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

**SCHEDULE 13D**

Under the Securities Exchange Act of 1934

**(Amendment No. 5)\***

**VOR BIOPHARMA INC.**

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**(Name of Issuer)**

**Common Stock, par value \$0.0001 per share**

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**(Title of Class of Securities)**

**929033108**

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**(CUSIP Number)**

**Peter Kolchinsky**  
**RA Capital Management, L.P., 200 Berkeley Street, 18th Floor**  
**Boston, MA, 02116**  
**617.778.2500**

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**(Name, Address and Telephone Number of Person Authorized to Receive Notices and Communications)**

**06/25/2025**

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**(Date of Event Which Requires Filing of This Statement)**

If the filing person has previously filed a statement on Schedule 13G to report the acquisition that is the subject of this Schedule 13D, and is filing this schedule because of §§ 240.13d-1(e), 240.13d-1(f) or 240.13d-1(g), check the following box.

The information required on the remainder of this cover page shall not be deemed to be "filed" for the purpose of Section 18 of the Securities Exchange Act of 1934 ("Act") or otherwise subject to the liabilities of that section of the Act but shall be subject to all other provisions of the Act (however, see the Notes).

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**SCHEDULE 13D**

**CUSIP No. 929033108**

Name of reporting person

1

RA Capital Management, L.P.

2

Check the appropriate box if a member of a Group (See Instructions)

(a)

(b)

3 SEC use only  
Source of funds (See Instructions)

4 AF, PF  
5 Check if disclosure of legal proceedings is required pursuant to Items 2(d) or 2(e)

Citizenship or place of organization

6 DELAWARE

Sole Voting Power

7

0.00

Number of  
Shares

Shared Voting Power

Beneficially 8

39,739,850.00

Owned by

Sole Dispositive Power

Each

9

0.00

Reporting

Person

Shared Dispositive Power

With:

10

39,739,850.00

Aggregate amount beneficially owned by each reporting person

11 39,739,850.00

12 Check if the aggregate amount in Row (11) excludes certain shares (See Instructions)

Percent of class represented by amount in Row (11)

13 31.8 %

Type of Reporting Person (See Instructions)

14 IA, PN

## SCHEDULE 13D

**CUSIP No.** 929033108

Name of reporting person

1

Peter Kolchinsky

Check the appropriate box if a member of a Group (See Instructions)

2

(a)

(b)

3 SEC use only  
Source of funds (See Instructions)

4 AF  
5 Check if disclosure of legal proceedings is required pursuant to Items 2(d) or 2(e)

Citizenship or place of organization

6 UNITED STATES

Number of 7 Sole Voting Power

Shares	
Beneficially	0.00
Owned by	Shared Voting Power
Each	8
Reporting	39,739,850.00
Person	Sole Dispositive Power
With:	9
	0.00
	Shared Dispositive Power
	10
	39,739,850.00
	Aggregate amount beneficially owned by each reporting person
11	39,739,850.00
	Check if the aggregate amount in Row (11) excludes certain shares (See Instructions)
12	<input type="checkbox"/>
	Percent of class represented by amount in Row (11)
13	31.8 %
	Type of Reporting Person (See Instructions)
14	HC, IN

## SCHEDULE 13D

**CUSIP No.** 929033108

1	Name of reporting person
	Rajeev Shah
	Check the appropriate box if a member of a Group (See Instructions)
2	<input type="checkbox"/> (a)
	<input type="checkbox"/> (b)
3	SEC use only
4	Source of funds (See Instructions)
	AF
5	Check if disclosure of legal proceedings is required pursuant to Items 2(d) or 2(e)
	<input type="checkbox"/>
6	Citizenship or place of organization
	UNITED STATES
	Sole Voting Power
7	0.00
Number of	Shared Voting Power
Shares	8
Beneficially	39,739,850.00
Owned by	Sole Dispositive Power
Each	9
Reporting	0.00
Person	Shared Dispositive Power
With:	10
	39,739,850.00
11	Aggregate amount beneficially owned by each reporting person

39,739,850.00

Check if the aggregate amount in Row (11) excludes certain shares (See Instructions)

12

Percent of class represented by amount in Row (11)

13

31.8 %

Type of Reporting Person (See Instructions)

14

HC, IN

### SCHEDULE 13D

**CUSIP No.** 929033108

Name of reporting person

1

RA Capital Healthcare Fund, L.P.

