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UNITED STATES SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

FORM 10-Q

☒ **QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For the quarterly period ended June 30, 2018

OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**
For transition period from _____ to _____.

Commission File Number: 001-31918

IDERA PHARMACEUTICALS, INC.

(Exact name of registrant as specified in its charter)

Delaware	**04-3072298**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
505 Eagleview Blvd., Suite 212 **Exton, Pennsylvania**	**19341**
(Address of principal executive offices)	(Zip code)

(484) 348-1600
(Registrant's telephone number, including area code)

167 Sidney Street, Cambridge, Massachusetts 02139
(Former Name or Former Address, if Changed Since Last Report)

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act. (Check one):

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

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

Common Stock, par value $.001 per share	27,173,853
Class	Outstanding as of July 31, 2018

IDERA PHARMACEUTICALS, INC.
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NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Quarterly Report on Form 10-Q contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended, or the Exchange Act. All statements, other than statements of historical fact, included or incorporated in this report regarding our strategy, future operations, clinical trials, collaborations, intellectual property, cash resources, financial position, future revenues, projected costs, prospects, plans, and objectives of management are forward-looking statements. The words “believes,” “anticipates,” “estimates,” “plans,” “expects,” “intends,” “may,” “could,” “should,” “potential,” “likely,” “projects,” “continue,” “will,” and “would” and similar expressions are intended to identify forward-looking statements, although not all forward-looking statements contain these identifying words. We cannot guarantee that we actually will achieve the plans, intentions or expectations disclosed in our forward-looking statements and you should not place undue reliance on our forward-looking statements.

There are a number of important factors that could cause our actual results to differ materially from those indicated or implied by forward-looking statements. These important factors include those set forth below under Part II, Item 1A “Risk Factors” in this Quarterly Report on Form 10-Q and under Part I, Item 1A “Risk Factors” in our Annual Report on Form 10-K for the fiscal year ended December 31, 2017, which was filed with the Securities and Exchange Commission, or the SEC, on March 7, 2018. These factors and the other cautionary statements made in this Quarterly Report on Form 10-Q should be read as being applicable to all related forward-looking statements whenever they appear in this Quarterly Report on Form 10-Q.

In addition, any forward-looking statements represent our estimates only as of the date that this Quarterly Report on Form 10-Q is filed with the SEC and should not be relied upon as representing our estimates as of any subsequent date. We do not assume any obligation to update any forward-looking statements. We disclaim any intention or obligation to update or revise any forward-looking statement, whether as a result of new information, future events or otherwise.

PART I — FINANCIAL INFORMATION

Item 1. Financial Statements.

IDERA PHARMACEUTICALS, INC.

CONDENSED BALANCE SHEETS

(In thousands, except per share amounts)	June 30, 2018 (unaudited)	December 31, 2017*
ASSETS		
Current assets:		
Cash and cash equivalents	$ 94,046	$ 112,629
Prepaid expenses and other current assets	3,923	3,992
Total current assets	97,969	116,621
Property and equipment, net	1,225	1,472
Restricted cash and other assets	320	324
Total assets	$ 99,514	$ 118,417
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 1,118	$ 1,334
Accrued expenses	12,721	8,000
Note payable	—	209
Deferred revenue	235	566
Total current liabilities	14,074	10,109
Other liabilities	374	613
Total liabilities	14,448	10,722
Commitments and contingencies		
Stockholders' equity:		
Preferred stock, $0.01 par value, Authorized — 5,000 shares:		
Series A convertible preferred stock; Designated — 1,500 shares, Issued and outstanding — 1 share	—	—
Common stock, $0.001 par value, Authorized — 70,000 shares; Issued and outstanding — 27,171 and 24,453 shares at June 30, 2018 and December 31, 2017, respectively	27	24
Additional paid-in capital	725,659	712,165
Accumulated deficit	(640,620)	(604,494)
Total stockholders' equity	85,066	107,695
Total liabilities and stockholders' equity	$ 99,514	$ 118,417

* The condensed consolidated balance sheet at December 31, 2017 has been derived from the audited financial statements at that date.

The accompanying notes are an integral part of these financial statements.

IDERA PHARMACEUTICALS, INC.

CONDENSED STATEMENTS OF OPERATIONS AND COMPREHENSIVE LOSS
(UNAUDITED)

(In thousands, except per share amounts)	Three Months Ended June 30, 2018	Three Months Ended June 30, 2017	Six Months Ended June 30, 2018	Six Months Ended June 30, 2017
Alliance revenue	$ 163	$ 187	$ 418	$ 565
Operating expenses:				
Research and development	10,880	17,891	24,436	29,376
General and administrative	5,583	3,888	12,562	7,969
Total operating expenses	16,463	21,779	36,998	37,345
Loss from operations	(16,300)	(21,592)	(36,580)	(36,780)
Other income (expense):				
Interest income	271	144	482	297
Interest expense	(4)	(13)	(11)	(29)
Foreign currency exchange gain (loss)	2	(10)	(17)	(16)
Net loss	$ (16,031)	$ (21,471)	$ (36,126)	$ (36,528)
Net loss per share applicable to common stockholders - basic and diluted (Note 11)	$ (0.59)	$ (1.15)	$ (1.39)	$ (1.96)
Weighted-average number of common shares used in computing net loss per share applicable to common stockholders - basic and diluted	27,133	18,676	26,012	18,657
Comprehensive loss:				
Net loss	$ (16,031)	$ (21,471)	$ (36,126)	$ (36,528)
Other comprehensive income (loss):				
Unrealized gain on available-for-sale securities	—	—	—	16
Total other comprehensive income	—	—	—	16
Comprehensive loss	$ (16,031)	$ (21,471)	$ (36,126)	$ (36,512)

The accompanying notes are an integral part of these financial statements.

IDERA PHARMACEUTICALS, INC.

CONDENSED STATEMENTS OF CASH FLOWS
(UNAUDITED)

(In thousands)	Six Months Ended June 30, 2018	2017
Cash Flows from Operating Activities:		
Net loss	$ (36,126)	$ (36,528)
Adjustments to reconcile net loss to net cash used in operating activities:		
Stock-based compensation	3,127	7,542
Issuance of common stock for services rendered	45	74
Accretion of discounts and premiums on investments	—	92
Depreciation and amortization expense	321	368
Changes in operating assets and liabilities:		
Prepaid expenses and other current assets	69	(2,179)
Accounts payable, accrued expenses, and other liabilities	4,243	(779)
Deferred revenue	(331)	(465)
Net cash used in operating activities	(28,652)	(31,875)
Cash Flows from Investing Activities:		
Proceeds from maturity of available-for-sale securities	—	25,695
Purchases of property and equipment	(42)	(100)
Net cash (used in) provided by investing activities	(42)	25,595
Cash Flows from Financing Activities:		
Proceeds from employee stock purchases	159	115
Proceeds from exercise of common stock options and warrants	10,166	304
Payments on note payable	(209)	(142)
Payments on capital lease	(5)	(5)
Net cash provided by financing activities	10,111	272
Net decrease in cash, cash equivalents and restricted cash	(18,583)	(6,008)
Cash, cash equivalents and restricted cash, beginning of period	112,940	80,978
Cash, cash equivalents and restricted cash, end of period	$ 94,357	$ 74,970

The accompanying notes are an integral part of these financial statements.

IDERA PHARMACEUTICALS, INC.

CONDENSED STATEMENT OF STOCKHOLDERS' EQUITY
(UNAUDITED)

(In thousands, except per share amounts)	Common Stock Number of Shares	Common Stock $0.001 Par Value	Additional Paid-In Capital	Accumulated Deficit	Total Stockholders' Equity
Balance, December 31, 2017	24,453	$ 24	$ 712,165	$ (604,494)	$ 107,695
Issuance of common stock under employee stock purchase plan	13	—	159	—	159
Issuance of common stock upon exercise of common stock options and warrants	2,702	3	10,163	—	10,166
Issuance of common stock for services rendered	3	—	45	—	45
Stock-based compensation	—	—	3,127	—	3,127
Net loss	—	—	—	(36,126)	(36,126)
Balance, June 30, 2018	27,171	$ 27	$ 725,659	$ (640,620)	$ 85,066

The accompanying notes are an integral part of these financial statements

IDERA PHARMACEUTICALS, INC.

