

ALNYLAM PHARMACEUTICALS, INC.
RESTATED
COMPENSATION COMMITTEE CHARTER

A. Purpose

The purpose of the Compensation Committee of the Board of Directors (the “Board”) of Alnylam Pharmaceuticals, Inc. (the “Company”) is to oversee the discharge of the responsibilities of the Board relating to compensation of the Company’s directors and executive officers; senior executive performance evaluation, development, promotion potential and succession planning; and the Company’s employee equity and incentive-based compensation philosophy and plans generally.

B. Structure and Membership

1. Number. The Compensation Committee shall consist of at least two members of the Board.
2. Independence. Except as otherwise permitted by the applicable Nasdaq Stock Market rules, each member of the Compensation Committee shall be “independent” as defined by such rules. In determining the members of the Compensation Committee, the Board will also consider whether the members qualify as “non-employee directors” as defined in Rule 16b-3 under the Securities Exchange Act of 1934, as amended, and the rules and regulations thereunder (the “Exchange Act”), and (only for so long as there are any outstanding compensation awards that (a) continue to be eligible for qualification as “performance-based compensation” exempt from the application of the deduction limit under Section 162(m) of the Internal Revenue Code of 1986, as amended, and (b) will require a certification of performance by the Compensation Committee to so qualify) as “outside directors” as defined in Section 162(m)).
3. Chair. Unless the Board elects a Chair of the Compensation Committee, the Compensation Committee shall elect a Chair by majority vote.
4. Compensation. The compensation of Compensation Committee members shall be as determined by the Board.
5. Selection and Removal. Members of the Compensation Committee shall be appointed by the Board, upon the recommendation of the Nominating and Corporate Governance Committee. Resignation or removal of a director from the Board, for whatever reason, shall automatically constitute resignation or removal, as applicable, from the Compensation Committee. The Board may remove members of the Compensation Committee from such committee, with or without cause. Vacancies occurring, for whatever reason, may be filled by the Board.
6. Quorum. A majority of the members of the Compensation Committee shall constitute a quorum for purposes of holding a meeting and the Compensation Committee may act by a vote of a majority of members present at such meeting.

C. Authority and Responsibilities

General

The Compensation Committee shall discharge its responsibilities and shall assess the information provided by the Company's management, in accordance with its business judgment.

Compensation Matters

1. Executive Officer Compensation. The Compensation Committee shall determine and approve, or recommend for approval by the Board, the compensation of the Company's Chief Executive Officer (the "CEO") and the Company's other executive officers as defined in Section 16 of the Exchange Act and Rule 16a-1 promulgated thereunder, including: salary, bonus and incentive compensation levels; deferred compensation; executive perquisites; equity compensation (including awards to induce employment); severance arrangements; change-in-control benefits; and other forms of executive officer compensation. The Compensation Committee shall meet without the presence of the CEO or any other executive officers when approving or deliberating on CEO compensation. The Compensation Committee may, in its discretion, invite the CEO, the Chief Human Resources Officer, and/or the Secretary to be present during the approval of, or deliberations with respect to, other executive officer compensation.

2. Evaluation of Senior Executives. The Compensation Committee shall be responsible for overseeing the evaluation of the Company's senior executives. In conjunction with the Audit Committee in the case of the evaluation of the senior financial management, the Compensation Committee shall determine the nature and frequency of the evaluation and the persons subject to the evaluation, supervise the conduct of the evaluation and prepare assessments of the performance of the Company's senior executives, to be discussed periodically with the Board. The Compensation Committee shall review with the CEO no less frequently than once per year the development and promotion potential of each of the Company's senior executives. The Compensation Committee shall also review with the Company's senior executives, its development programs, education and training opportunities, professional growth and advancement practices, individual development plans and overall effectiveness.

3. Plan Recommendations and Approvals. The Compensation Committee shall periodically review and make recommendations to the Board with respect to incentive-compensation and equity-based plans that are subject to approval by the Board. The Compensation Committee shall review and make such recommendations to the Board as the Compensation Committee deems advisable with regard to policies and procedures for the grant of equity-based awards by the Company. In addition, the Compensation Committee shall approve any tax-qualified, non-discriminatory plans (and any parallel nonqualified plans) for which stockholder approval is not sought and pursuant to which options or stock may be acquired by officers, directors, employees or consultants of the Company.

4. Administration of Equity-Based Plans. The Compensation Committee shall exercise all rights, authority and functions of the Board under all of the Company's stock option, stock incentive, employee stock purchase and other equity-based plans, including without limitation, the authority to interpret the terms thereof, to grant options thereunder and to make stock awards thereunder; provided, however, that, except as otherwise expressly authorized to do so by this charter, any such plan or a resolution of the Board, the Compensation Committee shall not be authorized to amend any such plan if stockholder approval is required or will be sought for such amendment. To the extent permitted by applicable law and the provisions of a given equity-based plan, and consistent with the

requirements of applicable law and such equity-based plan, the Compensation Committee may delegate to one or more executive officers of the Company the power to grant options or other stock awards pursuant to such equity-based plan to employees of the Company or any subsidiary of the Company who are not directors or executive officers of the Company. The Compensation Committee shall approve any inducement awards granted in reliance on the exemption from stockholder approval contained in Nasdaq Stock Market Rule 5635(c)(4).

5. Director Compensation. The Compensation Committee shall periodically review and make recommendations to the Board with respect to director compensation.

6. Management Succession. The Compensation Committee shall periodically review and make recommendations to the Board relating to senior executive succession planning, including policies and principles for CEO selection and performance review, as well as policies regarding succession in the event of an emergency or the retirement of the CEO or other executive officer.

