

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

SCHEDULE 13G/A
Under the Securities Exchange Act of 1934
(Amendment No. 1)*

AXSOME THERAPEUTICS, INC.

(Name of Issuer)

COMMON STOCK

(Title of Class of Securities)

05464T104

(CUSIP Number)

December 31, 2019

(Date of Event Which Requires Filing of this Statement)

Check the appropriate box to designate the rule pursuant to which this Schedule is filed:

- Rule 13d-1(b)
- Rule 13d-1(c)
- Rule 13d-1(d)

* The remainder of this cover page shall be filled out for a reporting person's initial filing on this form with respect to the subject class of securities, and for any subsequent amendment containing information which would alter the disclosures provided in a prior cover page.

The information required in 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).

1. Name of Reporting Persons
Venrock Healthcare Capital Partners II, L.P.
 2. Check the Appropriate Box if a Member of a Group (See Instructions)
 - (a) (1)
 - (b)
 3. SEC Use Only
 4. Citizenship or Place of Organization
Delaware
- Number of Shares Beneficially Owned by Each Reporting Person With:
5. Sole Voting Power
0
 6. Shared Voting Power
2,333,975(2)
 7. Sole Dispositive Power
0
 8. Shared Dispositive Power
2,333,975(2)
9. Aggregate Amount Beneficially Owned by Each Reporting Person
2,333,975(2)
 10. Check if the Aggregate Amount in Row (9) Excludes Certain Shares (See Instructions)
 11. Percent of Class Represented by Amount in Row (9)
6.3%(3)
 12. Type of Reporting Person (See Instructions)
PN

-
- (1) Venrock Healthcare Capital Partners II, L.P., VHCP Co-Investment Holdings II, LLC, Venrock Healthcare Capital Partners III, L.P., VHCP Co-Investment Holdings III, LLC, VHCP Management II, LLC, VHCP Management III, LLC, Nimish Shah and Bong Koh are members of a group for the purposes of this Schedule 13G/A.
 - (2) Consists of 559,326 shares owned by Venrock Healthcare Capital Partners II, L.P., 226,655 shares owned by VHCP Co-Investment Holdings II, LLC, 1,407,363 shares owned by Venrock Healthcare Capital Partners III, L.P. and 140,631 shares owned by VHCP Co-Investment Holdings III, LLC.
 - (3) This percentage is calculated based upon 36,796,846 shares of the Issuer's common stock outstanding following the closing of its public offering, as reported in the Issuer's prospectus filed with the Securities and Exchange Commission on December 12, 2019.

1. Name of Reporting Persons
VHCP Co-Investment Holdings II, LLC
 2. Check the Appropriate Box if a Member of a Group (See Instructions)
 - (a) (1)
 - (b)
 3. SEC Use Only
 4. Citizenship or Place of Organization
Delaware
- Number of
 Shares
 Beneficially
 Owned by
 Each
 Reporting
 Person With:
5. Sole Voting Power
0
 6. Shared Voting Power
2,333,975(2)
 7. Sole Dispositive Power
0
 8. Shared Dispositive Power
2,333,975(2)
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 11. Percent of Class Represented by Amount in Row (9)
6.3%(3)
 12. Type of Reporting Person (See Instructions)
OO

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- (1) Venrock Healthcare Capital Partners II, L.P., VHCP Co-Investment Holdings II, LLC, Venrock Healthcare Capital Partners III, L.P., VHCP Co-Investment Holdings III, LLC, VHCP Management II, LLC, VHCP Management III, LLC, Nimish Shah and Bong Koh are members of a group for the purposes of this Schedule 13G/A.
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 - (3) This percentage is calculated based upon 36,796,846 shares of the Issuer's common stock outstanding following the closing of its public offering, as reported in the Issuer's prospectus filed with the Securities and Exchange Commission on December 12, 2019.

