



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

DIVISION OF
CORPORATION FINANCE

February 28, 2011

John M. Maraganore, Ph.D.
Chief Executive Officer
Alnylam Pharmaceuticals, Inc.
300 Third Street
Cambridge, MA 02142

**Re: Alnylam Pharmaceuticals, Inc.
Form 10-K
Filed February 26, 2010
File No. 000-50743**

Dear Mr. Maraganore:

We have reviewed your response letter dated February 18, 2011 and have the following comment.

Please respond to this letter within ten business days by providing the requested information, or by advising us when you will provide the requested response. If you do not believe our comment applies to your facts and circumstances, please tell us why in your response.

After reviewing the information you provide in response to this comment, we may have additional comments.

Proxy Statement on Schedule 14A, filed April 20, 2010

2009 Annual Incentive Program, page 26

1. We note your response to prior comment 4 and your disclosure that the company has not disclosed Ms. Allen's performance target with respect to specified internal operating expense levels under its annual operating plan because the company believes that this information constitutes confidential financial data, the disclosure of which would result in competitive harm to it. However, you have already disclosed your operating expenses in your 2010 10-K filed on February 18, 2011. Please revise your disclosure to include a discussion of Ms. Allen's performance target with respect to specified internal operating expense levels and compare them to the level of operating expenses incurred by the company.

John M. Maraganore, Ph.D.
Alynham Pharmaceuticals, Inc.
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You may contact Johnny Gharib at (202) 551-3170 or me at (202) 551-3715 if you have any questions.

Sincerely,

Jeffrey Riedler
Assistant Director