Check the appropriate box if a member of a Group (See Instructions)

2

(a)

(b)

3

SEC use only

Source of funds (See Instructions)

4

WC

Check if disclosure of legal proceedings is required pursuant to Items 2(d) or 2(e)

5

Citizenship or place of organization

6

DELAWARE

Sole Voting Power

7

0.00

Number of  
Shares

Shared Voting Power

Beneficially 8

37,820,713.00

Owned by

Each

Sole Dispositive Power

Reporting 9

0.00

Person

With:

Shared Dispositive Power

10

37,820,713.00

Aggregate amount beneficially owned by each reporting person

11

37,820,713.00

Check if the aggregate amount in Row (11) excludes certain shares (See Instructions)

12

Percent of class represented by amount in Row (11)

13

30.3 %

Type of Reporting Person (See Instructions)

14

PN

# SCHEDULE 13D

## Item 1. Security and Issuer

Title of Class of Securities:

(a) Common Stock, par value \$0.0001 per share

Name of Issuer:

(b) VOR BIOPHARMA INC.

Address of Issuer's Principal Executive Offices:

(c) 100 CAMBRIDGEPARK DRIVE, SUITE 101, CAMBRIDGE, MASSACHUSETTS , 02140.

**Item 1 Comment:** This Amendment No. 5 (this "Amendment No. 5" or this "Schedule 13D/A") amends and supplements the statement on Schedule 13D originally filed with the Securities and Exchange Commission (the "SEC") on February 19, 2021, and amended on November 14, 2022, December 9, 2022, August 11, 2023 and December 30, 2024 (as amended, the "Statement") by the Reporting Persons. Unless otherwise defined herein, capitalized terms used in this Amendment No. 5 shall have the meanings ascribed to them in the Statement. Unless amended or supplemented below, the information in the Statement remains unchanged.

## Item 2. Identity and Background

This Schedule 13D/A is being filed on behalf of RA Capital Management, L.P. ("RA Capital"), Peter Kolchinsky, Rajeev Shah, and RA Capital Healthcare Fund, L.P. (the "Fund"). RA Capital, Dr. Kolchinsky, Mr. Shah and the Fund are collectively referred to herein as the "Reporting Persons." The agreement among the Reporting Persons to file this Schedule 13D/A jointly in accordance with Rule 13d-1(k) of the Securities Exchange Act of 1934, as amended, (the "Act") is attached hereto as Exhibit 99.1. The Reporting Persons' beneficial ownership of the Issuer's common stock consists of (i) 37,820,713 shares of common stock directly held by the Fund; (ii) 1,825,326 shares of common stock directly held by the RA Capital Nexus Fund, L.P. (the "Nexus Fund"); (iii) Common Stock Warrants exercisable for up to 21,121,449 shares of common stock held directly by the Fund; (iv) pre-funded warrants (the "Pre-Funded Warrants" and, together with the Common Stock Warrants, the "Warrants") exercisable for up to 200,000,000 shares of common stock directly held by the Fund; and (v) a total of 93,811 shares of common stock underlying vested stock options (right to buy) held by Joshua Resnick for the benefit of RA Capital. Each of the Common Stock Warrants and the Pre-Funded Warrants contains a provision (the "Beneficial Ownership Blockers") which precludes exercise of the Warrants to the extent that, following exercise, the Fund, together with its affiliates and other attribution parties, would own more than 9.99% of the common stock outstanding. Additionally, the Pre-Funded Warrants are not currently exercisable due to the limitation imposed by the current number of authorized but unissued shares of the Issuer's common stock. RA Capital Healthcare Fund GP, LLC is the general partner of the Fund and RA Capital Nexus Fund GP, LLC is the general partner of the Nexus Fund. The general partner of RA Capital is RA Capital Management GP, LLC, of which Dr. Kolchinsky and Mr. Shah are the controlling persons. RA Capital serves as investment adviser for each of the Fund and the Nexus Fund and may be deemed a beneficial owner, for purposes of Section 13(d) of the Act, of any securities of the Issuer held by the Fund or the Nexus Fund. Each of the Fund and the Nexus Fund has delegated to RA Capital the sole power to vote and the sole power to dispose of all securities held in its portfolio, including the shares of the Issuer's common stock reported herein. Because each of the Fund and the Nexus Fund has divested itself of voting and investment power over the reported securities it holds and may not revoke that delegation on less than 61 days' notice, each of the Fund and the Nexus Fund disclaims beneficial ownership of the securities it holds for purposes of Section 13(d) of the Act and therefore disclaims any obligation to report ownership of the reported securities under Section 13(d) of the Act. As managers of RA Capital, Dr. Kolchinsky and Mr. Shah may be deemed beneficial owners, for purposes of Section 13(d) of the Act, of any securities of the Issuer beneficially owned by RA Capital. RA Capital, Dr. Kolchinsky, and Mr. Shah disclaim beneficial ownership of the securities reported in this Schedule 13D/A other than for the purpose of determining their obligations under Section 13(d) of the Act, and the filing of this Schedule 13D/A shall not be deemed an admission that either RA Capital, Dr. Kolchinsky, or Mr. Shah is the beneficial owner of such securities for any other purpose.

