UNITED STATES SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 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) December 20, 2013

GTx, Inc.

(Exact name of registrant as specified in its charter)

Delaware000-5054962-1715807(State or other jurisdiction of incorporation or organization)(Commission incorporation or organization)(I.R.S. Employer incorporation incorpor

175 Toyota Plaza
7th Floor
Memphis, Tennessee
(Address of principal executive offices)

38103

(Zip Code)

Registrant's telephone number, including area code: (901) 523-9700

(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):

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

Item 5.02 Departure of Directors or Certain Officers; Election of Directors; Appointment of Certain Officers; Compensatory Arrangements of Certain Officers.

Executive Severance Arrangements

As previously disclosed, Mark E. Mosteller, the Company's Vice President, Chief Financial Officer and Treasurer, notified GTx, Inc. ("GTx" or the "Company") of his intent to resign from the Company, effective December 31, 2013. Mr. Mosteller currently serves as the Company's principal financial and accounting officer. On December 20, 2013, the Compensation Committee of the Company's Board of Directors (the "Compensation Committee") approved the provision of certain severance benefits to Mr. Mosteller in connection with Mr. Mosteller's impending resignation and in consideration of Mr. Mosteller entering into a severance and release agreement with GTx (such agreement, the "Severance Agreement"). As approved by the Compensation Committee, these severance benefits consist of: (i) a lump sum severance payment equal to nine months of Mr. Mosteller's base salary as currently in effect; (ii) an additional severance payment equal to \$14,000, which is intended to offset the loss of Company benefits by Mr. Mosteller in connection with his resignation; (iii) the acceleration of all outstanding unvested stock options held by Mr. Mosteller such that all of such outstanding unvested stock options will become fully vested and exercisable as of December 31, 2013; and (iv) the extension of the post-termination exercise period applicable to all of Mr. Mosteller's outstanding stock options through December 31, 2015, subject in each case to the earlier expiration of the original term of the applicable stock option (such benefits, the "Severance Benefits").

The Company expects to enter into the Severance Agreement with Mr. Mosteller that provides for the foregoing Severance Benefits in due course. The foregoing summary of the Severance Benefits does not purport to be complete and is subject to, and qualified in its entirety by, the full text of the Severance Agreement that will be filed as an exhibit to the Company's Annual Report on Form 10-K for the year ending December 31, 2013.

Officer Appointments

Appointment of Principal Financial Officer. On December 20, 2013, Marc S. Hanover, the Company's current President and Chief Operating Officer, was appointed as the Company's acting principal financial officer, effective December 31, 2013. Mr. Hanover will continue to serve as the Company's

President and Chief Operating Officer. Mr. Hanover, age 51, is a co-founder of GTx and has served as the Company's President and Chief Operating Officer since GTx's inception in September 1997. Mr. Hanover also served as a member of the Company's Board of Directors until August 2011. Prior to joining GTx, Mr. Hanover was a founder of Equity Partners International, Inc., a private equity firm in Memphis, Tennessee, and participated as a founder and investor in three healthcare companies. From 1985 to 1997, Mr. Hanover was a Senior Vice President and a member of the Executive Management Committee of National Bank of Commerce in Memphis, Tennessee. Mr. Hanover holds a B.S. in Biology from the University of Memphis and a MBA in Finance from the University of Memphis. For a description of Mr. Hanover's compensatory arrangements with the Company, including a description of the indemnity agreement between the Company and Mr. Hanover, see (i) "Compensation Discussion and Analysis," "Executive Compensation" and "Certain Relationships and Related Party Transactions—Certain Transactions With or Involving Related Persons—Indemnity Agreements" in the Company's definitive proxy statement on Schedule 14A, filed with the Securities and Exchange Commission on March 15, 2013 (the "Proxy Statement") and (ii) the Company's current report on Form 8-K, filed with the Securities and Exchange Commission on October 1, 2013, under "Item 5.02 Departure of Directors or Certain Officers; Election of Directors; Appointment of Certain Officers; Compensatory Arrangements of Certain Officers—Executive Compensation Arrangements." There were no new compensatory arrangements or modifications to existing compensatory arrangements nor were there any grants or awards made to Mr. Hanover in connection with his appointment as the Company's acting principal financial officer.

Appointment of Principal Accounting Officer. On December 20, 2013, Jason T. Shackelford, the Company's current Corporate Controller and Director of Accounting, was appointed as the Company's acting principal accounting officer, effective December 31, 2013. Mr. Shackelford, age 38, has served as GTx's Corporate Controller and Director of Accounting since July 2007. Prior to joining GTx, Mr.

2

Shackelford was a Senior Audit Manager at KPMG LLP. Mr. Shackelford is a Certified Public Accountant and holds a Bachelor of Business Administration and Master of Accountancy from the University of Mississippi.

Effective October 1, 2013, GTx entered into an at-will employment agreement with Mr. Shackelford (the "Shackelford Employment Agreement"). Under the Shackelford Employment Agreement, Mr. Shackelford's annual base salary of \$178,010, which was effective as of January 1, 2013, will continue at that level, and he will continue to be eligible to participate in the Company's benefit plans available to all employees, including the Company's 2013 Equity Incentive Plan (the "2013 EIP"), which 2013 EIP is described in the Proxy Statement under "Proposal No. 3—Approval of the GTx, Inc. 2013 Equity Incentive Plan," and any performance bonus award program for employees that may be re-instated by GTx. Under the Shackelford Employment Agreement, in the event that Mr. Shackelford's employment without "cause" or he voluntarily resigns for "good reason," each as defined in the Shackelford Employment Agreement, within 12 months following specified change of control transactions, he will be entitled to receive cash severance payments equal to six months' of his base salary and monthly premium payments to continue his health insurance coverage for up to six months following his employment termination, in each case subject to certain conditions, including Mr. Shackelford's compliance with the confidentiality provisions of the Shackelford Employment Agreement and the non-competition provisions of Shackelford Employment Agreement for a period of one year following termination.

