

COMPENSATION COMMITTEE CHARTER OF MIRNA THERAPEUTICS, INC.

This Compensation Committee Charter (this “Charter”) was adopted by the Board of Directors (the “Board”) of Mirna Therapeutics, Inc., a Delaware corporation (the “Company”), on August 25, 2015, effective upon the consummation of the Company’s initial public offering.

I. Purpose

The primary purpose of the Compensation Committee of the Board (the “Committee”) is (1) to assist the Board in discharging the Board’s responsibilities regarding: (a) the establishment and maintenance of compensation and benefit plans, policies and programs designed to attract, motivate and retain personnel with the requisite skills and abilities to enable the Company to achieve superior operating results; (b) the compensation of the Company’s Chief Executive Officer (the “CEO”), the Company’s other executive officers, as defined by Rule 3b-7 of the Securities Exchange Act of 1934, as amended (the “Exchange Act”), the Company’s other officers (as determined from time to time by the Committee) and the Company’s non-management directors; and (c) compliance with applicable compensation rules, regulations and guidelines promulgated by The Nasdaq Stock Market LLC (“NASDAQ”), the Securities and Exchange Commission (the “SEC”) and other law, as amended from time to time.

The Committee shall ensure that the above responsibilities are designed to encourage high performance, promote accountability and assure that employee interests are aligned with the interests of the Company’s stockholders. In addition to the powers and responsibilities expressly delegated to the Committee in this Charter, the Committee may exercise any other powers and carry out any other responsibilities delegated to it by the Board from time to time consistent with the Company’s bylaws (as in effect from time to time) and applicable law. The powers and responsibilities delegated by the Board to the Committee in this Charter or otherwise shall be exercised and carried out by the Committee as it deems appropriate without requirement of Board approval, and any decision made by the Committee (including any decision to exercise or refrain from exercising any of the powers delegated to the Committee hereunder) shall be at the Committee’s sole discretion. While acting within the scope of the powers and responsibilities delegated to it, the Committee shall have and may exercise all the powers and authority of the Board. To the fullest extent permitted by law, the Committee shall have the power to determine which matters are within the scope of the powers and responsibilities delegated to it.

II. Membership

Subject to any available exemptions permitted by applicable rules, the Committee shall be composed of at least two (2) directors as determined by the Board, each of whom shall satisfy the independence and other eligibility requirements of NASDAQ rules, as amended from time to time, and shall, if appropriate, meet all other eligibility requirements of applicable laws.

The members of the Committee, including the Chairperson of the Committee (the “Chair”), shall be appointed by the Board. Committee members may be removed from the Committee, with or without cause and with or without prior notice, by the Board. Any action duly taken by the Committee shall be valid and effective, whether or not the members of the Committee at the time of such action are later determined not to have satisfied the requirements for membership provided herein.

III. Meetings and Procedures

The Chair (or in his or her absence, a member designated by the Chair) shall preside at each meeting of the Committee and set the agendas for Committee meetings. The Committee shall have the authority to establish its own rules and procedures for notice and conduct of its meetings so long as they are not inconsistent with any provisions of the Company’s bylaws that are applicable to the Committee.

The Committee should meet as often as it determines advisable to fulfill its duties and responsibilities, but in no event less than two (2) times per year. Meetings of the Committee may be called by the Chair upon notice given at least twenty-four (24) hours prior to the meeting, or upon such shorter notice as shall be approved by the Committee. The Chair shall designate a secretary for each meeting who shall record minutes of all formal actions of the Committee. A majority of the Committee members, present in person or by phone, shall constitute a quorum. A majority of the members present shall decide any questions brought before the Committee, except to the extent otherwise required by the Company’s certificate of incorporation or bylaws (each as in effect from time to time). Notwithstanding the foregoing, in the event the Committee consists of only two (2) members, both members must be present, in person or by phone, to constitute a quorum, and any questions brought before the Committee must be decided by unanimous vote. Meetings of the Committee may be held by conference call. Unless otherwise restricted by the Company’s bylaws, any action required or permitted to be taken at any meeting of the Committee may be taken without a meeting if all members of the Committee consent thereto in writing (including by electronic transmission), and such writing (including any electronic transmission) is filed with the minutes of the Committee.