NOTES TO CONDENSED FINANCIAL STATEMENTS
June 30, 2018

(UNAUDITED)

Note 1. Business and Organization

Business Overview

Idera Pharmaceuticals, Inc. ("Idera" or the "Company"), a Delaware corporation, is a clinical-stage biopharmaceutical company currently focused on the development, and ultimately the commercialization of therapeutic drug candidates, including our Toll-like receptor ("TLR") agonist, tilsotolimod (IMO-2125), for oncology. The Company's business strategy is focused on the clinical development of drug candidates for oncology indications characterized by small, well-defined patient populations with serious unmet medical needs. The Company believes it can develop and commercialize these targeted therapies on its own. To the extent the Company seeks to develop drug candidates for broader disease indications, it has entered into and may explore additional collaborative alliances to support development and commercialization.

Agreement and Plan of Merger

On January 21, 2018, the Company, BioCryst Pharmaceuticals, Inc., a Delaware corporation ("BioCryst"), Nautilus Holdco, Inc., a Delaware corporation and a direct, wholly owned subsidiary of BioCryst ("Holdco"), Island Merger Sub, Inc., a Delaware corporation and a direct, wholly owned subsidiary of Holdco, and Boat Merger Sub, Inc., a Delaware corporation and a direct, wholly owned subsidiary of Holdco, entered into an Agreement and Plan of Merger (the "Merger Agreement"). The board of directors of each of Idera and BioCryst unanimously approved the Merger Agreement and the transactions contemplated thereby and the required regulatory approvals were received. However, the proposed merger was subject to approval by the stockholders of Idera and BioCryst, and satisfaction of other customary closing conditions, as specified in the Merger Agreement. At a special meeting of BioCryst stockholders held on July 10, 2018, BioCryst's stockholders voted against the adoption of the Merger Agreement. Following such vote and in accordance with the terms of the Merger Agreement, BioCryst terminated the Merger Agreement. See Note 12.

Liquidity and Financial Condition

As of June 30, 2018, the Company had an accumulated deficit of $640.6 million. The Company expects to incur substantial operating losses in future periods and will require additional capital as it seeks to advance tilsotolimod and any future drug candidates through development to commercialization. The Company does not expect to generate product revenue, sales-based milestones or royalties until the Company successfully completes development and obtains marketing approval for tilsotolimod or other future drug candidates, either alone or in collaboration with third parties, which the Company expects will take a number of years. In order to commercialize tilsotolimod and any future drug candidates, the Company needs to complete clinical development and comply with comprehensive regulatory requirements. The Company is subject to a number of risks and uncertainties similar to those of other companies of the same size within the biotechnology industry, such as uncertainty of clinical trial outcomes, uncertainty of additional funding, and history of operating losses.

The Company believes, based on its current operating plan, that its existing cash and cash equivalents will enable the Company to fund its operations into the first quarter of 2020. The Company has and plans to continue to evaluate available alternatives to extend its operations beyond the first quarter of 2020.

Reverse Stock Split

As further described in Note 12, on July 27, 2018, the Company effected a 1-for-8 reverse stock split of the Company's outstanding shares of common stock, as authorized at a special meeting of stockholders on June 20, 2018. All share and per share amounts of common stock, options and warrants in the accompanying condensed financial statements and notes thereto have been retroactively adjusted for all periods presented to reflect the reverse stock split.

Note 2. Summary of Significant Accounting Policies

Basis of Presentation

The accompanying unaudited financial statements included herein have been prepared by the Company in accordance with U.S. generally accepted accounting principles ("GAAP") for interim financial information and pursuant to the rules and regulations of the Securities and Exchange Commission (the "SEC"). Accordingly, certain information and footnote disclosures normally included in financial statements prepared in accordance with GAAP have been condensed or omitted pursuant to such rules and regulations. In the opinion of management, all adjustments, consisting of normal recurring adjustments, and disclosures considered necessary for a fair presentation of interim period results have been included. Interim results for the three and six months ended June 30, 2018 are not necessarily indicative of results that may be expected for the year ending December 31, 2018. For further information, refer to the financial statements and footnotes thereto included in the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2017 ("2017 Form 10-K"), which was filed with the SEC on March 7, 2018.

Cash and Cash Equivalents

The Company considers all highly liquid investments with maturities of 90 days or less when purchased to be "cash equivalents." Cash and cash equivalents at June 30, 2018 and December 31, 2017 consisted of cash and money market funds.

Restricted Cash

As part of the Company's lease arrangement for its office and laboratory facility in Cambridge, Massachusetts, the Company is required to restrict cash held in a certificate of deposit securing a line of credit for the lessor. As of June 30, 2018 and December 31, 2017, the restricted cash amounted to $0.3 million and is recorded in "Restricted cash and other assets" in the accompanying balance sheets. In July 2018, the Company terminated the lease agreement, effective September 30, 2018, as more fully described in Note 12, and will no longer be required to restrict cash for this purpose as of such date.

The following table provides a reconciliation of cash, cash equivalents, and restricted cash reported within the balance sheets that sum to the total of the same such amounts shown in the statements of cash flows:

(In thousands)	June 30, 2018	December 31, 2017
Cash and cash equivalents	$ 94,046	$ 112,629
Restricted cash	311	311
Cash, cash equivalents and restricted cash	$ 94,357	$ 112,940

Financial Instruments

The fair value of the Company's financial instruments is determined and disclosed in accordance with the three-tier fair value hierarchy specified in Note 3. The Company is required to disclose the estimated fair values of its financial instruments. As of June 30, 2018, the Company's financial instruments consisted of cash, cash equivalents, and accounts receivable. As of December 31, 2017, the Company's financial instruments consisted of cash, cash equivalents, accounts receivable and a note payable. The estimated fair values of these financial instruments approximate their carrying values as of June 30, 2018 and December 31, 2017. As of June 30, 2018, the Company did not have any derivatives, hedging instruments or other similar financial instruments.

Note 2. Summary of Significant Accounting Policies (Continued)

Revenue Recognition

Effective January 1, 2018, the Company adopted Accounting Standards Codification ("ASC") Topic 606, *Revenue from Contracts with Customers*, using the modified retrospective transition method. Under this method, the Company recognizes the cumulative effect of initially adopting ASC Topic 606, if any, as an adjustment to the opening balance of retained earnings. Additionally, under this method of adoption, the Company applies the guidance to all incomplete contracts in scope as of the date of initial application. This standard applies to all contracts with customers, except for contracts that are within the scope of other standards, such as leases, insurance, collaboration arrangements and financial instruments.

In accordance with ASC Topic 606, the Company recognizes revenue when its customer obtains control of promised goods or services, in an amount that reflects the consideration which the entity expects to receive in exchange for those goods or services. To determine revenue recognition for arrangements that the Company determines are within the scope of ASC Topic 606, it performs the following five steps:

(i) identify the contract(s) with a customer;

(ii) identify the performance obligations in the contract;

(iii) determine the transaction price;

(iv) allocate the transaction price to the performance obligations in the contract; and

(v) recognize revenue when (or as) the entity satisfies a performance obligation.

The Company only applies the five-step model to contracts when it determines that it is probable it will collect the consideration it is entitled to in exchange for the goods or services it transfers to the customer. At contract inception, once the contract is determined to be within the scope of ASC Topic 606, the Company assesses the goods or services promised within each contract and determines those that are performance obligations, and assesses whether each promised good or service is distinct. The Company then recognizes as revenue the amount of the transaction price that is allocated to the respective performance obligation when (or as) the performance obligation is satisfied.

Amounts received prior to satisfying the revenue recognition criteria are recognized as deferred revenue in the Company's balance sheet. Amounts expected to be recognized as revenue within the 12 months following the balance sheet date are classified as Current portion of deferred revenue. Amounts not expected to be recognized as revenue within the 12 months following the balance sheet date are classified as Deferred revenue, net of current portion.

Alliance Revenues

The Company's revenues have primarily been generated through collaborative research, development and/or commercialization agreements. The terms of these agreements may include payment to the Company of one or more of the following: nonrefundable, up-front license fees; research, development and commercial milestone payments; and other contingent payments due based on the activities of the counterparty or the reimbursement by licensees of costs associated with patent maintenance. Each of these types of revenue are recorded as Alliance revenues in the Company's statement of operations.

In determining the appropriate amount of revenue to be recognized as it fulfills its obligations under each of its agreements, the Company performs the following steps:

(i) identification of the promised goods or services in the contract;

(ii) determination of whether the promised goods or services are performance obligations including whether they are distinct in the context of the contract;

(iii) measurement of the transaction price, including the constraint on variable consideration;

Note 2. Summary of Significant Accounting Policies (Continued)

(iv) allocation of the transaction price to the performance obligations; and

(v) recognition of revenue when (or as) the Company satisfies each performance obligation.

See Note 8, “Collaboration and License Agreements” for additional details regarding the Company’s collaboration arrangements.