(a) The address of the principal business office of each of the Reporting Persons is 200 Berkeley Street, 18th Floor, Boston, MA 02116.

(b) The Fund is a private investment vehicle. RA Capital provides investment management services to the Fund and the Nexus Fund. The principal occupation of each of Dr. Kolchinsky and Mr. Shah is investment management.

(c) During the last five years, none of the Reporting Persons has been convicted in a criminal proceeding (excluding traffic violations or similar misdemeanors).

(d) During the last five years, none of the Reporting Persons has been a party to a civil proceeding of a judicial or administrative body of competent jurisdiction and as a result of such proceeding was or is subject to a judgment, decree of final order enjoining future violations of, or prohibiting or mandating activities subject to, federal or state securities laws or finding any violation with respect to such laws.

(e) See Item 6 of the cover pages.

## Item 3. Source and Amount of Funds or Other Consideration

Item 3 of the Statement is hereby amended and supplemented as follows: June 2025 Securities Purchase Agreement On June 25, 2025, the Issuer entered into a securities purchase agreement (the "June 2025 Securities Purchase

Agreement") with certain accredited investors (the "June 2025 PIPE Investors"), including the Fund, pursuant to which the Issuer agreed to issue and sell to the June 2025 PIPE Investors in a private placement (the "June 2025 Private Placement") Pre-Funded Warrants to purchase up to 700,000,000 shares of common stock at a price of \$0.25 per share (the "Pre-Funded Warrant Shares"). The Pre-Funded Warrants have an exercise price of \$0.0001 per share and will become exercisable upon approval by the Issuer's stockholders of the issuance of the shares of common stock underlying the Pre-Funded Warrants and a charter amendment that has the effect of increasing the Issuer's authorized shares of common stock (the "Stockholder Approval"). The June 2025 Private Placement closed on June 27, 2025. The Fund purchased Pre-Funded Warrants exercisable for up to 200,000,000 Pre-Funded Warrant Shares in the June 2025 Private Placement, for total consideration of \$50,000,000, which was funded by the working capital of the Fund. The foregoing description of the June 2025 Securities Purchase Agreement does not purport to be complete and is qualified in its entirety by reference to the June 2025 Securities Purchase Agreement, a copy of which is filed as Exhibit 99.5 hereto and incorporated by reference herein.

Item 5. Interest in Securities of the Issuer

- (a) Rows 11 and 13 of each Reporting Person's cover page to this Schedule 13D/A set forth the aggregate number of shares of common stock and percentages of the shares of common stock beneficially owned by such Reporting Person and are incorporated by reference. The percentage set forth in each row 13 is based upon 124,959,520 shares of common stock outstanding as of May 8, 2025 as reported in the Issuer's Quarterly Report on Form 10-Q filed with the SEC on May 14, 2025, and giving effect to stock options, to the extent exercisable within 60 days hereof, as referenced herein.
- (b) Rows 7 through 10 of each Reporting Person's cover page to this Schedule 13D/A set forth the number of shares of common stock as to which such Reporting Person has the sole or shared power to vote or direct the vote and sole or shared power to dispose or to direct the disposition and are incorporated by reference.
- (c) Except as set forth herein and below, none of the Reporting Persons has effected any transactions with respect to the securities of the Issuer during the past sixty days. No. Price Per Transaction Purchaser Date Shares Share Vest Stock Option (Right to Buy) RA Capital 05/22/2025 30,000 (1) (1) This option represents a right to purchase a total of 30,000 shares of the Issuer's common stock, which vested in full on May 22, 2025. This option has an exercise price of \$1.61 per share.
- (d) No person (other than the Reporting Persons) is known to have the right to receive or the power to direct the receipt of dividends from, or the proceeds from the sale of, the securities subject to this Schedule 13D/A.
- (e) Not applicable.

