

5,552,440 Shares

**ACELRX PHARMACEUTICALS, INC.**

**Common Stock**

This prospectus supplement updates and amends certain information contained in the prospectus dated July 3, 2012, or the prospectus, relating to the offer and sale from time to time by certain selling stockholders of up to 5,552,440 shares of our common stock, which includes 2,630,103 shares of our common stock issuable upon the exercise of warrants to purchase common stock, that were previously issued by us in a private placement on May 29, 2012, or the 2012 private placement.

This prospectus supplement should be read in conjunction with the prospectus, and is qualified by reference to the prospectus, except to the extent that the information presented herein supersedes the information contained in the prospectus. This prospectus supplement is not complete without, and may only be delivered or utilized in connection with, the prospectus, including any amendments or supplements thereto.

**Investing in our common stock involves a high degree of risk. See “Risk Factors” beginning on page 3 of the prospectus as well as the section entitled “Risk Factors” included in our most recent annual report on Form 10-K and in our most recent quarterly report on Form 10-Q, as well as any amendments thereto, as filed with the Securities and Exchange Commission.**

**NEITHER THE SECURITIES AND EXCHANGE COMMISSION NOR ANY STATE SECURITIES COMMISSION HAS APPROVED OR DISAPPROVED OF THESE SECURITIES OR PASSED UPON THE ACCURACY OR ADEQUACY OF THIS PROSPECTUS SUPPLEMENT OR THE PROSPECTUS TO WHICH IT RELATES. ANY REPRESENTATION TO THE CONTRARY IS A CRIMINAL OFFENSE.**

The date of this prospectus supplement is June 14, 2013

### Selling Stockholders

The following information is provided to supplement the table of selling stockholders contained on pages 16 and 17 of the prospectus to reflect the addition of a selling stockholder not previously listed in the prospectus. This information was furnished to us by the selling stockholder listed below on June 12, 2013. The selling stockholder listed below has not, within the past three years, had any position, office or other material relationship with us.

<u>Security Holder</u>	<u>Shares of Common Stock Beneficially Owned Prior to Offering(1)</u>		<u>Number of Shares Being Offered</u>	<u>Shares of Common Stock Beneficially Owned After Offering(1)</u>	
	<u>Number</u>	<u>Percent</u>		<u>Number</u>	<u>Percent</u>
OTA LLC(2) One Manhattanville Road Purchase, NY 10577	1,058,824(3)	2.8%	1,058,824(3)	—	—

- (1) The amounts set forth in these columns consist of shares of our common stock beneficially owned by the selling stockholder as of June 12, 2013 (inclusive of the shares that the selling stockholder has the right to acquire within 60 days of such date through the exercise of any options, warrants or other rights). Percentages are based on 37,252,905 shares of common stock outstanding on June 12, 2013.
- (2) The selling stockholder has identified itself as a registered broker-dealer. The selling stockholder has represented to us that it acquired the warrants originally issued in the 2012 private placement in the ordinary course of business and, at the time of acquisition of such warrants, the selling stockholder had no agreements or understandings, directly or indirectly, with any other person to distribute such warrants or the shares of common stock issuable upon exercise thereof.
- (3) Consists solely of shares of common stock underlying warrants we originally issued in the 2012 private placement, which warrants were subsequently transferred to the selling stockholder. Ira M. Leventhal has sole voting and investment power over the shares listed above.