As part of the accounting for these arrangements, the Company allocates the transaction price to each performance obligation on a relative stand-alone selling price basis. The stand-alone selling price may be, but is not presumed to be, the contract price. In determining the allocation, the Company maximizes the use of observable inputs. When the stand-alone selling price of a good or service is not directly observable, the Company estimates the stand-alone selling price for each performance obligation using assumptions that require judgment. Acceptable estimation methods include, but are not limited to: (i) the adjusted market assessment approach, (ii) the expected cost plus margin approach, and (iii) the residual approach (when the stand-alone selling price is not directly observable and is either highly variable or uncertain). In order for the residual approach to be used, the Company must demonstrate that (a) there are observable stand-alone selling prices for one or more of the performance obligations and (b) one of the two criteria in ASC 606-10- 32-34(c)(1) and (2) is met. The residual approach cannot be used if it would result in a stand-alone selling price of zero for a performance obligation as a performance obligation, by definition, has value on a stand-alone basis.

An option in a contract to acquire additional goods or services gives rise to a performance obligation only if the option provides a material right to the customer that it would not receive without entering into that contract. Factors that the Company considers in evaluating whether an option represents a material right include, but are not limited to: (i) the overall objective of the arrangement, (ii) the benefit the collaborator might obtain from the arrangement without exercising the option, (iii) the cost to exercise the option (e.g. priced at a significant and incremental discount) and (iv) the likelihood that the option will be exercised. With respect to options determined to be performance obligations, the Company recognizes revenue when those future goods or services are transferred or when the options expire.

The Company’s revenue arrangements may include the following:

Up-front License Fees: If a license is determined to be distinct from the other performance obligations identified in the arrangement, the Company recognizes revenues from nonrefundable, up-front fees allocated to the license when the license is transferred to the licensee and the licensee is able to use and benefit from the license. For licenses that are bundled with other promises, the Company utilizes judgment to assess the nature of the combined performance obligation to determine whether the combined performance obligation is satisfied over time or at a point in time and, if over time, the appropriate method of measuring progress for purposes of recognizing revenue from non-refundable, up-front fees. The Company evaluates the measure of progress each reporting period and, if necessary, adjusts the measure of performance and related revenue recognition.

Milestone Payments: At the inception of an agreement that includes research and development milestone payments, the Company evaluates whether each milestone is considered probable of being achieved and estimates the amount to be included in the transaction price using the most likely amount method. If it is probable that a significant revenue reversal would not occur, the associated milestone value is included in the transaction price. Milestone payments that are not within the control of the Company or the licensee, such as regulatory approvals, are not considered probable of being achieved until those approvals are received. The transaction price is then allocated to each performance obligation on a relative stand-alone selling price basis, for which the Company recognizes revenue as or when the performance obligations under the contract are satisfied. At the end of each subsequent reporting period, the Company re-evaluates the probability of achievement of such milestones and any related constraint, and if necessary, adjusts its estimate of the overall transaction price. Any such adjustments are recorded on a cumulative catch-up basis, which would affect Alliance revenues and earnings in the period of adjustment.

Note 2. Summary of Significant Accounting Policies (Continued)

Research and Development Activities: If the Company is entitled to reimbursement from its collaborators for specified research and development activities or the reimbursement of costs associated with patent maintenance, the Company determines whether such funding would result in Alliance revenues or an offset to research and development expenses. Reimbursement of patent maintenance costs are recognized during the period in which the related expenses are incurred as Alliance revenues in the Company's statement of operations.

Royalties: If the Company is entitled to receive sales-based royalties from its collaborator, including milestone payments based on the level of sales, and the license is deemed to be the predominant item to which the royalties relate, the Company recognizes revenue at the later of (i) when the related sales occur, provided the reported sales are reliably measurable, or (ii) when the performance obligation to which some or all of the royalty has been allocated has been satisfied (or partially satisfied). To date, the Company has not recognized any royalty revenue resulting from any of its collaboration and license arrangements.

Manufacturing Supply and Research Services: Arrangements that include a promise for future supply of drug substance, drug product or research services at the licensee's discretion are generally considered as options. The Company assesses if these options provide a material right to the licensee and if so, they are accounted for as separate performance obligations. If the Company is entitled to additional payments when the licensee exercises these options, any additional payments are recorded in Alliance revenues when the licensee obtains control of the goods, which is upon delivery, or as the services are performed.

The Company receives payments from its licensees based on schedules established in each contract. Upfront payments and fees are recorded as deferred revenue upon receipt, and may require deferral of revenue recognition to a future period until the Company performs its obligations under these arrangements. Amounts are recorded as accounts receivable when the Company's right to consideration is unconditional. The Company does not assess whether a contract has a significant financing component if the expectation at contract inception is such that the period between payment by the licensees and the transfer of the promised goods or services to the licensees will be one year or less.

Income Taxes

In accordance with ASC 270, *Interim Reporting*, and ASC 740, *Income Taxes*, the Company is required at the end of each interim period to determine the best estimate of its annual effective tax rate and then apply that rate in providing for income taxes on a current year-to-date (interim period) basis. For the three and six months ended June 30, 2018 and 2017, the Company recorded no tax expense or benefit due to the expected current year loss and its historical losses. The Company has not recorded its net deferred tax asset as of either June 30, 2018 or December 31, 2017 because it maintained a full valuation allowance against all deferred tax assets as of these dates as management has determined that it is not more likely than not that the Company will realize these future tax benefits. As of June 30, 2018 and December 31, 2017, the Company had no uncertain tax positions.

In December 2017, the Tax Cuts and Jobs Act ("TCJA") was signed into law. Among other things, the TCJA permanently lowers the corporate federal income tax rate to 21% from the existing maximum rate of 35%, effective for tax years including or commencing January 1, 2018. As a result of the reduction of the corporate federal income tax rate to 21%, GAAP requires companies to revalue their deferred tax assets and deferred tax liabilities as of the date of enactment, with the resulting tax effects accounted for in the reporting period of enactment. This revaluation resulted in a provision of $27.6 million to income tax expense and a corresponding reduction in the valuation allowance in the fourth quarter of 2017. As a result, there was no impact to the Company's statement of operations and comprehensive loss as a result of reduction in tax rates. The Company's preliminary estimate of the TCJA and the remeasurement of its deferred tax assets and liabilities is subject to the finalization of management's analysis related to certain matters, such as developing interpretations of the provisions of the TCJA, changes to certain estimates and the filing of the Company's tax returns. U.S. Treasury regulations, administrative interpretations or court decisions interpreting the TCJA may require further adjustments and changes in the Company's estimates. The final determination of the TCJA and the remeasurement of the Company's deferred assets and liabilities will be completed as additional information becomes available, but no later than one year from the enactment of the TCJA.

Note 2. Summary of Significant Accounting Policies (Continued)

New Accounting Pronouncements

Recently Adopted Accounting Pronouncements

In May 2014, the Financial Accounting Standards Board ("FASB") issued ASU No. 2014-09, *Revenue from Contracts with Customers (Topic 606)*, which was subsequently amended by several other ASU's related to Topic 606 to, among other things, defer the effective date and clarify various aspects of the new revenue guidance including principal versus agent considerations, identifying performance obligations, and licensing, and include other improvements and practical expedients (as amended, "ASU 2014-09"). The Company adopted ASU 2014-09 in the first quarter of 2018 using the modified retrospective transition method. See "Revenue Recognition" above. To date, the Company has derived substantially all of its revenues from a limited number of license and collaboration agreements. The consideration the Company is eligible to receive under these agreements includes upfront payments, research and development funding, contingent revenues in the form of commercial and development milestones and option payments and royalties. Each of the Company's license and collaboration agreements has unique terms and was evaluated separately under Topic 606. With respect to its license and collaboration agreements with Vivelix Pharmaceuticals, Ltd. ("Vivelix") and GlaxoSmithKline Intellectual Property Development Limited ("GSK"), there was no material impact to Alliance revenues for any of the years presented upon adoption of Topic 606. Additionally, there were no revisions to any balance sheet components of Alliance revenues such as accounts receivable and deferred revenues or beginning retained earnings as a result of the adoption of the modified retrospective method. The primary impact on the Company's financial statements was that revised or additional disclosures were made with respect to revenues and cash flows arising from contracts with customers, which are included in Notes 7 and 8.

In January 2016, the FASB issued ASU No. 2016-01, *Recognition and Measurement of Financial Assets and Financial Liabilities* ("ASU 2016-01"). The amendments in ASU 2016-01 address certain aspects of recognition, measurement, presentation and disclosure of financial instruments. The Company adopted ASU 2016-01 in the first quarter of 2018. The adoption of this new standard did not have a material impact on the Company's financial position or results of operations.