Item 6. Contracts, Arrangements, Understandings or Relationships With Respect to Securities of the Issuer

Item 6 of the Statement is hereby amended and supplemented as follows: June 2025 Registration Rights Agreement On June 25, 2025, the Issuer entered into a registration rights agreement (the "June 2025 Registration Rights Agreement") with the June 2025 PIPE Investors, pursuant to which the Issuer agreed to register for resale the Pre-Funded Warrant Shares underlying the Pre-Funded Warrants held by the June 2025 PIPE Investors (the "June 2025 Registrable Securities"). Under the June 2025 Registration Rights Agreement, the Issuer has agreed to file a registration statement (the "June 2025 Registration Statement") covering the resale of the June 2025 Registrable Securities within 30 days after Stockholder Approval (the "Filing Deadline"). The Issuer has agreed to use commercially reasonable efforts to cause such registration statement to become effective as soon as practicable, but in any event no later than 75 days after the initial filing of the June 2025 Registration Statement, subject to extension under the terms of the June 2025 Registration Rights Agreement. The Issuer also agreed to use commercially reasonable efforts to keep such registration statement effective until the date the Pre-Funded Warrant Shares covered by such registration statement have been sold or may be resold pursuant to Rule 144 without restriction. The Issuer has agreed to be responsible for all fees and expenses incurred in connection with the registration of the June 2025 Registrable Securities. The Issuer has granted the June 2025 PIPE Investors customary indemnification rights in connection with the June 2025 Registration Statement. The June 2025 PIPE Investors have also granted the Issuer customary indemnification rights in connection with the June 2025 Registration Statement. The foregoing description of the June 2025 Registration Rights Agreement does not purport to be complete and is qualified in its entirety by reference to the June 2025 Registration Rights Agreement, a copy of which is filed as Exhibit 99.6 hereto and incorporated by reference herein. Voting and Support Agreements In connection with the June 2025 Private Placement, certain stockholders of the Issuer, including the Fund, entered into Voting and Support Agreements (the "Support Agreements") pursuant to which, among other things, each stockholder has agreed, on the terms and subject to the conditions set forth therein, to vote all of their shares in favor of (i) the issuance of the Pre-Funded Warrant Shares and (ii) an amendment to the Issuer's charter that has the effect of increasing the Issuer's authorized shares of common stock. The Support Agreements also restrict the signing stockholders from transferring, selling or otherwise disposing of their shares or related securities except as permitted in the Support Agreements. The shares subject to the Support Agreements collectively represent approximately 63% of the total voting power of the Issuer's common stock as of June 26, 2025. The foregoing description of the Support Agreements does not purport to be complete and is qualified in its entirety by reference to the Form of Support Agreement, a copy of which is filed as Exhibit 99.7 hereto and incorporated by reference herein. Pre-Funded Warrants Each Pre-Funded Warrant has an exercise price of \$0.0001 per share of the Issuer's common stock, is exercisable at any time and from time to time on or after the Stockholder Approval and does not expire. Under the terms of the Pre-Funded Warrants, the Issuer may not effect the exercise of any Pre-Funded Warrant, and the Fund will not be entitled to exercise any portion of any Pre-Funded Warrant, which, upon giving effect to such exercise, would cause the Fund (together with its affiliates) to own more than 9.99% of the number of shares of the common stock outstanding immediately after giving effect to such exercise, as such percentage ownership is determined in accordance with the terms of the Pre-Funded Warrants.

However, the Fund may increase or decrease such percentage, from time to time, to any other percentage not in excess of 19.99%, provided that any increase in such percentage shall not be effective until 61 days after such notice is delivered to the Issuer. The exercise price and the number of shares of common stock issuable upon exercise of each Pre-Funded Warrant are subject to appropriate adjustment in the event of certain stock dividends and distributions, stock splits, stock combinations, reclassifications or similar events affecting the common stock. In the event of certain fundamental transactions (as described in the Pre-Funded Warrants), a holder of Pre-Funded Warrants will be entitled to receive, upon exercise of the Pre-Funded Warrants, the kind and amount of securities, cash or property that such holder would have received had they exercised in full the Pre-Funded Warrants immediately prior to such fundamental transaction without regard to any limitations on exercise contained in the Pre-Funded Warrants. The foregoing description of the Pre-Funded Warrant does not purport to be complete and is qualified in its entirety by reference to the Form of Pre-Funded Warrant, a copy of which is filed as Exhibit 99.8 hereto and incorporated by reference herein.

