

ALNYLAM PHARMACEUTICALS, INC.
 Form S-8
 February 18, 2011

As filed with the Securities and Exchange Commission on February 18, 2011

Registration No. 333- _____

**UNITED STATES
 SECURITIES AND EXCHANGE COMMISSION
 Washington, D.C. 20549
 FORM S-8
 REGISTRATION STATEMENT UNDER
 THE SECURITIES ACT OF 1933
 Alnylam Pharmaceuticals, Inc.
 (Exact Name of Registrant as Specified in Its Charter)**

Delaware
 (State or Other Jurisdiction of
 Incorporation or Organization)

77-0602661
 (I.R.S. Employer
 Identification No.)

300 Third Street
Cambridge, Massachusetts
 (Address of Principal Executive Offices)

02142
 (Zip Code)

2004 Employee Stock Purchase Plan, as amended
 (Full Title of the Plan)

John M. Maraganore, Ph.D.
Chief Executive Officer
Alnylam Pharmaceuticals, Inc.

300 Third Street
Cambridge, Massachusetts 02142
 (Name and Address of Agent For Service)

(617) 551-8200

(Telephone Number, Including Area Code, of Agent For Service)

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or a smaller reporting company. See the definitions of large accelerated filer, accelerated filer and smaller reporting company in Rule 12b2 of the Exchange Act.

Large accelerated filer Accelerated filer Non-accelerated filer Smaller reporting company
 (Do not check if a smaller reporting company)

CALCULATION OF REGISTRATION FEE

Title of Securities to be	Amount to be	Proposed Maximum Offering Price Per	Proposed Maximum Aggregate Offering	Amount of Registration Fee
Registered Common Stock (including associated Series A Junior	Registered (1) 400,000 shares (2)	Share (3) \$ 10.00	Price (3) \$4,000,000	Fee \$ 465

Participating Preferred Stock
Rights), \$0.01 par value per share

- (1) In accordance with Rule 416 under the Securities Act of 1933, as amended (the Securities Act), this registration statement shall be deemed to cover any additional securities that may from time to time be offered or issued to prevent dilution resulting from stock splits, stock dividends or similar transactions.
 - (2) Consists of 400,000 shares issuable under the 2004 Employee Stock Purchase Plan, as amended, pursuant to the terms of such plan.
 - (3) Estimated solely for the purpose of calculating the registration fee pursuant to Rules 457(c) and 457(h) of the Securities Act and based upon the average of the high and low prices of the Registrant's Common Stock as reported on the NASDAQ Global Market on February 16, 2011.
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STATEMENT OF INCORPORATION BY REFERENCE

This Registration Statement on Form S-8 incorporates by reference the contents of the Registration Statement on Form S-8, File No. 333-116151, filed by the Registrant on June 3, 2004 relating to the Registrant's 2004 Stock Employee Stock Purchase Plan.

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SIGNATURES

Pursuant to the requirements of the Securities Act of 1933, the registrant certifies that it has reasonable grounds to believe that it meets all of the requirements for filing on Form S-8 and has duly caused this registration statement to be signed on its behalf by the undersigned, thereunto duly authorized, in the City of Cambridge, Commonwealth of Massachusetts, on this 18th day of February, 2011.

ALNYLAM PHARMACEUTICALS, INC.

By: /s/ John M. Maraganore, Ph.D.
John M. Maraganore, Ph.D.
Chief Executive Officer

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POWER OF ATTORNEY AND SIGNATURES

We, the undersigned officers and directors of Alnylam Pharmaceuticals, Inc., hereby severally constitute and appoint John M. Maraganore and Patricia L. Allen, and each of them singly, our true and lawful attorneys with full power to them, and each of them singly, to sign for us and in our names in the capacities indicated below, the registration statement on Form S-8 filed herewith and any and all subsequent amendments to said registration statement, and generally to do all such things in our names and on our behalf in our capacities as officers and directors to enable Alnylam Pharmaceuticals, Inc. to comply with the provisions of the Securities Act of 1933, and all requirements of the Securities and Exchange Commission, hereby ratifying and confirming our signatures as they may be signed by our said attorneys, or any of them, to said registration statement and any and all amendments thereto.

Pursuant to the Securities Act of 1933, this registration statement has been signed by the following persons in the capacities and on the dates indicated.

Signature	Title	Date
/s/ John M. Maraganore, Ph.D. John M. Maraganore, Ph.D.	Director and Chief Executive Officer (Principal Executive Officer)	February 18, 2011
/s/ Patricia L. Allen Patricia L. Allen	Vice President of Finance and Treasurer (Principal Financial and Accounting Officer)	February 18, 2011
/s/ John K. Clarke John K. Clarke	Director	February 18, 2011
/s/ Victor J. Dzau, M.D. Victor J. Dzau, M.D.	Director	February 18, 2011
/s/ Marsha H. Fanucci Marsha H. Fanucci	Director	February 18, 2011
/s/ Steven M. Paul, M.D. Steven M. Paul, M.D.	Director	February 18, 2011
/s/ Vicki L. Sato, Ph.D. Vicki L. Sato, Ph.D.	Director	February 16, 2011
/s/ Paul R. Schimmel, Ph.D. Paul R. Schimmel, Ph.D.	Director	February 11, 2011
/s/ Phillip A. Sharp, Ph.D.	Director	February 18, 2011

Phillip A. Sharp, Ph.D.

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Signature	Title	Date
/s/ Kevin P. Starr	Director	February 18, 2011
Kevin P. Starr		

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INDEX TO EXHIBITS

Number	Description
4.1	Restated Certificate of Incorporation of the Registrant (filed as Exhibit 3.1 to the Registrant's Quarterly Report on Form 10-Q on August 11, 2005 (File No. 000-50743) and incorporated herein by reference)
4.2	Amended and Restated Bylaws of the Registrant (filed as Exhibit 3.4 to the Registrant's Registration Statement on Form S-1/A, as amended, on April 6, 2004 (File No. 333-113162) and incorporated herein by reference)
4.3	Rights Agreement dated July 13, 2005 between the Registrant and EquiServe Trust Company, N.A., as Rights Agent (filed as Exhibit 4.1 to the Registrant's Current Report of Form 8-K on July 14, 2005 (File No. 000-50743) and incorporated herein by reference)
5.1	Opinion of Wilmer Cutler Pickering Hale and Dorr LLP, counsel to the Registrant
23.1	Consent of Wilmer Cutler Pickering Hale and Dorr LLP (included in Exhibit 5.1)
23.2	Consent of PricewaterhouseCoopers LLP, Independent Registered Public Accounting Firm
23.3	Consent of Ernst & Young LLP, Independent Auditors of Regulus Therapeutics Inc.
24	Power of Attorney (included on the signature page of this registration statement)
99.1	2004 Employee Stock Purchase Plan, as amended, of the Registrant (filed as Appendix A to the Registrant's Definitive Proxy Statement on Schedule 14A filed on April 20, 2010 (File No. 000-50743) and incorporated herein by reference)