All non-management directors who are not members of the Committee may attend and observe meetings of the Committee. The Committee may, at its discretion, include in its meetings members of the Company’s management, compensation and benefits consultants or any other person whose presence the Committee believes to be desirable or appropriate. Such persons shall not participate in any discussion or deliberation unless invited to do so by the Committee, and in any event shall not be entitled to vote. Notwithstanding the foregoing, the CEO and other officers may not be present during voting or deliberations concerning his, her or their compensation, and the Committee may exclude from its meetings any persons that it deems appropriate to exclude, including, but not limited to, any non-management director who is not a member of the Committee.

Consistent with applicable requirements of the Exchange Act and NASDAQ listing standards, the Committee shall (i) have the sole authority to retain and/or replace, as needed, any independent legal counsel, compensation and benefits consultants and other outside

experts or advisors as the Committee believes to be necessary or appropriate (collectively, “Compensation Advisers”); (ii) be directly responsible for the appointment, determination of compensation and oversight of the work of any Compensation Advisers retained by the Committee; (iii) subject to any exceptions under NASDAQ listing standards, undertake an analysis of the independence of each Compensation Adviser under the independence factors specified in the applicable requirements of the Exchange Act and NASDAQ listing standards, with such analysis to occur prior to selection of such Compensation Adviser and as appropriate thereafter; and (iv) have such additional authority and responsibility as may be required from time to time under the rules and guidelines of the Exchange Act and NASDAQ listing standards. The Committee may also utilize the services of the Company’s regular legal counsel or other advisors to the Company as Compensation Advisers. The Company shall provide for appropriate funding, as determined by the Committee in its sole discretion, for payment of compensation to any such Compensation Advisers retained by the Committee.

The Committee shall keep regular minutes of any meetings where actions are taken (unless such actions are taken and reported to the Committee’s satisfaction in the minutes of the Board meetings). Any such minutes kept by the Committee shall be distributed to each member of the Committee and made available to other members of the Board. The Secretary of the Company shall maintain the original signed minutes for filing with the corporate records of the Company. The Chair shall report to the Board regarding the activities of the Committee at appropriate times and as otherwise requested by the Chairperson of the Board.

IV. Duties and Responsibilities

1. The Committee shall periodically review the compensation philosophy of the Company.

2. The Committee shall obtain information on market trends in executive compensation and shall review the competitiveness of the Company’s executive compensation programs to ensure (a) the attraction and retention of officers; (b) the motivation of officers to achieve the Company’s business objectives; and (c) the alignment of the interests of officers with the long-term interests of the Company’s stockholders.

3. The Committee shall, at least annually, review and recommend to the Board for approval the corporate goals and objectives relevant to CEO and other officer compensation, evaluate CEO and officer performance in light of those goals and objectives, and, determine and approve all compensation of the officers, other than the CEO, and recommend to the Board for approval all compensation of the CEO, based on such evaluation. The Board shall retain the authority to determine and approve, upon the recommendation of the Committee, the compensation of the CEO, unless such authority has been delegated to the Committee.

4. The Committee shall, periodically and as and when appropriate, review and approve the following as they affect the officers, other than the CEO: (a) any employment agreements and severance arrangements, including any amendments, supplements or changes thereto; (b) any change-in-control agreements and change-in-control provisions affecting any elements of compensation and benefits and (c) any special or supplemental compensation and

benefits for the officers and individuals who formerly served as officers, including supplemental retirement benefits and the perquisites provided to them during and after employment. The Board shall retain the authority to approve the foregoing as it relates to the CEO, upon the recommendation of the Committee, unless such authority has been delegated to the Committee by the Board.