Mr. Shackelford is also a party to an indemnity agreement with GTx, as described under "Certain Relationships and Related Party Transactions—Certain Transactions With or Involving Related Persons—Indemnity Agreements" in the Proxy Statement.

Pursuant to a Retention Bonus Program approved by the Compensation Committee on September 27, 2013 and Mr. Shackelford's individual Retention Benefits Agreement with GTx (the "Shackelford Retention Agreement"), Mr. Shackelford will be entitled to a cash retention bonus equal to 50% of his then current base salary if Mr. Shackelford remains an employee of GTx through the earlier to occur of (i) the end of business on May 31, 2014, (ii) an involuntary termination of employment by the Company (excluding a termination for cause (as defined in the Shackelford Retention Agreement) or a voluntary resignation) (a "Qualifying Termination"), and (iii) a change of control of GTx (as defined in the Shackelford Retention Agreement). In addition, if Mr. Shackelford's service continues through the end of business on May 31, 2014 and thereafter such service is terminated for any reason (other than for cause, as defined in the Shackelford Retention Agreement), including a voluntary termination, then Mr. Shackelford will be entitled to monthly premium payments from GTx to continue his health insurance coverage through December 31, 2014 (or, if earlier, the date on which Mr. Shackelford becomes eligible for coverage under the group health insurance of a subsequent employer or is otherwise no longer eligible for such continued coverage). In addition, if Mr. Shackelford's service is terminated by the Company prior to June 1, 2014 for any reason (other than for cause, as defined in the Shackelford Retention Agreement), then Mr. Shackelford will be entitled to the monthly premium payments described in the preceding sentence. No such health insurance coverage benefits will be provided to Mr. Shackelford if he voluntarily resigns prior to June 1, 2014. The Shackelford Retention Agreement also provides that each outstanding stock option then held by Mr. Shackelford and previously granted to Mr. Shackelford under GTx's equity compensation plans will be modified to provide that if Mr. Shackelford's service continues through the earlier to occur of (i) the end of business on May 31, 2014, and (ii) a Qualifying Termination (the "Determination Date"), then, as of the Determination Date: (i) an additional number of shares subject to such option will immediately vest as Mr. Shackelford's service had continued through January 1, 2015 and (ii) the period during which the vested portion of such option will generally expire will be extended from 90 days to six months after Mr. Shackelford's termination of service (subject to further extension under certain circumstances per the original terms of the stock option awards), subject in each case to the earlier expiration of the original term of the applicable stock option award. Mr. Shackelford currently holds stock options to purchase an aggregate of 193,000 shares of GTx common stock, at a weighted average exercise price of \$5.72 per share, that were previously granted to Mr. Shackelford under GTx's equity compensation plans. Other than with respect to the Retention Option (as defined below), these stock options generally have a term of ten years and vest over a five year period, subject to continued service with GTx and the change in control vesting acceleration and extended post-termination exercise period benefits under the terms of the applicable GTx equity compensation plan and

3

the Shackelford Retention Agreement. In connection with the adoption of the Retention Bonus Program, on October 1, 2013, Mr. Shackelford was granted a stock option to purchase 50,000 shares of GTx common stock (the "Retention Option") at an exercise price of \$1.88 per share, and a restricted stock unit covering 50,000 shares of GTx common stock, in each case under the 2013 EIP (such awards, together, the "Retention Grants"). Each of the Retention Grants will vest in full on the earlier to occur of (i) June 1, 2014, (ii) an involuntary termination of Mr. Shackelford's continuous service by the Company other than for cause (as defined in the applicable form of award agreement) and (iii) a change of control of GTx (as defined in the applicable form of award agreement), except that vesting will not occur in the event of a voluntary resignation or involuntary termination for cause occurring prior to any of these events. As a general matter, the vested portion of the Retention Option will expire six months after Mr. Shackelford's last day of service. The foregoing is only a brief description of the material terms of Mr. Shackelford's benefits under Retention Bonus Program, does not purport to be complete, and is qualified in its entirety by reference to (i) the form of retention benefits agreement that was filed as Exhibit 10.2 to the Company's quarterly report on Form 10-Q for the quarterly period ended September 30, 2013, (ii) the 2013 EIP, previously filed as Exhibit 99.1 to the Company's registration statement on Form S-8 (File No. 333-188377) filed on May 6, 2013, (iii) the form of stock option grant notice and form of stock option agreement that was filed as Exhibit 10.3 to the

Company's quarterly report on Form 10-Q for the quarterly period ended September 30, 2013, and (iv) the form of restricted stock unit grant notice and form of restricted stock unit award agreement that was filed as Exhibit 10.4 to the Company's quarterly report on Form 10-Q for the quarterly period ended September 30, 2013.

There were no new compensatory arrangements or modifications to existing compensatory arrangements nor were there any grants or awards made to Mr. Shackelford in connection with his appointment as the Company's acting principal accounting officer.

4

SIGNATURES

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.

GTx, Inc.

Date: December 23, 2013 By: /s/ Henry P. Doggrell

Name: Henry P. Doggrell

Title: Vice President, Chief Legal Officer

and Secretary