waived, discharged or terminated only by an instrument in writing signed by the party against which enforcement of the same is sought.

12. Notices. Any notice, request or other document required or permitted to be given or delivered to Holder or Company shall be deemed to have been given (i) upon receipt if delivered personally or by courier (ii) upon confirmation of receipt if by electronic mail or facsimile or (iii) three business days after deposit in the US mail, with postage prepaid and certified or registered, to each such Holder at its address as shown on the books of Company or to Company at the address indicated therefor in the opening paragraphs of this Warrant (or at such other location as Company may advise Holder in writing).

13. Survival of Certain Obligations. All of the obligations of Company relating to the Warrant Shares issuable upon the exercise of this Warrant shall survive the exercise and termination of this Warrant. All of the covenants and agreements of Company shall inure to the benefit of and be binding upon the successors and permitted assigns of Holder. Company will, at the time of the exercise of this Warrant, in whole or in part, upon request of Holder but at Company's expense, acknowledge in writing its continuing obligation to Holder in respect of any rights (including, without limitation, any right to registration of the Warrant Shares) to which Holder shall continue to be entitled after such exercise in accordance with this Warrant; provided, that the failure of Holder to make any such request shall not affect the continuing obligation of Company to Holder in respect of such rights.

14. Descriptive Headings and Governing Law. The descriptive headings of the several sections and paragraphs of this Warrant are inserted for convenience only and do not constitute a part of this Warrant. This Warrant shall be construed and enforced in accordance with, and the rights of the parties shall be governed by, the laws of the State of Delaware.

15. Lost or Rejected Warrants or Stock Certificates. Company agrees that upon receipt of evidence reasonably satisfactory to Company of the loss, theft, destruction, or mutilation of any Warrant or stock certificate and, in the case of any such loss, theft or destruction, upon receipt of an indemnity reasonably satisfactory to Company, or in the case of any such mutilation upon surrender and cancellation of such Warrant or stock certificate, Company at its expense will make and deliver a new Warrant or stock certificate, of like tenor, in lieu of the lost, stolen, destroyed or mutilated Warrant or stock certificate. If at any time the electronic original of this Warrant is rejected by any person (including, but not limited to, paying or escrow agents) or any person fails to comply with the terms of this Warrant based on being presented to such person as an electronic record or a printout hereof, or any signature hereto being in electronic form, Company shall, promptly upon Holder's request and without indemnity, execute and deliver to Holder, in lieu of electronic original versions of this Warrant, a new warrant of like tenor and amount in paper form with original ink signatures.

16. Fractional Shares. No fractional shares shall be issued upon exercise of this Warrant. Company shall, in lieu of issuing any fractional share, pay the holder entitled to such fraction a sum in cash equal to such fraction multiplied by the then effective Exercise Price.

17. Representations of Holder. With respect to this Warrant, Holder represents and warrants to Company as follows:

17.1 Experience. It is experienced in evaluating and investing in companies engaged in businesses similar to that of Company; it understands that investment in this Warrant involves substantial risks; it has made detailed inquiries concerning Company, its business and services, its officers and its personnel; the officers of Company have made available to Holder any and all written information it has requested; the officers of Company have answered to Holder's satisfaction all inquiries made by it; in making this investment it has relied upon information made available to it by Company; and it has such knowledge and experience in financial and business matters that it is capable of evaluating the merits and risks of investment in Company and it is able to bear the economic risk of that investment.

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17.2 Investment. It is acquiring this Warrant and any Warrant Shares for investment for its own account and not with a view to, or for resale in connection with, any distribution thereof. It understands that this Warrant and the Warrant Shares issuable upon exercise of this Warrant, have not been registered under the Securities Act, nor qualified under applicable state securities laws.

17.3 Rule 144. It acknowledges that this Warrant and the Common Stock issuable upon exercise of this Warrant must be held indefinitely unless they are

subsequently registered under the Securities Act or an exemption from such registration is available. It has been advised or is aware of the provisions of Rule 144 promulgated under the Securities Act.

17.4 Access to Data. It has had an opportunity to discuss Company's business, management and financial affairs with Company's management and has had the opportunity to inspect Company's facilities.

17.5 Accredited Investor. It is, and at the time this Warrant was offered was, an "accredited investor" within the meaning of Regulation D promulgated under the Securities Act.

18. Additional Representations and Covenants of Company. Company hereby represents, warrants and agrees as follows:

18.1 Corporate Power. Company has all requisite corporate power and corporate authority to issue this Warrant and to carry out and perform its obligations hereunder.

18.2 Authorization. All corporate action on the part of Company, its directors and stockholders necessary for the authorization, execution, delivery and performance by Company of this Warrant has been taken. This Warrant is a valid and binding obligation of Company, enforceable in accordance with its terms.

18.3 Offering. Subject in part to the truth and accuracy of Holder's representations set forth in Section 17 hereof, the offer, issuance and sale of this Warrant is, and the Common Stock issuable upon exercise of this Warrant will be, exempt from the registration requirements of the Securities Act, and are exempt from the qualification requirements of any applicable state securities laws; and neither Company nor anyone acting on its behalf will take any action hereafter that would cause the loss of such exemptions.

18.4 Listing; Stock Issuance. Company shall use its commercially reasonable efforts to secure and maintain the listing of the Common Stock or other securities issuable upon exercise of this Warrant, upon each securities exchange or over-the-counter market upon which securities of the same class or series issued by Company are listed, if any. Upon exercise of this Warrant, Company will use commercially reasonable efforts to cause the issuance of the shares of Common Stock purchased pursuant to the exercise to be issued in book-entry form in the names of Holder, its nominees or assignees, as appropriate at the time of such exercise.

18.5 Charter Documents. Company has provided Holder with true and complete copies of Company's Charter, By-Laws, and each Certificate of Designation or other charter document setting forth any rights, preferences and privileges of Company's capital stock, each as amended and in effect on the date of issuance of this Warrant.

18.6 Reserved.

18.7 Financial and Other Reports. Until the earlier of (a) the Expiration Date, and (b) the termination of this Warrant pursuant to Section 4.3, Company agrees to provide Holder at any time and from time to time with such information that is in the Company's possession as Holder may reasonably request for purposes of Holder's compliance (as determined by Holder in its reasonable discretion) with regulatory, accounting and reporting requirements applicable to Holder under law or GAAP (e.g., Fair Value Accounting Standard 157), including any 409A valuation reports (or equivalent reports) and budgets. Notwithstanding the foregoing, Company shall not be required to furnish to Holder the financial information described in this Section 18.7 in the event such financial information has been previously delivered to Lender pursuant to the Loan Agreement or produce any information not already in the Company's possession.