In November 2016, the FASB issued ASU No. 2016-18, *Statement of Cash Flows (Topic 230) — Restricted Cash* ("ASU 2016-18"). The amendments in ASU 2016-18 require that a statement of cash flows explain the change during the period in the total of cash, cash equivalents, and amounts generally described as restricted cash and restricted cash equivalents. Accordingly, amounts generally described as restricted cash or restricted cash equivalents should be included with cash and cash equivalents when reconciling the beginning of period and end of period total amounts shown on the statement of cash flows. The Company adopted ASU 2016-18 in the first quarter of 2018, and the guidance has been retrospectively applied to all periods presented. The total of the Company's cash, cash equivalents and restricted cash is described earlier in this Note 2.

Recently Issued (Not Yet Adopted) Accounting Pronouncements

In February 2016, the FASB issued ASU No. 2016-02, *Leases (Topic 842)* ("ASU 2016-02"). ASU 2016-02 requires organizations that lease assets, with lease terms of more than 12 months, to recognize on the balance sheet the assets and liabilities for the rights and obligations created by those leases. Consistent with GAAP, the recognition, measurement, and presentation of expenses and cash flows arising from a lease by a lessee primarily will depend on its classification as a finance or operating lease. However, unlike current GAAP which requires only capital leases to be recognized on the balance sheet, ASU 2016-02 will require both types of leases to be recognized on the balance sheet. This guidance is applicable to the Company's fiscal year beginning on January 1, 2019. The Company is currently evaluating the effect that the adoption of ASU 2016-02 will have on its financial statements.

Note 3. Fair Value Measurements

Assets and Liabilities Measured at Fair Value on a Recurring Basis

The Company applies the guidance in ASC 820, *Fair Value Measurement*, to account for financial assets and liabilities measured on a recurring basis. Fair value is measured at the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. As such, fair value is a market-based measurement that is determined based on assumptions that market participants would use in pricing an asset or liability.

The Company uses a fair value hierarchy, which distinguishes between assumptions based on market data (observable inputs) and an entity's own assumptions (unobservable inputs). The guidance requires that fair value measurements be classified and disclosed in one of the following three categories:

- Level 1: Unadjusted quoted prices in active markets that are accessible at the measurement date for identical, unrestricted assets or liabilities;
- Level 2: Quoted prices in markets that are not active or inputs which are observable, either directly or indirectly, for substantially the full term of the asset or liability; and
- Level 3: Prices or valuation techniques that require inputs that are both significant to the fair value measurement and unobservable (i.e., supported by little or no market activity).

Determining which category an asset or liability falls within the hierarchy requires significant judgment. The Company evaluates its hierarchy disclosures each reporting period. There were no transfers between Level 1, 2 and 3 during the six months ended June 30, 2018.

The table below presents the assets and liabilities measured and recorded in the financial statements at fair value on a recurring basis at June 30, 2018 and December 31, 2017 categorized by the level of inputs used in the valuation of each asset and liability:

	June 30, 2018			
(In thousands)	**Total**	**Level 1**	**Level 2**	**Level 3**
Assets				
Money market funds	$ 66,627	$ 66,627	$ —	$ —
Total Assets	$ 66,627	$ 66,627	$ —	$ —
Total Liabilities	$ —	$ —	$ —	$ —

	December 31, 2017			
(In thousands)	**Total**	**Level 1**	**Level 2**	**Level 3**
Assets				
Money market funds	$ 66,183	$ 66,183	$ —	$ —
Total Assets	$ 66,183	$ 66,183	$ —	$ —
Total Liabilities	$ —	$ —	$ —	$ —

The Level 1 assets consist of money market funds, which are actively traded daily.

Note 4. Property and Equipment

At June 30, 2018 and December 31, 2017, property and equipment, net, consisted of the following:

(In thousands)	June 30, 2018	December 31, 2017
Leasehold improvements	$ 671	$ 671
Laboratory equipment and other	5,274	5,261
Total property and equipment, at cost	5,945	5,932
Less: Accumulated depreciation and amortization	4,720	4,460
Property and equipment, net	$ 1,225	$ 1,472

Depreciation and amortization expense on property and equipment was approximately $0.1 million and $0.2 million for the three months ended June 30, 2018 and 2017, respectively, and approximately $0.3 million and $0.4 million for the six months ended June 30, 2018 and 2017, respectively. There was less than $0.1 million in non-cash property additions during each of the six months ended June 30, 2018 and 2017.

Note 5. Accrued Expenses

At June 30, 2018 and December 31, 2017, accrued expenses consisted of the following:

(In thousands)	June 30, 2018	December 31, 2017
Payroll and related costs	$ 2,309	$ 3,108
Clinical and nonclinical trial expenses	6,163	3,495
Professional and consulting fees	4,220	1,317
Other	29	80
Total accrued expenses	$ 12,721	$ 8,000

Included in accrued professional and consulting fees at June 30, 2018 and December 31, 2017 was $3.8 million and $0.7 million, respectively, of merger-related costs. See Note 12 for further discussion of the fixed expense reimbursement received in July 2018 in connection with the termination of the Merger Agreement.

Note 6. Stockholders' Equity

On June 20, 2018, the Company's stockholders approved an amendment to the Company's Restated Certificate of Incorporation, as amended, to effect a reverse stock split of the Company's outstanding shares of common stock at a ratio within a range from 1-for-4 to 1-for-8 and set the number of authorized shares of the Company's common stock at a number determined by calculating the product of 280,000,000 multiplied by two times (2x) the reverse stock split ratio. As further described in Note 12, in July 2018, the Company effected a 1-for-8 reverse stock split of its common stock and set the number of authorized shares of the Company's common stock at 70,000,000.

Common Stock Warrants

In connection with various financing transactions, the Company has issued warrants to purchase shares of the Company's common stock. The Company accounts for warrants as equity instruments, derivative liabilities, or liabilities, depending on the specific terms of the warrant. As of June 30, 2018 and December 31, 2017, all of the Company's outstanding warrants were equity-classified.

Note 6. Stockholders' Equity (Continued)

The following table summarizes outstanding warrants to purchase shares of the Company's common stock as of June 30, 2018 and December 31, 2017:

Description	Number of Shares		Weighted-Average Exercise Price	Expiration Date
	June 30, 2018	December 31, 2017		
Issued in May 2013 financing	—	2,700,791	$ 3.76	May 2018
Issued in May 2013 financing (pre-funded)	1,977,041	1,977,041	$ 0.08	May 2020
Issued in September 2013 financing (pre-funded)	521,997	521,997	$ 0.08	Sep 2020
Issued in February 2014 financing (pre-funded)	269,844	269,844	$ 0.08	Feb 2021
Total	2,768,882	5,469,673		

The table below is a summary of the Company's warrant activity for the six months ended June 30, 2018:

	Number of Warrants	Weighted-Average Exercise Price
Outstanding at December 31, 2017	5,469,673	$ 1.90
Issued	—	—
Exercised (1)	(2,700,791)	3.76
Expired	—	—
Outstanding at June 30, 2018	2,768,882	$ 0.08

(1) During the six months ended June 30, 2018, a related party exercised certain of these warrants as more fully described in Note 10.

Note 7. Alliance Revenue

Alliance revenue for the six months ended June 30, 2018 and 2017 represents revenue from contracts with customers accounted for in accordance with ASC Topic 606, which the Company adopted in the first quarter of 2018, as more fully described in Note 2. There was no impact to Alliance revenue previously recognized by the Company as a result of the adoption of ASC Topic 606.

For the three and six months ended June 30, 2018 and 2017, Alliance revenue in the accompanying statements of operations and comprehensive loss is comprised of the following:

(In thousands)	Three months ended June 30,		Six months ended June 30,	
	2018	2017	2018	2017
GSK collaboration (1)	$ 141	$ 186	$ 283	$ 557
Vivelix collaboration (2)	—	—	56	—
Other (3)	22	1	79	8
Total Alliance revenue	$ 163	$ 187	$ 418	$ 565

(1) For all periods presented, revenue recognized primarily relates to the amortization of the deferred up-front payment received at inception of the Company's collaboration and license agreement with GSK Agreement, as more fully described in Note 8. Revenue recognized for the six months ended June 30, 2017 also includes an additional $0.1 million related to additional research services provided in connection with the collaboration and license agreement with GSK.

(2) For the six months ended June 30, 2018, revenue recognized relates to services provided under the research program provided for under the Company's exclusive license and collaboration agreement with Vivelix, as more fully described in Note 8.