1. Name of Reporting Persons
Venrock Healthcare Capital Partners III, L.P.
 2. Check the Appropriate Box if a Member of a Group (See Instructions)
 - (a) (1)
 - (b)
 3. SEC Use Only
 4. Citizenship or Place of Organization
Delaware
- Number of Shares Beneficially Owned by Each Reporting Person With:
5. Sole Voting Power
0
 6. Shared Voting Power
2,333,975(2)
 7. Sole Dispositive Power
0
 8. Shared Dispositive Power
2,333,975(2)
9. Aggregate Amount Beneficially Owned by Each Reporting Person
2,333,975(2)
 10. Check if the Aggregate Amount in Row (9) Excludes Certain Shares (See Instructions)
 11. Percent of Class Represented by Amount in Row (9)
6.3%(3)
 12. Type of Reporting Person (See Instructions)
PN

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- (1) Venrock Healthcare Capital Partners II, L.P., VHCP Co-Investment Holdings II, LLC, Venrock Healthcare Capital Partners III, L.P., VHCP Co-Investment Holdings III, LLC, VHCP Management II, LLC, VHCP Management III, LLC, Nimish Shah and Bong Koh are members of a group for the purposes of this Schedule 13G/A.
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 - (3) This percentage is calculated based upon 36,796,846 shares of the Issuer's common stock outstanding following the closing of its public offering, as reported in the Issuer's prospectus filed with the Securities and Exchange Commission on December 12, 2019.

1. Name of Reporting Persons
VHCP Co-Investment Holdings III, LLC
 2. Check the Appropriate Box if a Member of a Group (See Instructions)
 - (a) (1)
 - (b)
 3. SEC Use Only
 4. Citizenship or Place of Organization
Delaware
- Number of
 Shares
 Beneficially
 Owned by
 Each
 Reporting
 Person With:
5. Sole Voting Power
0
 6. Shared Voting Power
2,333,975(2)
 7. Sole Dispositive Power
0
 8. Shared Dispositive Power
2,333,975(2)
9. Aggregate Amount Beneficially Owned by Each Reporting Person
2,333,975(2)
 10. Check if the Aggregate Amount in Row (9) Excludes Certain Shares (See Instructions)
 11. Percent of Class Represented by Amount in Row (9)
6.3%(3)
 12. Type of Reporting Person (See Instructions)
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- (1) Venrock Healthcare Capital Partners II, L.P., VHCP Co-Investment Holdings II, LLC, Venrock Healthcare Capital Partners III, L.P., VHCP Co-Investment Holdings III, LLC, VHCP Management II, LLC, VHCP Management III, LLC, Nimish Shah and Bong Koh are members of a group for the purposes of this Schedule 13G/A.
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 - (3) This percentage is calculated based upon 36,796,846 shares of the Issuer's common stock outstanding following the closing of its public offering, as reported in the Issuer's prospectus filed with the Securities and Exchange Commission on December 12, 2019.

1. Name of Reporting Persons
VHCP Management II, LLC
 2. Check the Appropriate Box if a Member of a Group (See Instructions)
 - (a) (1)
 - (b)
 3. SEC Use Only
 4. Citizenship or Place of Organization
Delaware
- Number of Shares Beneficially Owned by Each Reporting Person With:
5. Sole Voting Power
0
 6. Shared Voting Power
2,333,975(2)
 7. Sole Dispositive Power
0
 8. Shared Dispositive Power
2,333,975(2)
9. Aggregate Amount Beneficially Owned by Each Reporting Person
2,333,975(2)
 10. Check if the Aggregate Amount in Row (9) Excludes Certain Shares (See Instructions)
 11. Percent of Class Represented by Amount in Row (9)
6.3%(3)
 12. Type of Reporting Person (See Instructions)
OO

- (1) Venrock Healthcare Capital Partners II, L.P., VHCP Co-Investment Holdings II, LLC, Venrock Healthcare Capital Partners III, L.P., VHCP Co-Investment Holdings III, LLC, VHCP Management II, LLC, VHCP Management III, LLC, Nimish Shah and Bong Koh are members of a group for the purposes of this Schedule 13G/A.
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- (3) This percentage is calculated based upon 36,796,846 shares of the Issuer's common stock outstanding following the closing of its public offering, as reported in the Issuer's prospectus filed with the Securities and Exchange Commission on December 12, 2019.