19. Counterparts; Facsimile; Electronic Signatures. This Warrant may be executed by one or more of the parties hereto in any number of separate counterparts, all of which together shall constitute one and the same instrument. Holder's execution and delivery of Holder's counterpart signature page to this Warrant via facsimile or electronic mail (including pdf or any electronic signature complying with the U.S. federal ESIGN Act of 2000, e.g., www.docusign.com) shall constitute Holder's effective execution and delivery of this Warrant and agreement to and acceptance of the terms hereof for all purposes. The fact that this Warrant is executed, signed, stored or delivered electronically shall not prevent the transfer by any Holder of this Warrant pursuant to Section 2 or the enforcement of the terms hereof. Physical possession of the original of this Warrant or any paper copy thereof shall confer no special status to the bearer thereof. In no event shall an original ink-signed paper copy of this Warrant be required for any exercise of Holder's rights hereunder, nor shall this Warrant or any physical copy hereof be required to be physically surrendered at the time of any exercise hereof.

[Remainder of this page intentionally left blank; signature page follows]

[Signature Page to Warrant]

IN WITNESS WHEREOF, Company has caused this Warrant to be duly executed by its officer, thereunto duly authorized as of the date of issuance set forth on the first page hereof.

ABEONA THERAPEUTICS INC.

By: /s/ Joseph Vazzano
Name: Joseph Vazzano
Title: Chief Financial Officer

AGREED AND ACCEPTED:

HOLDER:

AVENUE VENTURE OPPORTUNITIES FUND, L.P.

By: Avenue Venture Opportunities Partners, LLC
Its: General Partner

By: /s/ Sonia Gardner
Name: Sonia Gardner
Title: Member

☐ The undersigned, the holder of the within Warrant, hereby irrevocably elects to exercise the purchase right represented by such Warrant for, and to purchase thereunder, (1) _____ (_____) shares¹ (the “Shares”) of Common Stock of _____ and herewith makes payment of _____ Dollars (\$ _____) therefor, and requests that the certificates for such shares be issued in the name of, and delivered to, _____, whose address is _____.

☐ The undersigned hereby elects to convert _____ percent (____%) of the value of the Warrant pursuant to the provisions of Section 1(b) of the Warrant.

Dated _____

Holder: _____

By: _____

Its: _____

(Address) _____

ASSIGNMENT

<u>Name of Assignee</u>	<u>Address</u>	<u>No. of Shares</u>
Dated _____		
Holder: _____		
By: _____		
Its: _____		

[On letterhead of Company]

[IF APPLICABLE] The Warrant provides that the actual number and type of shares of Company's capital stock issuable upon exercise of the Warrant and the initial exercise price per share are to be determined by reference to one or more events or conditions subsequent to the issuance of the Warrant. Such events or conditions have now occurred or lapsed, and Company wishes to confirm the actual number of shares issuable and the initial exercise price. The provisions of this Supplement to Warrant are incorporated into the Warrant by this reference, and shall control the interpretation and exercise of the Warrant.

This certifies that Holder is entitled to purchase from Company _____, at the Holder's option, either (i) (_____) fully paid and nonassessable shares of Company's _____ Stock at a price of _____ Dollars (\$_____) per share or (ii) (_____) fully paid and nonassessable shares of Company's _____ Stock at a price of _____ Dollars (\$_____) per share. The applicable Exercise Price and the number of shares purchasable under the Warrant remain subject to adjustment as provided in Section 4 of the Warrant.

ABEONA THERAPEUTICS INC.

By: _____
Name: _____
Title: _____

THE SECURITIES REPRESENTED BY THIS CERTIFICATE HAVE BEEN ACQUIRED FOR INVESTMENT AND NOT WITH A VIEW TO, OR IN CONNECTION WITH, THE SALE AND DISTRIBUTION THEREOF, AND HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OF 1933, AS AMENDED (THE “SECURITIES ACT”) OR ANY STATE SECURITIES LAWS. SUCH SECURITIES MAY NOT BE SOLD OR TRANSFERRED IN THE ABSENCE OF (A) SUCH REGISTRATION, (B) AN OPINION OF COUNSEL IN A FORM REASONABLY ACCEPTABLE TO COMPANY THAT SUCH REGISTRATION IS NOT REQUIRED DUE TO AN EXEMPTION THEREFROM UNDER SAID ACT AND ANY APPLICABLE STATE SECURITIES LAWS OR (C) ABEONA THERAPEUTICS INC. OTHERWISE SATISFIES ITSELF THAT SUCH TRANSACTION IS COMPLIANT WITH SUCH LAWS.

Date of Issuance: July 18, 2025

WARRANT TO PURCHASE
SHARES OF COMMON STOCK OF
ABEONA THERAPEUTICS INC.
(Void after July 18, 2030)

This certifies that AVENUE VENTURE OPPORTUNITIES FUND II, L.P., a Delaware limited partnership, or permitted assigns (“Holder”), for value received, is entitled to purchase from ABEONA THERAPEUTICS INC., a Delaware corporation (“Company”), the Applicable Number (hereinafter defined) of fully paid and nonassessable shares of the Company’s Common Stock (the “Common Stock”), for cash, at a purchase price per share equal to the Exercise Price (hereinafter defined). Holder may also exercise this Warrant on a cashless or “net issuance” basis as described in Section 1(b) below, and this Warrant shall be deemed to have been exercised in full on such basis on the Expiration Date (hereinafter defined), to the extent not fully exercised prior to such date. This Warrant is issued in connection with that certain Loan and Security Agreement and Supplement thereto, both of even date herewith (as amended, restated and supplemented from time to time, the “Loan Agreement” and the “Supplement”, respectively), between Company, as borrower, and Holder, as lender (“Lender”). Capitalized terms used herein and not otherwise defined in this Warrant shall have the meaning(s) ascribed to them in the Loan Agreement and the Supplement, unless the context would otherwise require.

In addition to the terms defined elsewhere in this Warrant, the following terms have the meanings indicated below:

“Applicable Number” means the number of shares of Common Stock purchasable hereunder obtained by dividing (x) \$80,000.00 by (y) the Exercise Price.

“Exercise Price” means \$6.07.

“Warrant Shares” means the shares of Common Stock purchased or purchasable hereunder.

Subject to Sections 4.3 and 4.8, this Warrant may be exercised at any time or from time to time up to and including 5:00 p.m. (Pacific time) on July 18, 2030 (the “Expiration Date”), upon surrender to Company at its principal office at 6555 Carnegie Avenue, 4th Floor, Cleveland, OH 44103 (or at such other location as Company may advise Holder in writing) of this Warrant properly endorsed with the Form of Subscription attached hereto duly completed and signed and upon payment in cash or by check of the aggregate Exercise Price for the number of shares for which this Warrant is being exercised determined in accordance with the provisions hereof. The Exercise Price and the number of shares purchasable hereunder are subject to further adjustment as provided in Section 4 of this Warrant.