Note 7. Alliance Revenue (Continued)

(3) For all periods presented, revenue recognized relates to collaborations which are not material to the Company's current operations nor expected to be material in the future, including reimbursements by licensees of costs associated with patent maintenance.

The following table presents changes in the Company's contract assets and liabilities during the six months ended June 30, 2018 and 2017:

	Six months ended June 30, 2018			
(In thousands)	Beginning	Additions	Deductions	Ending
Contract assets	$ —	$ —	$ —	$ —
Contract liabilities:				
Deferred revenue	$ 566	$ —	$ (331)	$ 235

	Six months ended June 30, 2017			
(In thousands)	Beginning	Additions	Deductions	Ending
Contract assets	$ —	$ —	$ —	$ —
Contract liabilities:				
Deferred revenue	$ 1,263	$ —	$ (465)	$ 798

During each of the six months ended June 30, 2018 and 2017, the Company recognized Alliance revenues of $0.3 million and $0.5 million, respectively, as a result of changes in the contract liability balances associated with its contracts with customers. Revenue recognized during each of the six months ended June 30, 2018 and 2017 were included in the contract liability at the beginning of each respective period. As of June 30, 2018, contract liabilities consisted of deferred revenue related entirely to the Company's collaboration and license agreement with GSK and were included in Deferred revenue in the accompanying condensed balance sheet.

See Note 8 for additional details regarding the Company's collaboration arrangements.

Note 8. Collaboration and License Agreements

Collaboration with Vivelix

In November 2016, the Company entered into an exclusive license and collaboration agreement with Vivelix pursuant to which the Company granted Vivelix worldwide rights to develop and market IMO-9200, an antagonist of TLR7, TLR8, and TLR9, for non-malignant gastrointestinal disorders (the "GI Field" or "Field" as defined in the Vivelix Agreement), and certain back-up compounds to IMO-9200 (the "Vivelix Agreement"). The Company was previously developing IMO-9200 for potential use in selected autoimmune disease indications. However, the Company determined not to proceed with internal development of IMO-9200 because the large autoimmune disease indications for which IMO-9200 had been developed did not fit within the strategic focus of the Company. Under the terms of the Vivelix Agreement, Vivelix is solely responsible for the development and commercialization of IMO-9200 and any designated back-up compounds. In connection with the Vivelix Agreement, Idera also transferred certain drug material to Vivelix for Vivelix's use in its development activities.

Pursuant to the Vivelix Agreement, Vivelix could request that Idera create, characterize and perform research on back-up compounds (the "Research Program"). Such activity was to be mutually agreed upon and moderated by the Joint Research Committee ("JRC") established under the Vivelix Agreement. The research period commenced with the execution of the agreement and may last for up to three years. As a result of the Company's decision to wind-down its discovery operations as described in Note 12, in July 2018, the Company has informed Vivelix that no additional research projects will be undertaken by Idera.

Note 8. Collaboration and License Agreements (Continued)

Vivelix has certain rights under the agreement whereby it may exercise (i) the right of first refusal to develop and commercialize products in any available field ("Right of First Refusal"), (ii) the right of first negotiation to obtain an exclusive license for any compound controlled by Idera that has activity in the field of inflammatory bowel disease ("Right of First Negotiation") and (iii) the right to request an expanded Field beyond the GI Field ("Expanded Field Option").

Under the terms of the Vivelix Agreement, the Company received an upfront, non-refundable fee of $15 million. In addition, the Company will be eligible for future IMO-9200 related development, regulatory and sales milestone payments totaling up to $140 million, including development and regulatory milestones totaling up to $65 million and sales milestones totaling up to $75 million, and escalating royalties ranging from the mid single-digits to low double-digits of global net sales, which percentages are subject to reduction under agreed upon circumstances. As it relates to back-up compounds, the Company will be eligible for related designation payments and development, regulatory and sales milestone payments totaling up to $52.5 million, including development and regulatory milestones totaling up to $35 million and sales milestones totaling up to $17.5 million and escalating royalties ranging from the mid single-digits to low double-digits of global net sales, which percentages are subject to reduction under agreed upon circumstances. Under the terms of the agreement, the Company has performed research services, as requested by Vivelix and at Vivelix's expense.

At the effective date of the Vivelix Agreement, Baker Bros. Advisors LP and certain of its affiliated funds (collectively, "Baker Brothers") beneficially owned approximately 7.0% of the Company's outstanding common stock. Baker Brothers also owned a controlling financial interest of Vivelix at the effective date of the Vivelix Agreement and as of December 31, 2017. Affiliates of Baker Brothers constitute two of the four directors on the board of directors of Vivelix and two of the seven directors on the board of directors of the Company. However, the boards of the Company and Vivelix share no common board members.

Accounting Analysis under ASC 606

In evaluating the Vivelix Agreement in accordance with ASC Topic 606, the Company concluded that the contract counterparty, Vivelix, is a customer. The Company identified the following performance obligations as of the inception of agreement: (i) a research and commercialization license for IMO-9200 and back-up compounds to IMO-9200 (the "IMO-9200 License") and (ii) drug materials transferred, which were both deemed to be distinct. The Company determined that participation in the JRC was deemed immaterial in the context of the contract. Consistent with the guidance under ASC 606-10-25-16A, the Company disregarded immaterial promised goods and services when determining performance obligations.

The Company concluded that the IMO-9200 License was distinct within the context of the contract (i.e. separately identifiable) because it has stand-alone value from other promised goods and services as Vivelix could benefit from the IMO-9200 License on a stand-alone basis and sell the compound in the market without any additional involvement or participation from Idera. Additionally, Idera has no further obligations related to the IMO-9200 License. In the event that Vivelix does not make a designated compound payment, the license to back-up compounds reverts back to Idera at the end of the research term at no cost or payment by either party. The services provided under the Research Program relate to the back-up compounds and Vivelix would be able to conduct research and development activities with external third parties, as IMO-9200 is at an advanced enough stage where Idera's expertise would not be required. Accordingly, the IMO-9200 License is a separate performance obligation.

The Company concluded that the drug materials transferred identified at the inception are also distinct within the context of the contract (i.e. separately identifiable) because they have standalone value from other promised goods and services based on their nature. Accordingly, the drug materials transferred are a separate performance obligation.

Note 8. Collaboration and License Agreements (Continued)

Allocable arrangement consideration at inception of the Vivelix Agreement was comprised of the up-front payment of $15 million. The $15 million was allocated based on the relative stand-alone selling prices of each performance obligation. Allocated revenue associated with the IMO-9200 License was recognized at the inception of the Vivelix Agreement in the fourth quarter of 2016 as Vivelix was granted an exclusive, perpetual license to develop and commercialize IMO-9200 and certain back-up compounds to IMO-9200, subject to certain designation milestone and royalty payments, and the performance obligations of Idera under the agreement were extinguished at that point. Allocable revenue associated with drug materials transferred shortly after the inception of the agreement was recognized upon delivery, also in the fourth quarter of 2016.

At inception of the contract, the transaction price included only the $15.0 million up-front consideration received. None of the development and commercialization milestones were included in the transaction price, as all milestone amounts were fully constrained. As part of its evaluation of the constraint, the Company considered numerous factors, including that receipt of the milestones is outside the control of the Company and contingent upon success in future clinical trials and the licensee's efforts. Similarly, other variable consideration related to services that may be provided under the Research Program and back-up compound designation payments were fully constrained. Any consideration related to sales-based royalties will be recognized when the related sales occur, provided that the reported sales are reliably measurable and the Company has no remaining performance obligations, as such sales were determined to relate predominantly to the license granted to Vivelix and therefore have also been excluded from the transaction price. The Company re-evaluates the transaction price in each reporting period and as uncertain events are resolved or other changes in circumstances occur.

Revenue associated with goods and services provided to Vivelix under the Research Program have been immaterial to date and such revenue is recognized as the related performance obligations under each research project are satisfied. See Note 7 for details on revenue recognized in connection with the Company's collaboration with Vivelix for the three and six months ended June 30, 2018 and 2017.

Collaboration with GSK

In November 2015, the Company entered into a collaboration and license agreement with GSK to license, research, develop and commercialize pharmaceutical compounds from the Company's nucleic acid chemistry technology for the treatment of selected targets in renal disease (the "GSK Agreement"). The initial collaboration term is currently anticipated to last between two and four years. In connection with the GSK Agreement, GSK identified an initial target for the Company to attempt to identify a potential population of development candidates to address such target under a mutually agreed upon research plan, which is estimated to take 36 months to complete. From the population of identified development candidates, GSK may designate one development candidate in its sole discretion to move forward into clinical development. If GSK designates a development candidate, GSK would be solely responsible for the development and commercialization activities for that designated development candidate.