1. Name of Reporting Persons
VHCP Management III, LLC
 2. Check the Appropriate Box if a Member of a Group (See Instructions)
 - (a) (1)
 - (b)
 3. SEC Use Only
 4. Citizenship or Place of Organization
Delaware
- Number of Shares Beneficially Owned by Each Reporting Person With:
5. Sole Voting Power
0
 6. Shared Voting Power
2,333,975(2)
 7. Sole Dispositive Power
0
 8. Shared Dispositive Power
2,333,975(2)
9. Aggregate Amount Beneficially Owned by Each Reporting Person
2,333,975(2)
 10. Check if the Aggregate Amount in Row (9) Excludes Certain Shares (See Instructions)
 11. Percent of Class Represented by Amount in Row (9)
6.3%(3)
 12. Type of Reporting Person (See Instructions)
OO

- (1) Venrock Healthcare Capital Partners II, L.P., VHCP Co-Investment Holdings II, LLC, Venrock Healthcare Capital Partners III, L.P., VHCP Co-Investment Holdings III, LLC, VHCP Management II, LLC, VHCP Management III, LLC, Nimish Shah and Bong Koh are members of a group for the purposes of this Schedule 13G/A.
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- (3) This percentage is calculated based upon 36,796,846 shares of the Issuer's common stock outstanding following the closing of its public offering, as reported in the Issuer's prospectus filed with the Securities and Exchange Commission on December 12, 2019.

	1.	Name of Reporting Persons Shah, Nimish
	2.	Check the Appropriate Box if a Member of a Group (See Instructions)
	(a)	<input checked="" type="checkbox"/> (1)
	(b)	<input type="checkbox"/>
	3.	SEC Use Only
	4.	Citizenship or Place of Organization United States
Number of Shares Beneficially Owned by Each Reporting Person With:	5.	Sole Voting Power 0
	6.	Shared Voting Power 2,333,975(2)
	7.	Sole Dispositive Power 0
	8.	Shared Dispositive Power 2,333,975(2)
	9.	Aggregate Amount Beneficially Owned by Each Reporting Person 2,333,975(2)
	10.	Check if the Aggregate Amount in Row (9) Excludes Certain Shares (See Instructions) <input type="checkbox"/>
	11.	Percent of Class Represented by Amount in Row (9) 6.3%(3)
	12.	Type of Reporting Person (See Instructions) IN

- (1) Venrock Healthcare Capital Partners II, L.P., VHCP Co-Investment Holdings II, LLC, Venrock Healthcare Capital Partners III, L.P., VHCP Co-Investment Holdings III, LLC, VHCP Management II, LLC, VHCP Management III, LLC, Nimish Shah and Bong Koh are members of a group for the purposes of this Schedule 13G/A.
- (2) Consists of 559,326 shares owned by Venrock Healthcare Capital Partners II, L.P., 226,655 shares owned by VHCP Co-Investment Holdings II, LLC, 1,407,363 shares owned by Venrock Healthcare Capital Partners III, L.P. and 140,631 shares owned by VHCP Co-Investment Holdings III, LLC.
- (3) This percentage is calculated based upon 36,796,846 shares of the Issuer's common stock outstanding following the closing of its public offering, as reported in the Issuer's prospectus filed with the Securities and Exchange Commission on December 12, 2019.

1. Name of Reporting Persons
Koh, Bong

2. Check the Appropriate Box if a Member of a Group (See Instructions)
 - (a) (1)
 - (b)

3. SEC Use Only

4. Citizenship or Place of Organization
United States

Number of
Shares
Beneficially
Owned by
Each
Reporting
Person With:

5. Sole Voting Power
0

 6. Shared Voting Power
2,333,975(2)

 7. Sole Dispositive Power
0

 8. Shared Dispositive Power
2,333,975(2)

9. Aggregate Amount Beneficially Owned by Each Reporting Person
2,333,975(2)

10. Check if the Aggregate Amount in Row (9) Excludes Certain Shares (See Instructions)

11. Percent of Class Represented by Amount in Row (9)
6.3%(3)

12. Type of Reporting Person (See Instructions)
IN

- (1) Venrock Healthcare Capital Partners II, L.P., VHCP Co-Investment Holdings II, LLC, Venrock Healthcare Capital Partners III, L.P., VHCP Co-Investment Holdings III, LLC, VHCP Management II, LLC, VHCP Management III, LLC, Nimish Shah and Bong Koh are members of a group for the purposes of this Schedule 13G/A.
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- (3) This percentage is calculated based upon 36,796,846 shares of the Issuer's common stock outstanding following the closing of its public offering, as reported in the Issuer's prospectus filed with the Securities and Exchange Commission on December 12, 2019.