This Warrant is subject to the following terms and conditions:

1. Exercise; Issuance of Certificates; Payment for Shares

(a) Unless an election is made pursuant to clause (b) of this Section 1, this Warrant shall be exercisable at the option of Holder, at any time or from time to time, on or before the Expiration Date for all or any portion of the Warrant Shares (but not for a fraction of a share) which may be purchased hereunder for the Exercise Price multiplied by the number of Warrant Shares to be purchased. Company agrees that the Warrant Shares purchased under this Warrant shall be and are deemed to be issued to Holder as the record owner of such Warrant Shares as of the close of business on the date on which the form of subscription shall have been delivered and payment made for such Warrant Shares. Subject to the provisions of Section 2, certificates for the Warrant Shares so purchased, together with any other securities or property to which Holder is entitled upon such exercise, shall be delivered to Holder by Company at Company’s expense within a reasonable time after the rights represented by this Warrant have been so exercised. Except as provided in clause (b) of this Section 1, in case of a purchase of less than all the Warrant Shares, Company shall cancel this Warrant and execute and deliver a new Warrant or Warrants of like tenor for the balance of the Warrant Shares surrendered upon such purchase to Holder within a reasonable time. Each stock certificate or book-entry statement so delivered shall be in such denominations of Common Stock as may be requested by Holder and shall be registered in the name of such Holder or such other name as shall be designated by such Holder, subject to the limitations contained in Section 2.

(b) Holder, in lieu of exercising this Warrant by the cash payment of the Exercise Price pursuant to clause (a) of this Section 1, may elect, at any time on or before the Expiration Date, to surrender this Warrant and receive that number of shares of Common Stock computed using the following formula:

$$X = \frac{Y(A - B)}{A}$$

Where: X = the number of shares of Common Stock to be issued to Holder.

Y = the number of shares of Common Stock that Holder would otherwise have been entitled to purchase hereunder pursuant to Section 1(a) (or such lesser number of shares as Holder may designate in the case of a partial exercise of this Warrant).

A = the closing price on the last trading day prior to exercise of this Warrant.

B = the Exercise Price then in effect.

Election to exercise under this Section 1(b) may be made by delivering a signed form of subscription to Company via electronic mail or facsimile, to be followed by delivery of this Warrant. Notwithstanding anything to the contrary contained in this Warrant, if as of the close of business on the last business day preceding the Expiration Date this Warrant remains unexercised as to all or a portion of the Warrant Shares purchasable hereunder, then effective at 9:00 a.m. (Pacific time) on the Expiration Date, Holder shall be deemed, automatically and without need for notice to Company, to have elected to exercise this Warrant in full pursuant to the provisions of this Section 1(b), and upon surrender of this Warrant shall be entitled to receive that number of Warrant Shares computed using the above formula, provided that the application of such formula as of the Expiration Date yields a positive number for “X”.

2. Limitation on Transfer.

(a) This Warrant and the Warrant Shares shall not be transferable except upon the conditions specified in this Section 2, which conditions are intended to ensure compliance with the provisions of the Securities Act of 1933, as amended (the “Securities Act”). Each holder of this Warrant or the Warrant Shares issuable hereunder will cause any proposed transferee of the Warrant or the Warrant Shares to agree to take and hold such securities subject to the provisions and upon the conditions specified in this Section 2. Notwithstanding the foregoing and any other provision of this Section 2 but subject to the last sentence of Section 2(c), Holder may freely transfer all or part of this Warrant or the shares issuable upon exercise of this Warrant (or the securities issuable, directly or indirectly, upon conversion of the shares, if any) at any time to any affiliate of Lender under the Loan Agreement, by giving Company notice of the portion of the Warrant being transferred setting forth the name, address and taxpayer identification number of the transferee and surrendering this Warrant to Company for reissuance to the transferees(s) (and Holder, if applicable).

(b) Each certificate representing (i) this Warrant, (ii) the Warrant Shares, and (iii) any other securities issued in respect of the Warrant Shares issued upon any stock split, stock dividend, recapitalization, merger, consolidation or similar event, shall (unless otherwise permitted by the provisions of this Section 2 or unless such securities have been registered under the Securities Act or sold under Rule 144) be stamped or otherwise imprinted with a legend substantially in the following form (in addition to any legend required under applicable state securities laws):

THE SECURITIES REPRESENTED BY THIS CERTIFICATE HAVE BEEN ACQUIRED FOR INVESTMENT AND NOT WITH A VIEW TO, OR IN CONNECTION WITH, THE SALE AND DISTRIBUTION THEREOF, AND HAVE NOT BEEN REGISTERED UNDER THE SECURITIES ACT OR ANY STATE SECURITIES LAWS. SUCH SECURITIES MAY NOT BE SOLD OR TRANSFERRED IN THE ABSENCE OF (A) SUCH REGISTRATION, (B) AN OPINION OF COUNSEL IN A FORM REASONABLY ACCEPTABLE TO COMPANY THAT SUCH REGISTRATION IS NOT REQUIRED DUE TO AN EXEMPTION THEREFROM UNDER SAID ACT AND ANY APPLICABLE STATE SECURITIES LAWS OR (C) ABEONA THERAPEUTICS INC. OTHERWISE SATISFIES ITSELF THAT SUCH TRANSACTION IS COMPLIANT WITH SUCH LAWS.

(c) Holder of this Warrant and each person to whom this Warrant is subsequently transferred represents and warrants to Company and agrees (by acceptance of such transfer) that it will not transfer this Warrant (or securities issuable upon exercise hereof unless a registration statement under the Securities Act was in effect with respect to such securities at the time of issuance thereof) unless (i) there is an effective registration statement under the Securities Act and applicable state securities laws covering any such transaction, (ii) pursuant to Rule 144 under the Securities Act (or any other rule under the Securities Act relating to the disposition of securities), (iii) Company receives an opinion of counsel, reasonably satisfactory to Company, that an exemption from such registration is available or (iv) the Company otherwise satisfies itself that such transaction is exempt from registration. Notwithstanding the foregoing or any other provision of this Section 2, Holder shall not transfer this Warrant (or securities issuable upon exercise hereof, or securities issuable, directly or indirectly, upon conversion of such securities, if any) to any competitor of Company, as determined in good faith by the Board of Directors of Company (the “Board”), without the prior written consent of Company.