The GSK Agreement also provided GSK with the option to select up to two additional targets at any time during the first two years of the GSK Agreement for further research under mutually agreed upon research plans. Upon selecting additional targets, GSK then had the option to designate one development candidate for each additional target, at which time GSK would have sole responsibility to develop and commercialize each such designated development candidate. GSK did not select any additional targets for research through expiry of the option period.

In accordance with the GSK Agreement, a Joint Steering Committee ("JSC") was formed with equal representation from Idera and GSK. The responsibilities of the JSC, include, but are not limited to monitoring the progress of the collaboration, reviewing research plans and dealing with disputes that may arise between the parties. If a dispute cannot be resolved by the JSC, GSK has final decision making authority.

Note 8. Collaboration and License Agreements (Continued)

Under the terms of the GSK Agreement, the Company received a $2.5 million upfront, non-refundable, non-creditable cash payment upon the execution of the GSK Agreement. Additionally, the Company was eligible to receive a total of up to approximately $100 million in license, research, clinical development and commercialization milestone payments, of which $9 million of these milestone payments would have been payable by GSK upon the identification of the additional targets, the completion of current and future research plans and the designation of development candidates and $89 million would have been payable by GSK upon the achievement of clinical milestones and commercial milestones. As a result of GSK not selecting additional targets during the two-year option period, the Company is now only eligible to receive a total of up to approximately $20 million in license, research, clinical development and commercialization milestone payments, of which $1 million of these milestone payments would be payable by GSK upon the designation of a development candidate from the initial target and $17 million would be payable by GSK upon the achievement of clinical milestones and commercial milestones. In addition, the Company is eligible to receive royalty payments on sales upon commercialization at varying rates of up to 5% on annual net sales, as defined in the GSK Agreement.

Accounting Analysis under ASC 606

In evaluating the GSK Agreement in accordance with ASC Topic 606, the Company concluded that the contract counterparty, GSK, is a customer. The Company identified the following performance obligations as of the inception of the agreement: (i) research services, combined with the license for Idera's proprietary technology related to the initial target (collectively, the "Collaboration License and Research Services") and (ii) daily options to extend the Collaboration License and Research Services. The Company determined that participation in the JSC and materials transferred were deemed immaterial in the context of the contract. Consistent with the guidance under ASC 606-10-25-16A, the Company disregarded immaterial promised goods and services when determining performance obligations.

The Company concluded that the research services related to the initial target and collaboration license to the Company's proprietary technology related to the initial target were not capable of being distinct as the collaboration license related to the initial target is highly interdependent upon the research services to be provided related to the initial target. As it relates to the assessment of standalone value, the Company determined that GSK cannot fully exploit the value of the collaboration license without receipt of the research services from the Company. The research services involve unique skills and specialized expertise, particularly as it relates to the Company's proprietary technology, which is not available in the marketplace. Accordingly, GSK must obtain the research services from the Company which significantly limits the ability for GSK to utilize the collaboration license for its intended purpose on a standalone basis. Similarly, the Company concluded that the daily option to extend the collaboration license and the daily option to extend the research services were also highly interdependent as the license has no value to GSK without the accompanying research services using the Company's proprietary technology. Accordingly, the Collaboration License and Research Services were determined to represent a single performance obligation and the daily options to extend the Collaboration License and Research Services were determined to represent a single performance obligation. Factors considered in this determination included, among other things, the capabilities of the collaborator, whether any other vendor sells the item separately, whether the value of the deliverable is dependent on the other elements in the arrangement, whether there are other vendors that can provide the items and if the customer could use the item for its intended purpose without the other deliverables in the arrangement.

Allocable arrangement consideration at inception of the GSK Agreement consisted of the up-front payment of $2.5 million. The $2.5 million was allocated based on the relative stand-alone selling prices of each performance obligation, calculated based on the expected period of time over which the initial license term will be in place, as well as the expected period of time over which the optional renewals occur. The Company will recognize the consideration allocated to the Collaboration License and Research Services over time as GSK is receiving the benefit of the Company's expertise and know-how on an on-going basis as the research progresses towards the goal of the development candidate designation for the initial target. The exercise of the daily options to extend the Collaboration License and Research Services are treated as a continuation of the contract and allocated consideration is recognized point-in-time upon commencement of each daily exercise.

Note 8. Collaboration and License Agreements (Continued)

At inception of the contract, the transaction price included only the $2.5 million up-front consideration received. None of the development and commercialization milestones were included in the transaction price, as all milestone amounts were fully constrained. As part of its evaluation of the constraint, the Company considered numerous factors, including that receipt of the milestones is outside the control of the Company and contingent upon success in future clinical trials and the licensee's efforts. Any consideration related to sales-based royalties will be recognized when the related sales occur, provided that the reported sales are reliably measurable and the Company has no remaining performance obligations, as such sales were determined to relate predominantly to the license granted to GSK and therefore have also been excluded from the transaction price. The Company re-evaluates the transaction price in each reporting period and as uncertain events are resolved or other changes in circumstances occur.

The up-front payment of $2.5 million was recorded as deferred revenue in the Company's balance sheet upon receipt and is currently being recognized as revenue on a straight line basis over the estimated 36 month research plan period, which approximates the timing in which performance obligations are satisfied. See Note 7 for details on revenue recognized in connection with the Company's collaboration with GSK for each of the three and six months ended June 30, 2018 and 2017.

Note 9. Stock-Based Compensation

Equity Compensation Plans

2013 Stock Incentive Plan

The Company's board of directors adopted the 2013 Stock Incentive Plan (as amended to date, the "2013 Plan"), which was approved by the Company's stockholders effective July 26, 2013. The 2013 Plan is intended to further align the interests of the Company and its stockholders with its employees, including its officers, non-employee directors, consultants and advisers by providing equity-based incentives. The 2013 Plan allows for the issuance of up to such number of shares of the Company's common stock as equal to (i) 3,153,057 shares of common stock; plus (ii) such additional number of shares of common stock (up to 868,372 shares) as is equal to the sum of the number of shares of common stock subject to awards granted under the Company's 2005 Stock Incentive Plan (the "2005 Plan") or the Company's 2008 Stock Incentive Plan (the "2008 Plan" and, together with the 2005 Plan, the "Existing Plans") which awards expire, terminate or are otherwise surrendered, canceled, forfeited or repurchased by the Company at their original issuance price pursuant to a contractual repurchase right (subject, however, in the case of incentive stock options to any limitations of the Internal Revenue Code).

As of June 30, 2018, options to purchase a total of 2,050,232 shares of common stock were outstanding and up to 1,308,485 shares of common stock remained available for grant under the 2013 Plan. The Company has not made any awards pursuant to other equity incentive plans, including the Existing Plans, since the Company's stockholders approved the 2013 Plan. As of June 30, 2018, options to purchase a total of 511,093 shares of common stock were outstanding under these earlier plans.

In addition, as of June 30, 2018, non-statutory stock options to purchase an aggregate of 393,750 shares of common stock were outstanding that were issued outside of the 2013 Plan to certain employees in 2017, 2015 and 2014 pursuant to the Nasdaq inducement grant exception as a material component of new hires' employment compensation.

2017 *Employee Stock Purchase Plan*

The Company's board of directors adopted the 2017 Employee Stock Purchase Plan (the "2017 ESPP") which was approved by the Company's stockholders and became effective on June 7, 2017. The 2017 ESPP provides for the issuance of up to 62,500 shares of common stock to participating employees of the Company or its subsidiaries. Participation is limited to employees that would not own 5% or more of the total combined voting power or value of the stock of the Company after the grant. As of June 30, 2018, 44,006 shares remained available for issuance under the 2017 ESPP.

Note 9. Stock-Based Compensation (Continued)

For the six months ended June 30, 2018 and 2017, the Company issued 13,112 and 10,418 shares of common stock, respectively, under the 2017 ESPP and the Company's 1995 Employee Stock Purchase Plan and received proceeds of approximately $0.2 million and $0.1 million during each period, respectively, as a result of employee stock purchases.

Accounting for Stock-based Compensation

The Company recognizes non-cash compensation expense for stock-based awards under the Company's equity incentive plans over an award's requisite service period, or vesting period, using the straight-line attribution method, based on their grant date fair value determined using the Black-Scholes option-pricing model. The Company also recognizes non-cash compensation for stock purchases made under the 2017 ESPP. The fair value of the discounted purchases made under the Company's 2017 ESPP is calculated using the Black-Scholes option-pricing model. The fair value of the look-back provision plus the 15% discount is recognized as compensation expense over each plan period.