7. Review and Discussion of Compensation Discussion and Analysis; Recommendation to Board. The Compensation Committee shall review and discuss annually with management the Company's "Compensation Discussion and Analysis" required by Item 402(b) of Regulation S-K (the "CD&A"). The Compensation Committee shall consider annually whether it will recommend to the Board that the CD&A be included in the Company's Annual Report on Form 10-K, proxy statement on Schedule 14A or information statement on Schedule 14C.

8. Compensation Committee Report. The Compensation Committee shall prepare the annual Compensation Committee Report required by Item 407(e)(5) of Regulation S-K.

9. Say-On-Pay and Compensation Related Proposals. The Compensation Committee shall oversee the Company's compliance with Securities and Exchange Commission's rules and regulations regarding stockholder approval of certain executive compensation matters, including advisory votes on executive compensation and the frequency of such votes. The Compensation Committee shall provide recommendations to the Board on compensation-related proposals to be considered at the Company's annual meeting, including equity compensation plans.

10. Peer Group. The Compensation Committee shall periodically review and revise a peer group of companies against which to assess the Company's compensation programs and practices to ensure that they are competitive and supportive of the Company's strategy and objectives.

11. Clawback Policy. The Compensation Committee shall approve and oversee the application of the Company's policy for clawback, or recoupment, of incentive compensation.

12. Stock Ownership Guidelines. The Compensation Committee shall establish the terms of, amend, and oversee compliance with the Company's stock ownership guidelines for the Company's CEO, executive officers and non-employee directors.

13. Compensation Risk Assessment. The Compensation Committee shall review the Company's compensation policies and practices and assess whether such policies and practices are reasonably likely to have a material adverse effect on the Company and whether they support the strategies and objectives of the Company.

14. Consider Stockholder Feedback on Executive Compensation. The Committee shall review the results of any say on pay votes and consider whether to make or recommend adjustments to the Company's executive compensation policies and practices as a result of such votes.

15. Stockholder Engagement. The Committee shall oversee engagement with stockholders and proxy advisory firms on executive compensation matters.

16. Additional Duties. The Compensation Committee shall have such other duties as may be delegated from time to time by the Board.

D. Procedures and Administration

1. Meetings. The Compensation Committee shall meet as often as it deems necessary in order to perform its responsibilities. The Compensation Committee may also act by unanimous written consent in lieu of a meeting. The Compensation Committee shall keep such records of its meetings as it shall deem appropriate.

2. Subcommittees. The Compensation Committee may form and delegate authority to one or more subcommittees as it deems appropriate from time to time under the circumstances (including (a) a subcommittee consisting of a single member and (b) a subcommittee consisting of at least two members, each of whom qualifies as a “non-employee director,” as such term is defined from time to time in Rule 16b-3 promulgated under the Exchange Act, and (only for so long as there are any outstanding compensation awards that (x) continue to be eligible for qualification as “performance-based compensation” exempt from the application of the deduction limit under Section 162(m) of the Internal Revenue Code of 1986, as amended, and (y) will require a certification of performance by the Compensation Committee to so qualify) as “outside directors” as defined in Section 162(m)).

3. Reports to Board. The Compensation Committee shall report regularly to the Board.

4. Charter. The Compensation Committee shall, at least once per year, review and reassess the adequacy of this Charter and recommend any proposed changes to the Board for approval.

5. Consulting Arrangements. The Compensation Committee shall have the sole authority and direct responsibility for the appointment, compensation and oversight of the work of any compensation consultant, legal counsel or other adviser to be used to assist the Compensation Committee in the evaluation of director or executive officer compensation and shall have sole authority to approve the consultant's fees and other retention terms. Nothing in this provision requires the Compensation Committee to implement or act consistently with the advice or recommendations of any advisor or affects the ability or obligation of the Compensation Committee to exercise its own judgment in fulfillment of its duties. The Compensation Committee shall also have authority to commission compensation surveys or studies as the need arises. The Compensation Committee is empowered, without further action by the Board, to cause the Company to pay the compensation of such consultants as established by the Compensation Committee. However, nothing in this provision requires that any advisors be independent. Before selecting any compensation consultant, legal counsel or other adviser subject to Nasdaq Stock Market Rule 5605(d)(3), the Compensation Committee shall take into consideration the following factors:

- The provision of other services to the Company by the person that employs the compensation consultant, legal counsel or other adviser;

- The amount of fees received from the Company by the person that employs the compensation consultant, legal counsel or other adviser, as a percentage of the total revenue of the person that employs the compensation consultant, legal counsel or other adviser;
- The policies and procedures of the person that employs the compensation consultant, legal counsel or other adviser that are designed to prevent conflicts of interest;
- Any business or personal relationship of the compensation consultant, legal counsel or other adviser with a member of the Compensation Committee;
- Any stock of the Company owned by the compensation consultant, legal counsel or other adviser; and
- Any business or personal relationship of the compensation consultant, legal counsel, other adviser or the person employing the adviser with an executive officer of the Company.

6. Independent Advisors. Subject to the foregoing, the Compensation Committee is authorized, without further action by the Board, to engage such independent legal and other advisors as it deems necessary or appropriate to carry out its responsibilities. Such independent advisors may be the regular advisors to the Company. The Compensation Committee is empowered, without further action by the Board, to cause the Company to pay the compensation of such advisors as established by the Compensation Committee.

7. Investigations. The Compensation Committee shall have the authority to conduct or authorize investigations into any matters within the scope of its responsibilities as it shall deem appropriate, including the authority to request any officer, employee or advisor of the Company to meet with the Compensation Committee or any advisors engaged by the Compensation Committee.

8. Periodic Self-Evaluation. The Compensation Committee shall periodically evaluate its own performance.

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Approved by the Board on October 9, 2018