5. The Committee shall oversee the Company's compliance with the requirement under NASDAQ rules that, with limited exceptions, stockholders approve equity compensation plans. Subject to such stockholder approval, or otherwise required by the Exchange Act, the regulations promulgated under Section 162(m) of the Internal Revenue Code of 1986, as amended (the "Code"), or other applicable law, the Committee shall have the power to establish, amend, manage, periodically review and, where appropriate, terminate all annual bonus, long-term incentive compensation, stock option, employee pension and welfare benefit plans including 401(k) plans, employee stock purchase plans, long-term incentive plans, management incentive plans and others and with respect to each plan shall have responsibility for:

- (i) general administration;
- (ii) setting performance targets under all annual bonus and long-term incentive compensation plans for officers as appropriate and, with respect to any compensation under such plans that is intended to constitute "qualified performance-based compensation" within the meaning of Section 162(m) of the Code, committing to writing any and all performance targets for all officers who may be "covered employees" under Section 162(m) of the Code within the first 90 days of the performance period to which such target relates or, if shorter, within the period provided by Section 162(m) of the Code in order for such target to be "pre-established" within the meaning of Section 162(m);
- (iii) certifying that any and all performance targets used for any performance-based compensation plans have been met before payment of any officer bonus or compensation or exercise of any officer award granted under any such plan(s);
- (iv) approving all amendments to, and terminations of, all compensation plans and any awards under such plans;
- (v) granting any awards under any performance-based annual bonus, long-term incentive compensation and equity compensation plans, including stock options and other equity rights (*e.g.*, restricted stock, stock purchase rights), except for grants to the CEO, which shall be recommended by the Committee to the Board for approval;
- (vi) approving which employees or consultants are entitled to awards under the Company's stock option and other equity compensation plan(s);
- (vii) repurchasing securities from terminated employees; and
- (viii) providing compensation risk assessments to confirm that compensation does not encourage unnecessary risk taking and to review and discuss periodically the

relationship between risk management policies and practice, business strategy and the officers' compensation.

All periodic plan reviews should include reviewing the plan's administrative costs, reviewing current plan features relative to any proposed new features, and assessing the performance of the plan's internal and external administrators if any duties have been delegated.

6. The Committee shall establish and periodically review policies concerning perquisite benefits.

7. The Committee shall periodically review the need for a Company policy regarding compensation paid to the Company's officers in excess of limits deductible under Section 162(m) of the Code.

8. The Committee shall determine the Company's policy with respect to change of control or "parachute" payments.

9. The Committee shall monitor the Company's compliance with applicable legal requirements of the Sarbanes Oxley Act of 2002 and the Dodd-Frank Wall Street Reform and Consumer Protection Act relating to employee compensation and benefits.

10. The Committee shall have generalized supervisory responsibility for the compensation policies applicable to all employees of the Company, including periodic reviews of the adequacy of the Company's compensation structure, performance review procedures, employee turn-over and retention, successorship plans and other human resource issues. The Committee shall receive periodic reports on the Company's compensation programs as they affect all employees.

11. The Committee shall review and discuss with the management of the Company the Compensation Discussion and Analysis (the "CD&A"), and based on such discussions, determine whether to recommend to the Board that the CD&A be included in the Company's proxy statement and annual report on Form 10-K.

12. The Committee shall produce the annual Compensation Committee Report for inclusion in the Company's proxy statement and annual report on Form 10-K in compliance with the rules and regulations promulgated by the SEC.

13. The Committee shall periodically review and make recommendations to the Board with respect to the compensation of the Board's non-management directors.

14. The Committee shall, periodically and with input from the Nominating and Corporate Governance Committee of the Board (the "Nominating and Corporate Governance Committee") if deemed appropriate, perform an evaluation of the performance of the Committee and its members, including a review of the Committee's compliance with this Charter, and provide any written material with respect to such evaluation to the Board or the Nominating and Corporate Governance Committee, as appropriate, including any recommendations for changes in procedures or policies governing the Committee.

15. The Committee shall, periodically and with input from the Nominating and Corporate Governance Committee if deemed appropriate, review and reassess this Charter and submit any recommended changes to the Board for its consideration.

V. Delegation of Duties

In fulfilling its responsibilities, the Committee shall be entitled to delegate any or all of its responsibilities to a subcommittee, but only to the extent consistent with the Company's certificate of incorporation, bylaws, Section 162(m) of the Code, applicable laws, regulations and NASDAQ rules.