Total stock-based compensation expense attributable to stock-based payments made to employees and directors and employee stock purchases included in operating expenses in the Company's statements of operations for the three and six months ended June 30, 2018 and 2017 was as follows:

	Three Months Ended June 30,		Six Months Ended June 30,	
(in thousands)	2018	2017	2018	2017
Stock-based compensation:				
Research and development				
Employee Stock Purchase Plans	$ 29	$ 20	$ 51	$ 42
Equity Incentive Plans	520	4,627	1,076	5,341
	$ 549	$ 4,647	$ 1,127	$ 5,383
General and administrative				
Employee Stock Purchase Plans	$ 18	$ 11	$ 32	$ 30
Equity Incentive Plans	971	1,100	1,968	2,129
	$ 989	$ 1,111	$ 2,000	$ 2,159
Total stock-based compensation expense	$ 1,538	$ 5,758	$ 3,127	$ 7,542

During the six months ended June 30, 2018 and 2017, the weighted average fair market value of stock options granted was $9.76 and $8.00, respectively. The following weighted average assumptions apply to the options to purchase 569,199 and 488,915 shares of common stock granted to employees and directors during the six months ended June 30, 2018 and 2017, respectively:

	Six Months Ended June 30,	
	2018	2017
Average risk free interest rate	2.2%	1.7%
Expected dividend yield	—	—
Expected lives (years)	3.9	4.0
Expected volatility	75.6%	86.9%
Weighted average exercise price (per share)	$ 17.42	$ 12.80

All options granted during the six months ended June 30, 2018 were granted at exercise prices equal to the fair market value of the common stock on the dates of grant**.**

Note 9. Stock-Based Compensation (Continued)

Stock Option Activity

The following table summarizes stock option activity for the six months ended June 30, 2018:

($ in thousands, except per share data)	Stock Options	Weighted-Average Exercise Price	Weighted-Average Remaining Contractual Life (in years)	Aggregate Intrinsic Value
Outstanding at December 31, 2017	2,675,184	$ 23.52	6.5	$ 5,805
Granted	569,199	17.42		
Exercised	(858)	12.77		
Forfeited	(162,420)	19.04		
Expired	(126,030)	55.07		
Outstanding at June 30, 2018 (1)	2,955,075	$ 21.25	6.6	$ 1,191
Exercisable at June 30, 2018	1,901,703	$ 22.98	5.4	$ 1,190

(1) Includes both vested stock options as well as unvested stock options for which the requisite service period has not been rendered but that are expected to vest based on achievement of a service condition.

The fair value of options that vested during the six months ended June 30, 2018 was $3.8 million. As of June 30, 2018, there was $9.6 million of unrecognized compensation cost related to unvested options, which the Company expects to recognize over a weighted average period of 2.4 years.

Note 10. Related Party Transactions

Overview of Related Parties

Youssef El Zein, a member of the Company's Board until his resignation in October 2017, is a director and controlling stockholder of Pillar Invest Corporation ("Pillar Invest"), which is the general partner of Pillar Pharmaceuticals I, L.P. ("Pillar I"), Pillar Pharmaceuticals II, L.P. ("Pillar II"), Pillar Pharmaceuticals III, L.P. ("Pillar III"), Pillar Pharmaceuticals IV, L.P. ("Pillar IV") and Pillar Pharmaceuticals V, L.P. ("Pillar V") and a limited partner of Pillar I, Pillar II, Pillar III, Pillar IV and Pillar V. Entities affiliated with Pillar Invest and Participations Besancon ("Besancon"), an investment fund advised by Pillar Invest having no affiliation with Mr. El Zein, Pillar I, Pillar II, Pillar III, Pillar IV, Pillar V or Pillar Invest (collectively, the "Pillar Investment Entities"), owned approximately 12% of the Company's common stock as of June 30, 2018.

Julian C. Baker, a member of the Company's Board, is a principal of Baker Bros. Advisors, LP. Baker Bros. Advisors, LP and certain of its affiliated funds (collectively, "Baker Brothers") owned approximately 18% of the Company's common stock as of June 30, 2018. Additionally, one of the Company's directors, Kelvin M. Neu, was an employee of Baker Bros. Advisors, LP as of June 30, 2018.

Pillar Investment Entities

During the six months ended June 30, 2018, Besancon exercised warrants to purchase 150,000 shares of the Company's common stock at an exercise price of $3.76 per share for a total exercise price of approximately $0.6 million.

Baker Brothers

During the six months ended June 30, 2018, Baker Brothers exercised warrants to purchase 2,539,541 shares of the Company's common stock at an exercise price of $3.76 per share for a total exercise price of approximately $9.5 million.

As of June 30, 2018, Baker Brothers held pre-funded warrants to purchase up to 2,768,882 shares of the Company's common stock at an exercise price of $0.08 per share.

Note 10. Related Party Transactions (Continued)

Board Fees Paid in Stock

Pursuant to the Company's director compensation program, in lieu of director board and committee fees incurred of $0.1 million during each of the six months ended June 30, 2018 and 2017, the Company issued 4,727 and 4,818 shares of its common stock, respectively, to certain of its directors. Director board and committee fees are paid in arrears (including fees paid in stock) and the number of shares issued was calculated based on the market closing price of the Company's common stock on the issuance date.

Note 11. Net Loss per Common Share

Basic and diluted net loss per common share applicable to common stockholders is calculated by dividing net loss applicable to common stockholders by the weighted-average number of shares of common stock outstanding during the period, without consideration of common stock equivalents. The Company's potentially dilutive shares, which include outstanding stock option awards, common stock warrants and convertible preferred stock, are considered to be common stock equivalents and are only included in the calculation of diluted net loss per share when their effect is dilutive. For the three and six months ended June 30, 2018 and 2017, diluted net loss per common share applicable to common stockholders was the same as basic net loss per common share applicable to common stockholders as the effects of the Company's potential common stock equivalents are antidilutive.

Total antidilutive securities that were excluded from the calculation of diluted net loss per share, due to their anti-dilutive effect, were 5,725,883 and 9,102,569 as of June 30, 2018 and 2017, respectively, and consisted of stock options, preferred stock and warrants.

Note 12. Subsequent Events

The Company considers events or transactions that occur after the balance sheet date but prior to the issuance of the financial statements to provide additional evidence relative to certain estimates or to identify matters that require additional disclosure.

Termination of Agreement and Plan of Merger

On July 10, 2018, BioCryst terminated the Merger Agreement following the July 10, 2018 special meeting of BioCryst stockholders at which BioCryst's stockholders voted against the adoption of the Merger Agreement.

In accordance with the Merger Agreement, BioCryst paid the Company a fixed expense reimbursement amount of $6 million in July 2018 in connection with the termination of the Merger Agreement.

Reverse Stock Split

On July 27, 2018, the Company implemented a 1-for-8 reverse split of its issued and outstanding shares of common stock, $0.001 par value per share (the "Reverse Split"), and set the number of its authorized shares of common stock to 70,000,000, as authorized at a special meeting of stockholders on June 20, 2018. The Reverse Split became effective on July 27, 2018 at 5:00 p.m., Eastern Time, and the Company's common stock began trading on the Nasdaq Capital Market on a Reverse Split-adjusted basis at the opening of trading on July 30, 2018. As of a result of the Reverse Split, every eight shares of the Company's issued and outstanding common stock were combined into one share of its common stock, except to the extent that the Reverse Split resulted in any of the Company's stockholders owning a fractional share, which was settled in cash. In connection with the Reverse Split, there was no change in the nominal par value per share of $0.001. The Reverse Split did not change the number of authorized shares or par value of the Company's preferred stock.

Note 12. Subsequent Events (Continued)

Restructuring

In July 2018, the Company determined to wind-down its discovery operations, close its Cambridge, Massachusetts facility and reduce the workforce in Cambridge, Massachusetts that supports such operations. In connection with the reduction-in-workforce, 18 positions are being eliminated, primarily in the area of discovery, representing approximately 40% of the Company's employees. The Company will incur one-time termination costs in connection with the reduction in workforce of approximately $2.9 million, which includes severance, benefits and related costs, for the quarter ended September 30, 2018. Additionally, the Company expects to incur non-cash fixed asset impairments of less than $1.0 million and to incur other cash expenditures in the third and fourth quarters of 2018 related to the wind-down of its Cambridge, Massachusetts facility, which are not expected to be material to the Company's financial condition and results of the operations.