Item 7. Material to be Filed as Exhibits.

Exhibit 99.1 Joint Filing Agreement Exhibit 99.2 Form of Securities Purchase Agreement (incorporated by reference to Exhibit 10.1 to the Issuer's Current Report on Form 8-K filed on December 27, 2024). Exhibit 99.3 Form of Registration Rights Agreement (incorporated by reference to Exhibit 10.2 to the Issuer's Current Report on Form 8-K filed on December 27, 2024). Exhibit 99.4 Form of Common Stock Warrant (incorporated by reference to Exhibit 4.1 to the Issuer's Current Report on Form 8-K filed on December 27, 2024). Exhibit 99.5 Form of Securities Purchase Agreement (incorporated by reference to Exhibit 10.3 to the Issuer's Current Report on Form 8-K filed on June 26, 2025). Exhibit 99.6 Form of Registration Rights Agreement (incorporated by reference to Exhibit 10.4 to the Issuer's Current Report on Form 8-K filed on June 26, 2025). Exhibit 99.7 Form of Voting and Support Agreement (incorporated by reference to Exhibit 10.5 to the Issuer's Current Report on Form 8-K filed on June 26, 2025). Exhibit 99.8 Form of Pre-Funded Warrant to Purchase Common Stock (incorporated by reference to Exhibit 10.1 to the Issuer's Current Report on Form 8-K filed on June 26, 2025).

SIGNATURE

After reasonable inquiry and to the best of my knowledge and belief, I certify that the information set forth in this statement is true, complete and correct.

RA Capital Management, L.P.

Signature: /s/ Peter Kolchinsky

Name/Title: By Peter Kolchinsky, Manager

Date: 06/27/2025

Peter Kolchinsky

Signature: /s/ Peter Kolchinsky

Name/Title: Peter Kolchinsky

Date: 06/27/2025

Rajeev Shah

Signature: /s/ Rajeev Shah

Name/Title: Rajeev Shah

Date: 06/27/2025

RA Capital Healthcare Fund, L.P.

Signature: /s/ Peter Kolchinsky

Name/Title: By RA Capital Healthcare Fund GP, LLC, its  
General Partner, By Peter Kolchinsky, Manager

Date: 06/27/2025

**JOINT FILING AGREEMENT**

This Joint Filing Agreement, dated as of June 27, 2025, is by and among RA Capital Management, L.P., Peter Kolchinsky, Rajeev Shah, and RA Capital Healthcare Fund, L.P. (the foregoing are collectively referred to herein as the “Filers”).

Each of the Filers may be required to file with the United States Securities and Exchange Commission a statement on Schedule 13G and/or 13D with respect to Common Stock, par value \$0.0001 per share of Vor Biopharma, Inc. beneficially owned by them from time to time.

Pursuant to and in accordance with Rule 13(d)(1)(k) promulgated under the Securities Exchange Act of 1934, as amended, the Filers hereby agree to file a single statement on Schedule 13G and/or 13D (and any amendments thereto) on behalf of each of such parties, and hereby further agree to file this Joint Filing Agreement as an exhibit to such statement, as required by such rule.

This Joint Filing Agreement may be terminated by any of the Filers upon one week’s prior written notice or such lesser period of notice as the Filers may mutually agree.

Executed and delivered as of the date first above written.

**RA CAPITAL MANAGEMENT, L.P.**

By: /s/ Peter Kolchinsky  
Name: Peter Kolchinsky  
Title: Authorized Signatory

**PETER KOLCHINSKY**

/s/ Peter Kolchinsky

**RAJEEV SHAH**

/s/ Rajeev Shah

**RA CAPITAL HEALTHCARE FUND, L.P.**

By: RA Capital Healthcare Fund GP, LLC  
Its: General Partner

By: /s/ Peter Kolchinsky  
Name: Peter Kolchinsky  
Title: Manager