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

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SCHEDULE 13G

Under the Securities Exchange Act of 1934

(Amendment No. )\*

TAYSHA GENE THERAPIES, INC.

(Name of Issuer)

Common Stock, \$0.00001 par value per share

(Title of Class of Securities)

877619106

(CUSIP Number)

August 16, 2023

(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).

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<b>1</b>	NAMES OF REPORTING PERSONS I.R.S. IDENTIFICATION NOS. OF ABOVE PERSONS (ENTITIES ONLY)  RA Capital Management, L.P.	
<b>2</b>	CHECK THE APPROPRIATE BOX IF A MEMBER OF A GROUP (SEE INSTRUCTIONS) (a) <input type="checkbox"/> (b) <input type="checkbox"/>	
<b>3</b>	SEC USE ONLY	
<b>4</b>	CITIZENSHIP OR PLACE OF ORGANIZATION  Delaware	
NUMBER OF SHARES BENEFICIALLY OWNED BY EACH REPORTING PERSON WITH:	<b>5</b>	SOLE VOTING POWER  0
	<b>6</b>	SHARED VOTING POWER  18,690,868
	<b>7</b>	SOLE DISPOSITIVE POWER  0
	<b>8</b>	SHARED DISPOSITIVE POWER  18,690,868
<b>9</b>	AGGREGATE AMOUNT BENEFICIALLY OWNED BY EACH REPORTING PERSON  18,690,868	
<b>10</b>	CHECK BOX IF THE AGGREGATE AMOUNT IN ROW (9) EXCLUDES CERTAIN SHARES (SEE INSTRUCTIONS) <input type="checkbox"/>	
<b>11</b>	PERCENT OF CLASS REPRESENTED BY AMOUNT IN ROW 9  9.99%	
<b>12</b>	TYPE OF REPORTING PERSON (SEE INSTRUCTIONS)  IA, PN	

<b>1</b>	NAMES OF REPORTING PERSONS I.R.S. IDENTIFICATION NOS. OF ABOVE PERSONS (ENTITIES ONLY)  Peter Kolchinsky	
<b>2</b>	CHECK THE APPROPRIATE BOX IF A MEMBER OF A GROUP (SEE INSTRUCTIONS) (a) <input type="checkbox"/> (b) <input type="checkbox"/>	
<b>3</b>	SEC USE ONLY	
<b>4</b>	CITIZENSHIP OR PLACE OF ORGANIZATION  United States of America	
NUMBER OF SHARES BENEFICIALLY OWNED BY EACH REPORTING PERSON WITH:	<b>5</b>	SOLE VOTING POWER  0
	<b>6</b>	SHARED VOTING POWER  18,690,868
	<b>7</b>	SOLE DISPOSITIVE POWER  0
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<b>11</b>	PERCENT OF CLASS REPRESENTED BY AMOUNT IN ROW 9  9.99%	
<b>12</b>	TYPE OF REPORTING PERSON (SEE INSTRUCTIONS)  IN, HC	

<b>1</b>	NAMES OF REPORTING PERSONS I.R.S. IDENTIFICATION NOS. OF ABOVE PERSONS (ENTITIES ONLY)  Rajeev Shah	
<b>2</b>	CHECK THE APPROPRIATE BOX IF A MEMBER OF A GROUP (SEE INSTRUCTIONS) (a) <input type="checkbox"/> (b) <input type="checkbox"/>	
<b>3</b>	SEC USE ONLY	
<b>4</b>	CITIZENSHIP OR PLACE OF ORGANIZATION  United States of America	
NUMBER OF SHARES BENEFICIALLY OWNED BY EACH REPORTING PERSON WITH:	<b>5</b>	SOLE VOTING POWER  0
	<b>6</b>	SHARED VOTING POWER  18,690,868
	<b>7</b>	SOLE DISPOSITIVE POWER  0
	<b>8</b>	SHARED DISPOSITIVE POWER  18,690,868
<b>9</b>	AGGREGATE AMOUNT BENEFICIALLY OWNED BY EACH REPORTING PERSON  18,690,868	
<b>10</b>	CHECK BOX IF THE AGGREGATE AMOUNT IN ROW (9) EXCLUDES CERTAIN SHARES (SEE INSTRUCTIONS) <input type="checkbox"/>	
<b>11</b>	PERCENT OF CLASS REPRESENTED BY AMOUNT IN ROW 9  9.99%	
<b>12</b>	TYPE OF REPORTING PERSON (SEE INSTRUCTIONS)  IN, HC	

