Greene Barry E Form 4 December 10, 2010

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

STATEMENT OF CHANGES IN BENEFICIAL OWNERSHIP OF

SECURITIES

2. Issuer Name and Ticker or Trading

OMB APPROVAL

OMB Number:

3235-0287

Expires:

January 31, 2005

0.5

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if no longer subject to Section 16. Form 4 or Form 5

obligations

Check this box

may continue.

Filed pursuant to Section 16(a) of the Securities Exchange Act of 1934, Section 17(a) of the Public Utility Holding Company Act of 1935 or Section 30(h) of the Investment Company Act of 1940

1(b).

(Print or Type Responses)

See Instruction

1. Name and Address of Reporting Person *

Greene Barry E

ALNYLAM PHARMACEUTICALS, INC.

[ALNY] 3. Date of Earliest Transaction

(Last) (First) (Middle)

C/O ALNYLAM PHARMACEUTICALS, INC, 300

THIRD STREET

(State)

(Street)

4. If Amendment, Date Original

Symbol

Filed(Month/Day/Year)

(Month/Day/Year)

12/08/2010

5. Relationship of Reporting Person(s) to

Issuer

(Check all applicable)

Director 10% Owner X_ Officer (give title Other (specify below)

President and COO

6. Individual or Joint/Group Filing(Check

Applicable Line)

X Form filed by One Reporting Person Form filed by More than One Reporting

Table I - Non-Derivative Securities Acquired, Disposed of, or Beneficially Owned

CAMBRIDGE, MA 02142

1. Title of 2. Transaction Date 2A. Deemed Security (Month/Day/Year) Execution Date, if (Instr. 3)

(Month/Day/Year)

(Zip)

3. 4. Securities TransactionAcquired (A) or Code Disposed of (D) (Instr. 8) (Instr. 3, 4 and 5)

(A)

5. Amount of Securities Beneficially Owned Following Reported Transaction(s) (Instr. 3 and 4)

6. Ownership 7. Nature of Form: Direct Indirect (D) or Beneficial Indirect (I) Ownership (Instr. 4) (Instr. 4)

Code V Amount (D) Price

or

Common Stock

(City)

1,303 Ι Managed Account (1)

Reminder: Report on a separate line for each class of securities beneficially owned directly or indirectly.

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SEC 1474 (9-02)

by

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Table II - Derivative Securities Acquired, Disposed of, or Beneficially Owned (e.g., puts, calls, warrants, options, convertible securities)

1. Title of Derivative Security (Instr. 3)	2. Conversion or Exercise Price of Derivative Security	3. Transaction Date (Month/Day/Year)	3A. Deemed Execution Date, if any (Month/Day/Year)	4. Transaction Code (Instr. 8)	5. Number of orDerivative Securities Acquired (A) or Disposed of (D) (Instr. 3, 4, and 5)	6. Date Exercisable and Expiration Date (Month/Day/Year)		7. Title and Amount of Underlying Securities (Instr. 3 and 4)	
				Code V	(A) (D)	Date Exercisable	Expiration Date	Title	Amount or Number of Shares
Stock Option (right to buy)	\$ 9.14	12/08/2010		A	100,000	(2)	12/08/2020	Common Stock	100,000

Reporting Owners

Reporting Owner Name / Address	Relationships					
1	Director	10% Owner	Officer	Other		
Greene Barry E						
C/O ALNYLAM PHARMACEUTICALS, INC			President			
300 THIRD STREET			and COO			
CAMBRIDGE, MA 02142						

Signatures

/s/ Patricia L. Allen, Attorney-in-Fact for Barry E.

Greene
12/10/2010

**Signature of Reporting Person Date

Explanation of Responses:

- * If the form is filed by more than one reporting person, see Instruction 4(b)(v).
- ** Intentional misstatements or omissions of facts constitute Federal Criminal Violations. See 18 U.S.C. 1001 and 15 U.S.C. 78ff(a).
- (1) The reporting person owns 1,303 shares of ALNY common stock under the ALNY 401(k) plan as a result of the ALNY 401(k) matching contribution program.
- (2) The stock option vests as to 25% of the shares on the 1st anniversary of the stock option grant date and as to an additional 6.25% of the shares each successive three month period thereafter.

Note: File three copies of this Form, one of which must be manually signed. If space is insufficient, *see* Instruction 6 for procedure. Potential persons who are to respond to the collection of information contained in this form are not required to respond unless the form displays a currently valid OMB number.

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