Introductory Note: This Schedule 13G/A is filed on behalf of Venrock Healthcare Capital Partners II, L.P., a limited partnership organized under the laws of the State of Delaware (“VHCP II LP”), VHCP Co-Investment Holdings II, LLC, a limited liability company organized under the laws of the State of Delaware (“VHCP Co-Investment II”), Venrock Healthcare Capital Partners III, L.P., a limited partnership organized under the laws of the State of Delaware (“VHCP III LP”), VHCP Co-Investment Holdings III, LLC, a limited liability company organized under the laws of the State of Delaware (“VHCP Co-Investment III”), VHCP Management II, LLC, a limited liability company organized under the laws of the State of Delaware (“VHCP Management II”), VHCP Management III, LLC, a limited liability company organized under the laws of the State of Delaware (“VHCP Management III” and collectively with VHCP II LP, VHCP Co-Investment II, VHCP III LP, VHCP Co-Investment III and VHCP Management II, the “Venrock Entities”), Nimish Shah (“Shah”) and Bong Koh (“Koh”) in respect of Common Stock of Axsome Therapeutics, Inc.

Item 1.

- (a) Name of Issuer
Axsome Therapeutics, Inc.

- (b) Address of Issuer’s Principal Executive Offices
200 Broadway, 3rd Floor
New York, NY 10038

Item 2.

- (a) Name of Person Filing
Venrock Healthcare Capital Partners II, L.P.
VHCP Co-Investment Holdings II, LLC
Venrock Healthcare Capital Partners III, L.P.
VHCP Co-Investment Holdings III, LLC
VHCP Management II, LLC
VHCP Management III, LLC
Nimish Shah
Bong Koh

- (b) Address of Principal Business Office or, if none, Residence

New York Office:	Palo Alto Office:
7 Bryant Park 23rd Floor New York, NY 10018	3340 Hillview Avenue Palo Alto, CA 94304

- (c) Citizenship
All of the Venrock Entities were organized in Delaware. The individuals are both United States citizens.

- (d) Title of Class of Securities
Common Stock

- (e) CUSIP Number
05464T104

Item 3. If this statement is filed pursuant to §§240.13d-1(b), or 240.13d-2(b) or (c), check whether the person filing is a:

Not applicable

Item 4. Ownership

(a) Amount beneficially owned as of December 31, 2019:

Venrock Healthcare Capital Partners II, L.P.	2,333,975 (1)
VHCP Co-Investment Holdings II, LLC	2,333,975 (1)
Venrock Healthcare Capital Partners III, L.P.	2,333,975 (1)
VHCP Co-Investment Holdings III, LLC	2,333,975 (1)
VHCP Management II, LLC	2,333,975 (1)
VHCP Management III, LLC	2,333,975 (1)
Nimish Shah	2,333,975 (1)
Bong Koh	2,333,975 (1)

(b) Percent of class as of December 31, 2019:

Venrock Healthcare Capital Partners II, L.P.	6.3 %
VHCP Co-Investment Holdings II, LLC	6.3 %
Venrock Healthcare Capital Partners III, L.P.	6.3 %
VHCP Co-Investment Holdings III, LLC	6.3 %
VHCP Management II, LLC	6.3 %
VHCP Management III, LLC	6.3 %
Nimish Shah	6.3 %
Bong Koh	6.3 %

(c) Number of shares as to which the person has, as of December 31, 2019:

(i) Sole power to vote or to direct the vote

Venrock Healthcare Capital Partners II, L.P.	0
VHCP Co-Investment Holdings II, LLC	0
Venrock Healthcare Capital Partners III, L.P.	0
VHCP Co-Investment Holdings III, LLC	0
VHCP Management II, LLC	0
VHCP Management III, LLC	0
Nimish Shah	0
Bong Koh	0