3. Shares to be Fully Paid; Reservation of Shares. Company covenants and agrees that all Warrant Shares will, upon issuance, be duly authorized, validly issued, fully paid and nonassessable and free from all preemptive rights of any stockholder and free of all taxes, liens and charges with respect to the issue thereof. Company further covenants and agrees that during the period within which the rights represented by this Warrant may be exercised, Company will at all times have authorized and reserved, for the purpose of issue or transfer upon exercise of the subscription rights evidenced by this Warrant, a sufficient number of shares of authorized but unissued Common Stock, or other securities and property, when and as required to provide for the exercise of the rights represented by this Warrant. Company will take all such action as may be necessary to assure that such shares of Common Stock may be issued as provided herein without violation of any applicable law or regulation, or of any requirements of any domestic securities exchange upon which the Common Stock may be listed. Company will not take any action which would result in any adjustment of the Exercise Price (as described in Section 4 hereof) (i) if the total number of Warrant Shares issuable after such action upon exercise of all outstanding warrants, together with all shares of Common Stock then outstanding and all shares of Common Stock then issuable upon exercise of all options and upon the conversion of all convertible securities then outstanding, would exceed the total number of shares of Common Stock then authorized by Company’s Certificate of Incorporation, as amended and restated from time to time (the “Charter”) or (ii) if the par value per share of the Common Stock would exceed the Exercise Price.

4. Adjustment of Exercise Price and Number of Shares. The Exercise Price and the number of shares purchasable upon the exercise of this Warrant shall be subject to adjustment from time to time upon the occurrence of certain events described in this Section 4. Upon each adjustment of the Exercise Price, Holder of this Warrant shall thereafter be entitled to purchase, at the Exercise Price resulting from such adjustment, the number of Warrant Shares obtained by multiplying the Exercise Price in effect immediately prior to such adjustment by the number of Warrant Shares purchasable pursuant hereto immediately prior to such adjustment, and dividing the product thereof by the Exercise Price resulting from such adjustment.

4.1 Subdivision or Combination of Stock. In case Company shall at any time subdivide its outstanding shares of Common Stock into a greater number of shares, the Exercise Price in effect immediately prior to such subdivision shall be proportionately reduced, and conversely, in case the outstanding shares of Common Stock of Company shall be combined into a smaller number of shares, the Exercise Price in effect immediately prior to such combination shall be proportionately increased.

4.2 Dividends. If at any time or from time to time the holders of Common Stock (or any shares of stock or other securities at the time receivable upon the exercise of this Warrant) shall have received or become entitled to receive,

(a) Common Stock, or any shares of stock or other securities whether or not such securities are at any time directly or indirectly convertible into or exchangeable for Common Stock, or any rights or options to subscribe for, purchase or otherwise acquire any of the foregoing by way of dividend or other distribution,

(b) any cash paid or payable including as a cash dividend, or

(c) Common Stock or other or additional stock or other securities or property (including cash) by way of spin off, split-up, reclassification, combination of shares or similar corporate rearrangement, (other than shares of Common Stock issued as a stock split, adjustments in respect of which shall be covered by the terms of Section 4.1 above),

then and in each such case, Holder hereof shall, upon the exercise of this Warrant, be entitled to receive, in addition to the number of shares of Common Stock receivable thereupon, and without payment of any additional consideration therefor, the amount of stock and other securities and property (including cash in the cases referred to in clauses (b) and (c) above) which such Holder would hold on the date of such exercise had it been the holder of record of such Common Stock as of the date on which holders of Common Stock received or became entitled to receive such shares and/or all other additional stock and other securities and property.

4.3 Change of Control. In the event of a Change of Control (as hereinafter defined) where the per share price of the Company’s Common Stock is less than or equal to two (2) times the Exercise Price, immediately prior to the consummation of such Change of Control, this Warrant shall be automatically exchanged for a number of shares of Company’s securities, such number of shares being equal to the maximum number of shares issuable pursuant to the terms hereof (after taking into account all adjustments described herein) had Holder elected to exercise this Warrant immediately prior to the closing of such Change of Control and purchased all such shares pursuant to the cash exercise provision set forth in Section 1(a) hereof (as opposed to the cashless exercise provision set forth in Section 1(b)). Company acknowledges and agrees that Holder shall not be required to make any payment (cash or otherwise) for such shares as further consideration for their issuance pursuant to the terms of the preceding sentence. “Change of Control” shall mean any sale, license, or other disposition of all or substantially all of the assets of Company, any reorganization, consolidation, merger or other

transaction involving Company where the holders of Company's securities before the transaction beneficially own less than 50% of the outstanding voting securities of the surviving entity after the transaction; provided that an issuance of equity securities for the primary purpose of raising capital shall not be considered a Change of Control under this Warrant. This Warrant shall terminate upon Holder's receipt of the number of shares of Company's equity securities described in this Section 4.3.

4.4 Reserved.

4.5 Notice of Adjustment. Upon any adjustment of the Exercise Price, and/or any increase or decrease in the number of Warrant Shares purchasable upon the exercise of this Warrant, Company shall give written notice thereof to Holder pursuant to Section 12. The notice, which may be substantially in the form of Exhibit "A" attached hereto, shall be signed by Company's chief financial officer and shall state the Exercise Price resulting from such adjustment and the increase or decrease, if any, in the number of Warrant Shares purchasable at such price upon the exercise of this Warrant, setting forth in reasonable detail the method of calculation and the facts upon which such calculation is based.

4.6 Other Notices. If at any time:

- (a) Company shall declare any cash dividend upon its Common Stock;
- (b) Company shall declare any dividend upon its Common Stock payable in stock or make any special dividend or other distribution to the holders of its Common Stock;
- (c) Company shall offer for subscription pro rata to the holders of its Common Stock any additional shares of stock of any class or other rights;
- (d) there shall be any capital reorganization or reclassification of the capital stock of Company, or consolidation or merger of Company with, or sale of all or substantially all of its assets to, another entity;
- (e) there shall be a voluntary or involuntary dissolution, liquidation or winding-up of Company; or
- (f) Company shall take or propose to take any other action, notice of which is actually provided to holders of the Common Stock;

then, in any one or more of said cases, Company shall give Holder, pursuant to Section 12, (i) at least 15 days' prior written notice of the date on which the books of Company shall close or a record shall be taken for such dividend, distribution or subscription rights or for determining rights to vote in respect of any such reorganization, reclassification, consolidation, merger, sale, dissolution, liquidation or winding-up, or other action and (ii) in the case of any such reorganization, reclassification, consolidation, merger, sale, dissolution, liquidation or winding-up, or other action, at least 15 days' written notice of the date when the same shall take place. Any notice given in accordance with the foregoing clause (i) shall also specify, in the case of any such dividend, distribution or subscription rights, the date on which the holders of Common Stock shall be entitled thereto. Any notice given in accordance with the foregoing clause (ii) shall also specify the date on which the holders of Common Stock shall be entitled to exchange their Common Stock for securities or other property deliverable upon such reorganization, reclassification, consolidation, merger, sale, dissolution, liquidation or winding-up, or other action as the case may be.

