

**PROSPECTUS SUPPLEMENT NO. 5
TO THE PROSPECTUS DATED APRIL 3, 2014
AS SUPPLEMENTED BY PROSPECTUS SUPPLEMENT NOS. 1, 2, 3 and 4
DATED APRIL 4, APRIL 24, MAY 5, AND MAY 12, 2014**

Aastrom Bioscience, Inc.

This Prospectus Supplement No. 5 updates, amends and supplements our Prospectus dated April 3, 2014, as amended and supplemented by Prospectus Supplement No.1 dated April 4, 2014, Prospectus Supplement No. 2 dated April 24, 2014, Prospectus Supplement No. 3 dated May 5, 2014, and Prospectus Supplement No. 4 dated May 12, 2014 (collectively, the "Prospectus"), which forms a part of our Registration Statement on Form S-1 (Registration No. 333-193861).

We incorporated by reference into this Prospectus Supplement No. 5 the Current Report on Form 8-K of Aastrom Biosciences, Inc. filed with the Securities and Exchange Commission on May 12, 2014.

This Prospectus Supplement No. 5 should be read in conjunction with the Prospectus. To the extent information in this Prospectus Supplement No. 5 differs from, updates or conflicts with information contained in the Prospectus, the information in this Prospectus Supplement No. 5 is the more current information.

Investing in our common stock involves a high degree of risk. You should review carefully the "Risk Factors" beginning on page 10 of the Prospectus dated April 3, 2014 for a discussion of certain risks that you should consider.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or passed upon the adequacy or accuracy of this prospectus supplement. Any representation to the contrary is a criminal offense.

The date of this prospectus supplement is May 16, 2014.

INCORPORATION BY REFERENCE

This prospectus incorporates by reference important business and financial information that we file with the SEC and that we are not including in or delivering with this prospectus. As the SEC allows, incorporated documents are considered part of this prospectus, and we can disclose important information to you by referring you to those documents. We incorporate by reference the documents listed below:

- our current reports on Form 8-K, filed with the SEC on April 1, 2014, April 23, 2014, May 1, 2014, May 9, 2014 and May 12, 2014, respectively (excluding any information furnished in such reports under Item 2.02, Item 7.01 or Item 9.01);
- the description of the rights to purchase shares of our Series A Junior Participating Cumulative Preferred Stock contained in the Registration Statement on Form 8-A, filed with the SEC on August 12, 2011, including any amendment or report for the purpose of updating such description; and
- the description of our common stock contained in our registration statements on Form S-1, filed with the SEC on November 1, 1996, filed with the SEC on including any amendment or report filed for the purpose of updating such description.

Pursuant to Rule 412 under the Securities Act, any statement contained in a document incorporated or deemed to be incorporated by reference into this prospectus will be deemed to be modified or superseded for purposes of this prospectus to the extent that a statement contained in this prospectus or any other subsequently filed document that is deemed to be incorporated by reference into this prospectus modifies or supersedes the statement. Any statement so modified or superseded will not be deemed, except as so modified or superseded, to constitute a part of this prospectus.

You may request a copy of any or all of these filings, at no cost, by writing to us at: Aastrom Biosciences, Inc., 24 Frank Lloyd Wright Drive, Lobby K, Ann Arbor, Michigan 48105, Attention: Investor Relations, or by telephoning us at (734) 418-4400. These filings may also be obtained through our website located at <http://www.aastrom.com>. The reference to our website is intended to be an inactive textual reference and, except for the documents incorporated by reference as noted above, the information on, or accessible through, our website is not intended to be part of this prospectus.

You should rely only on the information incorporated by reference or provided in this prospectus or any supplement. We have not authorized anyone else to provide you with different information. You should not assume that information in this prospectus or any supplement is accurate as of any date other than the date on the front of these documents.

We advise that there have been no material changes in our affairs that have occurred since the end of the latest fiscal period for which audited financial statements were included in the latest Form 10-K and that have not been described in a Form 8-K filed under the Exchange Act.