(ii) Shared power to vote or to direct the vote		
Venrock Healthcare Capital Partners II, L.P.	2,333,975	(1)
VHCP Co-Investment Holdings II, LLC	2,333,975	(1)
Venrock Healthcare Capital Partners III, L.P.	2,333,975	(1)
VHCP Co-Investment Holdings III, LLC	2,333,975	(1)
VHCP Management II, LLC	2,333,975	(1)
VHCP Management III, LLC	2,333,975	(1)
Nimish Shah	2,333,975	(1)
Bong Koh	2,333,975	(1)
(iii) Sole power to dispose or to direct the disposition of		
Venrock Healthcare Capital Partners II, L.P.	0	
VHCP Co-Investment Holdings II, LLC	0	
Venrock Healthcare Capital Partners III, L.P.	0	
VHCP Co-Investment Holdings III, LLC	0	
VHCP Management II, LLC	0	
VHCP Management III, LLC	0	
Nimish Shah	0	
Bong Koh	0	
(iv) Shared power to dispose or to direct the disposition of		
Venrock Healthcare Capital Partners II, L.P.	2,333,975	(1)
VHCP Co-Investment Holdings II, LLC	2,333,975	(1)
Venrock Healthcare Capital Partners III, L.P.	2,333,975	(1)
VHCP Co-Investment Holdings III, LLC	2,333,975	(1)
VHCP Management II, LLC	2,333,975	(1)
VHCP Management III, LLC	2,333,975	(1)
Nimish Shah	2,333,975	(1)
Bong Koh	2,333,975	(1)

- (1) These shares are owned directly as follows: 559,326 shares are owned by Venrock Healthcare Capital Partners II, L.P., 226,655 shares are owned by VHCP Co-Investment Holdings II, LLC, 1,407,363 shares are owned by Venrock Healthcare Capital Partners III, L.P. and 140,631 shares are owned by VHCP Co-Investment Holdings III, LLC. VHCP Management II, LLC is the general partner of Venrock Healthcare Capital Partners II, L.P. and the manager of VHCP Co-Investment Holdings II, LLC. VHCP Management III, LLC is the general partner of Venrock Healthcare Capital Partners III, L.P. and the manager of VHCP Co-Investment Holdings III, LLC. Messrs. Shah and Koh are the voting members of VHCP Management II, LLC and VHCP Management III, LLC.

Item 5. Ownership of Five Percent or Less of a Class

If this statement is being filed to report the fact that as of the date hereof the reporting person has ceased to be the beneficial owner of more than five percent of the class of securities, check the following .

Item 6. Ownership of More than Five Percent on Behalf of Another Person

Not Applicable

Item 7. Identification and Classification of the Subsidiary Which Acquired the Security Being Reported on By the Parent Holding Company or Control Person.

Not Applicable

Item 8. Identification and Classification of Members of the Group

Not Applicable

Item 9. Notice of Dissolution of a Group

Not Applicable

Item 10. Certification

By signing below I certify that, to the best of my knowledge and belief, the securities referred to above were not acquired and are not held for the purpose of or with the effect of changing or influencing the control of the issuer of the securities and were not acquired and are not held in connection with or as a participant in any transaction having that purpose or effect, other than activities solely in connection with a nomination under § 240.14a-11.

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.

Dated: February 14, 2020

Venrock Healthcare Capital Partners II, L.P.

By: VHCP Management II, LLC
Its: General Partner

By: /s/ David L. Stepp
Name: David L. Stepp
Its: Authorized Signatory

VHCP Co-Investment Holdings II, LLC

By: VHCP Management II, LLC
Its: Manager

By: /s/ David L. Stepp
Name: David L. Stepp
Its: Authorized Signatory

VHCP Management II, LLC

By: /s/ David L. Stepp
Name: David L. Stepp
Its: Authorized Signatory

Nimish Shah

By: /s/ David L. Stepp
David L. Stepp, as attorney-in-fact

Venrock Healthcare Capital Partners III, L.P.

By: VHCP Management III, LLC
Its: General Partner

By: /s/ David L. Stepp
Name: David L. Stepp
Its: Authorized Signatory

VHCP Co-Investment Holdings III, LLC

By: VHCP Management III, LLC
Its: Manager

By: /s/ David L. Stepp
Name: David L. Stepp
Its: Authorized Signatory

VHCP Management III, LLC

By: /s/ David L. Stepp
Name: David L. Stepp
Its: Authorized Signatory

Bong Koh

By: /s/ David L. Stepp
David L. Stepp, as attorney-in-fact

EXHIBITS

A: Joint Filing Agreement (incorporated by reference to Exhibit A to Schedule 13G filed January 28, 2019)

B: Power of Attorney for Nimish Shah (incorporated by reference to Exhibit B to Schedule 13G filed January 28, 2019)

C: Power of Attorney for Bong Koh (incorporated by reference to Exhibit C to Schedule 13G filed January 28, 2019)