4.7 Certain Events. If any change in the outstanding Common Stock of Company or any other event occurs as to which the other provisions of this Section 4 are not strictly applicable or if strictly applicable would not fairly effect the adjustments to this Warrant in accordance with the essential intent and principles of such provisions, then the Board shall make in good faith an adjustment in the number and class of shares issuable under this Warrant, the Exercise Price and/or the application of such provisions, in accordance with such essential intent and principles, so as to protect such purchase rights as aforesaid. The adjustment shall be such as will give Holder of this Warrant upon exercise for the same aggregate Exercise Price the total number, class and kind of shares as Holder would have owned had this Warrant been exercised prior to the event and had Holder continued to hold such shares until after the event requiring adjustment.

4.8 Holder's Exercise Limitations. The Company shall not effect any exercise of this Warrant, and a Holder shall not have the right to exercise any portion of this Warrant, pursuant to Section 1 or otherwise, to the extent that after giving effect to such issuance after exercise as set forth on the applicable notice of exercise, the Holder (together with the Holder's Affiliates, and any other Persons acting as a group together with the Holder or any of the Holder's Affiliates (such Persons, "Attribution Parties")), would beneficially own in excess of the Beneficial Ownership Limitation (as defined below). For purposes of the foregoing sentence, the number of shares of Common Stock beneficially owned by the Holder and its Affiliates and Attribution Parties shall include the number of Warrant Shares issuable upon exercise of this Warrant with respect to which such determination is being made, but shall exclude the number of shares of Common Stock which would be issuable upon (i) exercise of the remaining, nonexercised portion of this Warrant beneficially owned by the Holder or any of its Affiliates or Attribution Parties and (ii) exercise or conversion of the unexercised or nonconverted portion of any other securities of the Company (including, without limitation, the Conversion Option set forth in the Supplement) subject to a limitation on conversion or exercise analogous to the limitation contained herein beneficially owned by the Holder or any of its Affiliates or Attribution Parties. Except as set forth in the preceding sentence, for purposes of this Section 4.8, beneficial ownership shall be calculated in accordance with Section 13(d) of the Exchange Act and the rules and regulations promulgated thereunder, it being acknowledged by the Holder that the Company is not representing to the Holder that such calculation is in compliance with Section 13(d) of the Exchange Act and the Holder is solely responsible for any schedules required to be filed in accordance therewith. To the extent that the limitation contained in this Section 4.8 applies, the determination of whether this Warrant is exercisable (in relation to other securities owned by the Holder together with any Affiliates and Attribution Parties) and of which portion of this Warrant is exercisable shall be in the sole discretion of the Holder, and the submission of a notice of exercise shall be deemed to be the Holder's determination of whether this Warrant is exercisable (in relation to other securities owned by the Holder together with any Affiliates and Attribution Parties) and of which portion of this Warrant is exercisable, in each case subject to the Beneficial Ownership Limitation, and the Company shall have no obligation to verify or confirm the accuracy of such determination. In addition, a determination as to any group status as contemplated above shall be determined in accordance with Section 13(d) of the Exchange Act and the rules and regulations promulgated thereunder. For purposes of this Section 4.8, in determining the number of outstanding shares of Common Stock, a Holder may rely on the number of outstanding shares of Common Stock as reflected in (A) the Company's most recent periodic or annual report filed with the SEC, as the case may be, (B) a more recent public announcement by the Company or (C) a more recent written notice by the Company or the transfer agent setting forth the number of shares of Common Stock outstanding. Upon the written request of a Holder, the Company shall within one trading day confirm in writing to the Holder the number of shares of Common Stock then outstanding. In any case, the number of outstanding shares of Common Stock shall be determined after giving effect to the conversion or exercise of securities of the Company, including this Warrant, by the Holder or its Affiliates or Attribution Parties since the date as of which such number of outstanding shares of Common Stock was reported. The "Beneficial Ownership Limitation" shall be 4.99% (or, upon written election by Holder which is delivered to the Company prior to the issuance of any Warrant Shares to such Holder, 9.99%) of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock issuable upon exercise of this Warrant. The Holder, upon notice to the Company, may increase or decrease the Beneficial Ownership Limitation provisions of this Section 4.8, provided that the Beneficial Ownership Limitation in no event exceeds 9.99% of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock upon exercise of this Warrant held by the Holder and the provisions of this Section 4.8 shall continue to apply. Any increase in the Beneficial Ownership Limitation will not be effective until the 61st day after such notice is delivered to the Company. The provisions of this paragraph shall be construed and implemented in a manner otherwise than in strict conformity with the terms of this Section 4.8 to correct this paragraph (or any portion hereof) which may be defective or inconsistent with the intended Beneficial Ownership Limitation herein contained or to make changes or supplements necessary or desirable to properly give effect to such limitation. The limitations contained in this paragraph shall apply to a successor holder of this Warrant.

5. Issue Tax. The issuance of certificates for shares of Common Stock upon the exercise of this Warrant shall be made without charge to Holder of this Warrant for any issue tax in respect thereof; provided, however, that Company shall not be required to pay any tax which may be payable in respect of any transfer involved in the issuance and delivery of any certificate in a name other than that of the then Holder of this Warrant being exercised.

6. Closing of Books. Company will at no time close its transfer books against the transfer of this Warrant or of any Warrant Shares issued or issuable upon the exercise of this Warrant in any manner which interferes with the timely exercise of this Warrant.

7. No Voting Rights; Limitation of Liability. Nothing contained in this Warrant shall be construed as conferring upon Holder hereof the right to vote or to consent as a stockholder in respect of meetings of stockholders for the election of directors of Company or any other matters or any rights whatsoever as a stockholder of Company. No dividends or interest shall be payable in respect of this Warrant or the interest represented hereby or the shares purchasable hereunder until, and only to the extent that, this Warrant shall have been exercised; provided, however, that if any dividends are due or paid at any time on the underlying securities for which this Warrant is exercisable, then upon exercise, the securities issued to Holder shall be deemed to have accrued dividends and be paid identical dividends from the date of this Warrant. No provisions hereof, in the absence of affirmative action by Holder to purchase shares of Common Stock, and no mere enumeration herein of the rights or privileges of Holder hereof, shall give rise to any liability of such Holder for the Exercise Price or as a stockholder of Company, whether such liability is asserted by Company or by its creditors.

8. Amendment of Charter. Unless Holder consents thereto in writing, Company shall not amend its Charter prior to the exercise of this Warrant if the Common Stock would be adversely affected by such amendment in a manner that would be more adverse to Holder with respect to the shares of Common Stock issuable upon the exercise of this Warrant than, and substantially dissimilar to, such amendment's effect on the other holders of Common Stock.