<b>1</b>	NAMES OF REPORTING PERSONS I.R.S. IDENTIFICATION NOS. OF ABOVE PERSONS (ENTITIES ONLY)  RA Capital Healthcare Fund, L.P.	
<b>2</b>	CHECK THE APPROPRIATE BOX IF A MEMBER OF A GROUP (SEE INSTRUCTIONS) (a) <input type="checkbox"/> (b) <input type="checkbox"/>	
<b>3</b>	SEC USE ONLY	
<b>4</b>	CITIZENSHIP OR PLACE OF ORGANIZATION  Delaware	
NUMBER OF SHARES BENEFICIALLY OWNED BY EACH REPORTING PERSON WITH:	<b>5</b>	SOLE VOTING POWER  0
	<b>6</b>	SHARED VOTING POWER  18,690,868
	<b>7</b>	SOLE DISPOSITIVE POWER  0
	<b>8</b>	SHARED DISPOSITIVE POWER  18,690,868
<b>9</b>	AGGREGATE AMOUNT BENEFICIALLY OWNED BY EACH REPORTING PERSON  18,690,868	
<b>10</b>	CHECK BOX IF THE AGGREGATE AMOUNT IN ROW (9) EXCLUDES CERTAIN SHARES (SEE INSTRUCTIONS) <input type="checkbox"/>	
<b>11</b>	PERCENT OF CLASS REPRESENTED BY AMOUNT IN ROW 9  9.99%	
<b>12</b>	TYPE OF REPORTING PERSON (SEE INSTRUCTIONS)  PN	

**Item 1(a). Name of Issuer:**

Taysha Gene Therapies, Inc. (the “Issuer”)

**Item 1(b). Address of Issuer’s Principal Executive Offices:**

3000 Pegasus Park Drive, Suite 1430, Dallas, Texas

**Item 2(a). Names of Persons Filing:**

The names of the persons filing this report (collectively, the “Reporting Persons”) are:

RA Capital Management, L.P. (“RA Capital”)

Peter Kolchinsky

Rajeev Shah

RA Capital Healthcare Fund, L.P. (the “Fund”)

**Item 2(b). Address of Principal Business Office or, if None, Residence:**

The address of the principal business office of each of the Reporting Persons is:

c/o RA Capital Management, L.P., 200 Berkeley Street, 18<sup>th</sup> Floor, Boston MA 02116

**Item 2(c). Citizenship:**

RA Capital and the Fund are Delaware limited partnerships. Dr. Kolchinsky and Mr. Shah are United States citizens.

**Item 2(d). Title of Class of Securities:**

Common Stock, \$0.00001 par value per share

**Item 2(e). CUSIP Number:**

877619106

**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.**

The Fund directly holds (i) 18,472,503 shares of Common Stock and (ii) 42,638,607 pre-funded warrants (“Warrants”) through which it has the right to acquire 42,638,607 shares of Common Stock during the exercise period (as defined in the Warrants). The Warrants are subject to a Beneficial Ownership Blocker (as defined below).

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The shares reported herein for the Reporting Persons represent (i) 18,472,503 shares of Common Stock and (ii) 218,365 shares of Common Stock that the Reporting Persons beneficially own based on the right to acquire, upon the exercise of the Warrants. The Warrants may be exercised as Common Stock at the election of the holder, except that the agreement governing the terms of the exercise of the Warrants contains a provision (the “Beneficial Ownership Blocker”) which precludes the exercise of the Warrants to the extent that, following the exercise, the holder, together with its affiliates and any other person acting together with the holder as a “group” (as defined in the rules under the Securities Exchange Act of 1934 (the “Act”)), would beneficially own more than 9.99% of the Common Stock shares outstanding.

The Reporting Persons are currently prohibited from exercising the Warrants to the extent that the exercise would result in beneficial ownership of more than 18,690,868 shares of Common Stock by the Reporting Persons.

The information required by this item with respect to each Reporting Person is set forth in Rows 5 through 9 and 11 of the cover page to this Schedule 13G. The beneficial ownership percentages reported are based on the equivalent of (i) 64,465,037 outstanding shares of Common Stock, as reported in the Issuer’s Form 10-Q filed with the Securities and Exchange Commission on August 14, 2023, plus (ii) 122,412,376 shares of Common Stock issued in the private placement of equity securities by the Issuer that closed on August 16, 2023, plus (iii) 218,365 shares of Common Stock of which the Reporting Persons may currently acquire beneficial ownership upon the exercise of the Warrant, as limited by the Beneficial Ownership Blocker.

RA Capital Healthcare Fund GP, LLC is the general partner of the 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 the 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. The Fund has delegated to RA Capital the sole power to vote and the sole power to dispose of all securities held in the Fund’s portfolio, including the shares of the Issuer’s Common Stock reported herein. Because the Fund has divested voting and investment power over the reported securities it holds and may not revoke that delegation on less than 61 days’ notice, the Fund disclaims beneficial ownership of the securities it holds for purposes of 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 13G other than for the purpose of determining their obligations under Section 13(d) of the Act, and the filing of this Schedule 13G 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.

**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 Persons have 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.

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**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 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.

**Exhibit List**

Exhibit 1: Joint Filing Agreement

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SIGNATURE

After reasonable inquiry and to the best of its knowledge and belief, each of the undersigned certifies that the information set forth in this statement is true, complete and correct.

Date: August 25, 2023

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

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AGREEMENT

This Joint Filing Agreement, dated as of August 25, 2023, 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, \$0.00001 par value per share of Taysha Gene Therapies, 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

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