9. Registration Rights. If Company proposes to file a new registration statement under the Securities Act for purposes of effecting an underwritten offering of its equity securities for its own account or for the account of any other persons (other than (i) a registration of securities solely relating to an offering and sale to employees or directors of the Company pursuant to any employee stock plan or other employee benefit plan arrangement, and (ii) a registration of securities filed on Form S-4 or Form S-8 or any successor thereto), Holder shall be entitled to piggyback registration rights, and Company shall afford Holder an opportunity to include in that registration all or any part of the Warrant Shares issued upon exercise hereof, provided, however, that the Company's underwriters may limit the number of shares included in such underwritten offering if the underwriters determine that marketing factors require a limitation of the number of shares to be underwritten which may impact the number of Holder's Warrant Shares eligible to be registered in such offering.

10. Rights and Obligations Survive Exercise of Warrant. The rights and obligations of Company, of Holder of this Warrant and of the holder of Warrant Shares contained in Sections 6, 8, 9 and 18 shall survive the exercise of this Warrant.

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11. Modification and Waiver. This Warrant and any provision hereof may be changed, waived, discharged or terminated only by an instrument in writing signed by the party against which enforcement of the same is sought.

12. Notices. Any notice, request or other document required or permitted to be given or delivered to Holder or Company shall be deemed to have been given (i) upon receipt if delivered personally or by courier (ii) upon confirmation of receipt if by electronic mail or facsimile or (iii) three business days after deposit in the US mail, with postage prepaid and certified or registered, to each such Holder at its address as shown on the books of Company or to Company at the address indicated therefor in the opening paragraphs of this Warrant (or at such other location as Company may advise Holder in writing).

13. Survival of Certain Obligations. All of the obligations of Company relating to the Warrant Shares issuable upon the exercise of this Warrant shall survive the exercise and termination of this Warrant. All of the covenants and agreements of Company shall inure to the benefit of and be binding upon the successors and permitted assigns of Holder. Company will, at the time of the exercise of this Warrant, in whole or in part, upon request of Holder but at Company's expense, acknowledge in writing its continuing obligation to Holder in respect of any rights (including, without limitation, any right to registration of the Warrant Shares) to which Holder shall continue to be entitled after such exercise in accordance with this Warrant; provided, that the failure of Holder to make any such request shall not affect the continuing obligation of Company to Holder in respect of such rights.

14. Descriptive Headings and Governing Law. The descriptive headings of the several sections and paragraphs of this Warrant are inserted for convenience only and do not constitute a part of this Warrant. This Warrant shall be construed and enforced in accordance with, and the rights of the parties shall be governed by, the laws of the State of Delaware.

15. Lost or Rejected Warrants or Stock Certificates. Company agrees that upon receipt of evidence reasonably satisfactory to Company of the loss, theft, destruction, or mutilation of any Warrant or stock certificate and, in the case of any such loss, theft or destruction, upon receipt of an indemnity reasonably satisfactory to Company, or in the case of any such mutilation upon surrender and cancellation of such Warrant or stock certificate, Company at its expense will make and deliver a new Warrant or stock certificate, of like tenor, in lieu of the lost, stolen, destroyed or mutilated Warrant or stock certificate. If at any time the electronic original of this Warrant is rejected by any person (including, but not limited to, paying or escrow agents) or any person fails to comply with the terms of this Warrant based on being presented to such person as an electronic record or a printout hereof, or any signature hereto being in electronic form, Company shall, promptly upon Holder's request and without indemnity, execute and deliver to Holder, in lieu of electronic original versions of this Warrant, a new warrant of like tenor and amount in paper form with original ink signatures.

16. Fractional Shares. No fractional shares shall be issued upon exercise of this Warrant. Company shall, in lieu of issuing any fractional share, pay the holder entitled to such fraction a sum in cash equal to such fraction multiplied by the then effective Exercise Price.

17. Representations of Holder. With respect to this Warrant, Holder represents and warrants to Company as follows:

17.1 Experience. It is experienced in evaluating and investing in companies engaged in businesses similar to that of Company; it understands that investment in this Warrant involves substantial risks; it has made detailed inquiries concerning Company, its business and services, its officers and its personnel; the officers of Company have made available to Holder any and all written information it has requested; the officers of Company have answered to Holder's satisfaction all inquiries made by it; in making this investment it has relied upon information made available to it by Company; and it has such knowledge and experience in financial and business matters that it is capable of evaluating the merits and risks of investment in Company and it is able to bear the economic risk of that investment.

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17.2 Investment. It is acquiring this Warrant and any Warrant Shares for investment for its own account and not with a view to, or for resale in connection with, any distribution thereof. It understands that this Warrant and the Warrant Shares issuable upon exercise of this Warrant, have not been registered under the Securities Act, nor qualified under applicable state securities laws.

17.3 Rule 144. It acknowledges that this Warrant and the Common Stock issuable upon exercise of this Warrant must be held indefinitely unless they are

subsequently registered under the Securities Act or an exemption from such registration is available. It has been advised or is aware of the provisions of Rule 144 promulgated under the Securities Act.

17.4 Access to Data. It has had an opportunity to discuss Company's business, management and financial affairs with Company's management and has had the opportunity to inspect Company's facilities.

17.5 Accredited Investor. It is, and at the time this Warrant was offered was, an "accredited investor" within the meaning of Regulation D promulgated under the Securities Act.

18. Additional Representations and Covenants of Company. Company hereby represents, warrants and agrees as follows:

18.1 Corporate Power. Company has all requisite corporate power and corporate authority to issue this Warrant and to carry out and perform its obligations hereunder.

18.2 Authorization. All corporate action on the part of Company, its directors and stockholders necessary for the authorization, execution, delivery and performance by Company of this Warrant has been taken. This Warrant is a valid and binding obligation of Company, enforceable in accordance with its terms.

18.3 Offering. Subject in part to the truth and accuracy of Holder's representations set forth in Section 17 hereof, the offer, issuance and sale of this Warrant is, and the Common Stock issuable upon exercise of this Warrant will be, exempt from the registration requirements of the Securities Act, and are exempt from the qualification requirements of any applicable state securities laws; and neither Company nor anyone acting on its behalf will take any action hereafter that would cause the loss of such exemptions.

18.4 Listing; Stock Issuance. Company shall use its commercially reasonable efforts to secure and maintain the listing of the Common Stock or other securities issuable upon exercise of this Warrant, upon each securities exchange or over-the-counter market upon which securities of the same class or series issued by Company are listed, if any. Upon exercise of this Warrant, Company will use commercially reasonable efforts to cause the issuance of the shares of Common Stock purchased pursuant to the exercise to be issued in book-entry form in the names of Holder, its nominees or assignees, as appropriate at the time of such exercise.

18.5 Charter Documents. Company has provided Holder with true and complete copies of Company's Charter, By-Laws, and each Certificate of Designation or other charter document setting forth any rights, preferences and privileges of Company's capital stock, each as amended and in effect on the date of issuance of this Warrant.

18.6 Reserved.

18.7 Financial and Other Reports. Until the earlier of (a) the Expiration Date, and (b) the termination of this Warrant pursuant to Section 4.3, Company agrees to provide Holder at any time and from time to time with such information that is in the Company's possession as Holder may reasonably request for purposes of Holder's compliance (as determined by Holder in its reasonable discretion) with regulatory, accounting and reporting requirements applicable to Holder under law or GAAP (e.g., Fair Value Accounting Standard 157), including any 409A valuation reports (or equivalent reports) and budgets. Notwithstanding the foregoing, Company shall not be required to furnish to Holder the financial information described in this Section 18.7 in the event such financial information has been previously delivered to Lender pursuant to the Loan Agreement or produce any information not already in the Company's possession.

19. Counterparts; Facsimile; Electronic Signatures. This Warrant may be executed by one or more of the parties hereto in any number of separate counterparts, all of which together shall constitute one and the same instrument. Holder's execution and delivery of Holder's counterpart signature page to this Warrant via facsimile or electronic mail (including pdf or any electronic signature complying with the U.S. federal E-SIGN Act of 2000, e.g., www.docusign.com) shall constitute Holder's effective execution and delivery of this Warrant and agreement to and acceptance of the terms hereof for all purposes. The fact that this Warrant is executed, signed, stored or delivered electronically shall not prevent the transfer by any Holder of this Warrant pursuant to Section 2 or the enforcement of the terms hereof. Physical possession of the original of this Warrant or any paper copy thereof shall confer no special status to the bearer thereof. In no event shall an original ink-signed paper copy of this Warrant be required for any exercise of Holder's rights hereunder, nor shall this Warrant or any physical copy hereof be required to be physically surrendered at the time of any exercise hereof.

[Remainder of this page intentionally left blank; signature page follows]

[Signature Page to Warrant]

IN WITNESS WHEREOF, Company has caused this Warrant to be duly executed by its officer, thereunto duly authorized as of the date of issuance set forth on the first page hereof.

ABEONA THERAPEUTICS INC.

By: /s/ Joseph Vazzano
Name: Joseph Vazzano
Title: Chief Financial Officer

AGREED AND ACCEPTED:

HOLDER:

AVENUE VENTURE OPPORTUNITIES FUND II, L.P.

By: Avenue Venture Opportunities Partners II, LLC
Its: General Partner

By: /s/ Sonia Gardner
Name: Sonia Gardner
Title: Member

To: _____

- ☐ The undersigned, the holder of the within Warrant, hereby irrevocably elects to exercise the purchase right represented by such Warrant for, and to purchase thereunder, (1) _____ (_____) shares¹ (the “Shares”) of Common Stock of _____ and herewith makes payment of _____ Dollars (\$ _____) therefor, and requests that the certificates for such shares be issued in the name of, and delivered to, _____, whose address is _____.
- ☐ The undersigned hereby elects to convert _____ percent (____%) of the value of the Warrant pursuant to the provisions of Section 1(b) of the Warrant.

The undersigned acknowledges that it has reviewed the representations and warranties contained in Section 17 of this Warrant and by its signature below hereby makes such representations and warranties to Company.

Dated _____

Holder: _____

By: _____

Its: _____

(Address) _____

¹ Insert here the number of shares called for on the face of the Warrant (or, in the case of a partial exercise, the portion thereof as to which the Warrant is being exercised), in either case without making any adjustment for additional Warrant Shares or any other stock or other securities or property or cash which, pursuant to the adjustment provisions of the Warrant, may be issuable upon exercise.

ASSIGNMENT

FOR VALUE RECEIVED, the undersigned, the holder of the within Warrant, hereby sells, assigns and transfers all of the rights of the undersigned under the within Warrant, with respect to the number of shares of Common Stock covered thereby set forth herein below, unto:

Name of Assignee	Address	No. of Shares
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Dated _____

Holder: _____

By: _____

Its: _____

EXHIBIT “A”

[On letterhead of Company]

Reference is hereby made to that certain Warrant dated July 18, 2025 issued by ABEONA THERAPEUTICS INC., a Delaware corporation (the “Company”), to AVENUE VENTURE OPPORTUNITIES FUND II, L.P., a Delaware limited partnership (the “Holder”).

[IF APPLICABLE] The Warrant provides that the actual number and type of shares of Company’s capital stock issuable upon exercise of the Warrant and the initial exercise price per share are to be determined by reference to one or more events or conditions subsequent to the issuance of the Warrant. Such events or conditions have now occurred or lapsed, and Company wishes to confirm the actual number of shares issuable and the initial exercise price. The provisions of this Supplement to Warrant are incorporated into the Warrant by this reference, and shall control the interpretation and exercise of the Warrant.

[IF APPLICABLE] Notice is hereby given pursuant to Section 4.5 of the Warrant that the following adjustment(s) have been made to the Warrant: [describe adjustments, setting forth details regarding method of calculation and facts upon which calculation is based].

This certifies that Holder is entitled to purchase from Company _____, at the Holder’s option, either (i) (_____) fully paid and nonassessable shares of Company’s _____ Stock at a price of _____ Dollars (\$ _____) per share or (ii) (_____) fully paid and nonassessable shares of Company’s _____ Stock at a price of _____ Dollars (\$ _____) per share. The applicable Exercise Price and the number of shares purchasable under the Warrant remain subject to adjustment as provided in Section 4 of the Warrant.

Executed this ____ day of _____, 20 ____.

ABEONA THERAPEUTICS INC.

By: _____

Name: _____

Title: _____

FIRST AMENDMENT TO LOAN AND SECURITY AGREEMENT AND SUPPLEMENT

This First Amendment to Loan and Security Agreement and Supplement (this “Amendment”) is dated as of July 18, 2025 (the “First Amendment Date”), and is entered into by and among **Abeona Therapeutics, Inc.**, a Delaware corporation (“Company”), **MacroChem Corporation**, a Delaware corporation, and **Abeona Therapeutics LLC**, an Ohio limited liability company (together with Company, each individually, a “Borrower,” and collectively, “Borrower”), **Avenue Venture Opportunities Fund II, L.P.**, a Delaware limited partnership (“Avenue 2”), and **Avenue Venture Opportunities Fund, L.P.**, a Delaware limited partnership (in the capacity as administrative agent and collateral agent, “Agent,” and, together with Avenue 2, each individually, a “Lender,” and collectively, “Lenders”). Capitalized terms used herein without definition shall have the same meanings given them in the Loan Agreement (defined herein).

Recitals

A. Borrower, Lenders and Agent have entered into that certain Loan and Security Agreement, dated as of January 8, 2024 (the “LSA”), as supplemented by that certain Supplement to the Loan and Security Agreement, dated as of January 8, 2024 (the “Supplement”), together with related documents and agreements (together, as further amended, restated, or otherwise modified from time to time, hereinafter collectively referred to as the “Loan Agreement”).

B. Borrower, Lenders and Agent now desire to amend the Loan Agreement upon the terms and conditions more fully set forth in this Amendment.

Agreement

NOW, THEREFORE, in consideration of the foregoing Recitals, the parties hereto agree as follows:

1. Amendment. The following definition in Part I of the Supplement is hereby amended and restated in its entirety, as set forth below:

“**Designated Rate**” means, for each Growth Capital Loan, a fixed rate of interest per annum equal to eleven and three-quarters percent (11.75%).

2. Conditions. As consideration for the making of this Amendment, Lenders have earned and are entitled to receive immediately upon the execution of the Amendment, warrant instruments issued by Borrower substantially in the form of Exhibits A-1 and A-2 attached hereto (the “New Warrants”).

3. Borrower’s Representations And Warranties. Borrower represents and warrants that:

- a. Immediately upon giving effect to this Amendment (i) the representations and warranties contained in the Loan Agreement are true, accurate and complete in all material respects as of the date hereof (except to the extent such representations and warranties relate to an earlier date, in which case they are true and correct in all material respects as of such date), and (ii) no Event of Default has occurred and is continuing.
-
- b. Borrower has the necessary organizational power and authority to execute and deliver this Amendment and to perform its obligations under the Loan Agreement, as amended by this Amendment.
 - c. The certificate of incorporation, bylaws and other organizational documents of Borrower delivered to Lenders on the Closing Date remain true, accurate and complete and have not been amended, supplemented or restated and are and continue to be in full force and effect.
 - d. The execution and delivery by Borrower of this Amendment and the performance by Borrower of its obligations under the Loan Agreement, as amended by this Amendment, have been duly authorized by all necessary company action on the part of Borrower.
 - e. This Amendment has been duly executed and delivered by Borrower and is the binding obligation of Borrower, enforceable in accordance with its terms, except as such enforceability may be limited by bankruptcy, insolvency, reorganization, liquidation, moratorium or other similar laws affecting the enforcement of creditors’ rights in general and subject to general principles of equity, regardless of whether considered in a proceeding in equity or in law.
 - f. As of the date hereof, to its best knowledge, it has no defenses against the obligations to pay any amounts arising under the Loan and Security Agreement. Borrower acknowledges that, to its best knowledge, Lenders and Agent have acted in good faith and have conducted in a commercially reasonable manner its relationships with Borrower in connection with this Amendment and in connection with the Loan Documents.

Borrower understands and acknowledges that Lenders and Agent are entering into this Amendment in reliance upon, and in partial consideration for, the above representations and warranties, and agrees that such reliance is reasonable and appropriate.

4. Limitation. The amendments set forth in this Amendment shall be limited precisely as written and shall not be deemed (a) to be a waiver or modification of any other term or condition of the Loan Agreement or of any other instrument or agreement referred to therein or to prejudice any right or remedy which Lenders or Agent may now have or may have in the future under or in connection with the Loan Agreement (as amended hereby) or any instrument or agreement referred to therein; or (b) to be a consent to any future amendment or modification or waiver to any instrument or agreement the execution and delivery of which is consented to hereby, or to any waiver of any of the provisions thereof. Except as expressly amended hereby, the Loan Agreement shall continue in full force and effect.

5. Effectiveness. This Amendment shall become effective upon Lenders’ and Agent’s receipt of the following:

5.1 this Amendment, duly executed by Borrower;

5.2 the New Warrants, duly executed by Borrower;

5.3 reimbursement of Lenders’ and Agent’s fees and expenses, including all reasonable documented attorneys’ fees, expenses and disbursements, incurred through the date of this Amendment.

6. Counterparts. This Amendment may be executed in any number of counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same agreement

7. Incorporation By Reference. The provisions of Sections 9.11 and 9.12 of the Loan Agreement shall be deemed incorporated herein by reference, *mutatis mutandis*.

8. Electronic Signatures. This Amendment may be executed by electronic signatures. Borrower, Lenders and Agent expressly agree to conduct the transactions contemplated by this Amendment and the other Loan Documents by electronic means (including, without limitation, with respect to the execution, delivery, storage and transfer of this Amendment and each of the other Loan Documents by electronic means and to the enforceability of electronic Loan Documents). Delivery of an executed signature page

to this Amendment and each of the other Loan Documents by facsimile or other electronic mail transmission (including pdf or any electronic signature complying with the U.S. federal ESIGN Act of 2000, e.g., www.docuSign.com) shall be effective as delivery of a manually executed counterpart hereof and thereof, as applicable. The words “execution,” “signed,” “signature” and words of like import herein shall be deemed to include electronic signatures or the keeping of records in electronic form, each of which shall be of the same legal effect, validity and enforceability as a manually executed signature or the use of a paper-based recordkeeping systems, as the case may be, to the extent and as provided for in any applicable law, including, without limitation, any state law based on the Uniform Electronic Transactions Act.

[Signature Pages Follow on Next Page.]

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In Witness Whereof, the parties have duly authorized and caused this Amendment to be executed as of the date first written above.

Borrower:

Abeona Therapeutics Inc.

By: /s/ Joseph Vazzano
Name: Joseph Vazzano
Title: Chief Financial Officer

MacroChem Corporation

By: /s/ Joseph Vazzano
Name: Joseph Vazzano
Title: Treasurer

Abeona Therapeutics LLC

By: /s/ Joseph Vazzano
Name: Joseph Vazzano
Title: Treasurer

Lenders:

Avenue Venture Opportunities Fund, L.P.

By: Avenue Venture Opportunities Partners, LLC
Its: General Partner

By: /s/ Sonia Gardner
Name: Sonia Gardner
Title: Member

Avenue Venture Opportunities Fund II, L.P.

By: Avenue Venture Opportunities Partners, LLC
Its: General Partner

By: /s/ Sonia Gardner
Name: Sonia Gardner
Title: Member

Agent:

Avenue Venture Opportunities Fund, L.P.

By: Avenue Venture Opportunities Partners, LLC
Its: General Partner

By: /s/ Sonia Gardner
Name: Sonia Gardner
Title: Member

Signature Pages (First Amendment to Loan and Security Agreement and Supplement)

Exhibit A-1

(New Warrant to Be Issued to Avenue Venture Opportunities Fund, L.P.)

Exhibit A-2

(New Warrant to Be Issued to Avenue Venture Opportunities Fund II, L.P.)