In connection with the closing of its Cambridge, Massachusetts facility, on July 27, 2018, the Company entered into a termination agreement with the landlord terminating the lease agreement, dated October 31, 2006, as amended, between the Company and the landlord effective September 30, 2018. The Company leased its facility at 167 Sidney Street in Cambridge, Massachusetts under the lease agreement. Under the terms of the termination agreement, the Company has agreed to pay an early termination fee of $0.2 million. The Company expects to record a charge for the $0.2 million early termination fee and a non-cash gain of $0.4 million due to the write-off of the remaining deferred rent liability associated with the lease in the third quarter of 2018. The Company is consolidating its operations at its Exton, Pennsylvania location.

Item 2. Management's Discussion and Analysis of Financial Condition and Results of Operations.

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with:

- *our unaudited condensed financial statements and accompanying notes included in Part I, Item 1 of this Quarterly Report on Form 10-Q; and*
- *our audited financial statements and accompanying notes included in our Annual Report on Form 10-K for 2017, or our 2017 Form 10-K, as well as the information contained under the heading "Management's Discussion and Analysis of Financial Condition and Results of Operations" in our 2017 Form 10-K.*

Overview

We are a clinical-stage biopharmaceutical company currently focused on the development, and ultimately the commercialization of, therapeutic drug candidates, including our Toll-like receptor, or TLR, agonist, tilsotolimod (IMO-2125), for oncology. Our business strategy is focused on the clinical development of drug candidates for oncology indications characterized by small, well-defined patient populations with serious unmet medical needs. We believe we can develop and commercialize these targeted therapies on our own. To the extent we seek to develop drug candidates for broader disease indications, we have entered into and may explore additional collaborative alliances to support development and commercialization.

TLRs are key receptors of the immune system and play a role in innate and adaptive immunity. As a result, we believe TLRs are potential therapeutic targets for the treatment of a broad range of diseases. Using our chemistry-based platform, we have designed both TLR agonists and antagonists to act by modulating the activity of targeted TLRs. A TLR agonist is a compound that stimulates an immune response through the targeted TLR. A TLR antagonist is a compound that inhibits an immune response by blocking the targeted TLR.

Our current TLR-targeted clinical-stage drug candidate, tilsotolimod, is an agonist of TLR9. We are developing tilsotolimod, via intratumoral injection, for the treatment of anti-PD1 refractory metastatic melanoma in combination with ipilimumab, an anti-CTLA4 antibody marketed as Yervoy® by Bristol-Myers Squibb Company. We are also investigating the combination of intratumoral tilsotolimod in combination with pembrolizumab, an anti-PD1 antibody marketed as Keytruda® by Merck & Co., for the treatment of anti-PD1 refractory metastatic melanoma and tilsotolimod for the treatment of various solid tumors.

Termination of Merger Agreement

On January 21, 2018, we entered into an Agreement and Plan of Merger, or the Merger Agreement, with BioCryst Pharmaceuticals, Inc., or BioCryst, Nautilus Holdco, Inc., a direct, wholly owned subsidiary of BioCryst, or Holdco, Island Merger Sub, Inc., a direct, wholly owned subsidiary of Holdco, and Boat Merger Sub, Inc., a direct, wholly owned subsidiary of Holdco. The board of directors of each of Idera and BioCryst unanimously approved the Merger Agreement and the transactions contemplated thereby and the required regulatory approvals were received. However, the proposed merger was subject to approval by the stockholders of Idera and BioCryst, and satisfaction of other customary closing conditions, as specified in the Merger Agreement.

At a special meeting of BioCryst stockholders held on July 10, 2018, BioCryst's stockholders voted against the adoption of the Merger Agreement. Following such vote and in accordance with the terms of the Merger Agreement, BioCryst terminated the Merger Agreement on July 10, 2018.

In accordance with the Merger Agreement, BioCryst paid us a fixed expense reimbursement amount of $6 million in connection with the termination of the Merger Agreement.

Corporate Consolidation and Wind-down of Discovery Operations

In July 2018, following an analysis of our gene-silencing technology platform and our research portfolio, we decided to suspend our rare disease and discovery programs, including our nucleic acid chemistry research program, as part of our overall strategy to more narrowly focus on the development and commercialization of tilsotolimod. In connection with this focused strategy, we are closing our operating facility in Cambridge, Massachusetts and consolidating our operations at our Exton, Pennsylvania location.

In connection with these actions, we are eliminating 18 positions, primarily in the area of discovery, representing approximately 40% of our employee base.

We entered into a lease termination agreement on July 27, 2018 with ARE-MA-Region No. 23 LLC terminating our lease agreement for our Cambridge, Massachusetts facility, effective September 30, 2018. We will incur a $0.2 million early termination fee, however, the lease termination is expected to result in annual cash savings of approximately $2.0 million. Of the 18 positions being eliminated, 15 were effective July 31, 2018 with the remaining expected to be eliminated by December 31, 2018. We expect to incur one-time termination costs in connection with the reduction in workforce of approximately $2.9 million. Additionally, we expect to incur non-cash fixed asset impairments of less than $1.0 million and other cash expenditures in the third and fourth quarters of 2018 related to the facility closing which are not expected to be material to our financial condition and results of the operations. In the aggregate, the aforementioned actions are expected to result in annual cash savings of approximately $10 million, which includes the savings related to the lease termination described above.

Clinical Development

Tilsotolimod (IMO-2125)

Tilsotolimod (IMO-2125) is a synthetic phosphorothioate oligonucleotide that acts as a direct agonist of TLR9 to stimulate the innate and adaptive immune systems. We are developing tilsotolimod for administration via intratumoral injection, for the treatment of anti-PD1 refractory metastatic melanoma in combination with ipilimumab. We are also investigating the combination of intratumoral tilsotolimod and pembrolizumab for the treatment of anti-PD1 refractory metastatic melanoma and intratumoral tilsotolimod in various solid tumors. We refer to our tilsotolimod development program as the ILLUMINATE development program.

Advancements in cancer immunotherapy have included the approval and late-stage development of multiple checkpoint inhibitors, which are therapies that target mechanisms by which tumor cells evade detection by the immune system. Despite these advancements, many patients fail to respond to these therapies. For instance, approximately 50% of patients with melanoma fail to respond to therapy with approved checkpoint inhibitors. Current published data suggests that the lack of response to checkpoint inhibition is related to a non-immunogenic tumor micro environment. Because TLR9 agonists, such as tilsotolimod, stimulate the immune system, we believe there is a scientific rationale to evaluate the combination of intratumoral injection of tilsotolimod with checkpoint inhibitors. Specifically, we believe intratumoral injection of tilsotolimod activates a local immune response in the injected tumor, which may complement the effect of the systemically administered checkpoint inhibitors.

In studies in preclinical cancer models conducted in our laboratories, intratumoral injection of TLR9 agonists, such as tilsotolimod, has potentiated the anti-tumor activity of multiple checkpoint inhibitors in multiple tumor models. These data have been presented at several scientific and medical conferences from 2014 through the second quarter of 2018. We believe these data support evaluation of combination regimens including the combination of a TLR9 agonist, such as tilsotolimod, with one or more checkpoint inhibitors for the treatment of cancer.

Melanoma

Melanoma is a type of skin cancer that begins in a type of skin cell called melanocytes. Although melanoma is a rare form of skin cancer, it causes the large majority of skin cancer deaths. As is the case in many forms of cancer, melanoma becomes more difficult to treat once the disease has spread beyond the skin to other parts of the body such as the lymphatic system (metastatic disease). Additionally, despite recent advances in therapy, such

as immune checkpoint inhibitors, advanced metastatic melanoma continues to present significant morbidity and mortality.

We are currently developing tilsotolimod for use in combination with checkpoint inhibitors for the treatment of patients with anti-PD1 refractory metastatic melanoma. We believe, based on internally conducted commercial research, that in the United States, by 2025, approximately 20,000 people will have metastatic melanoma and over 50% will not have responded to first-line anti-PD1 therapy. We also believe TLR9 agonists may be useful in other solid tumor types that are refractory to anti-PD1 treatment due in part to low mutation load and low dendritic cell infiltration.

Tilsotolimod has received Orphan Drug Designation for the treatment of melanoma Stages IIb to IV and Fast Track designation for the treatment of anti-PD1 refractory metastatic melanoma in combination with ipilimumab therapy from the U.S. Food and Drug Administration, or FDA.

Phase 1/2 Trial of Tilsotolimod (IMO-2125) in Combination with Ipilimumab or Pembrolizumab in Patients with Anti-PD1 Refractory Metastatic Melanoma

In December 2015, we initiated a Phase 1/2 clinical trial to assess the safety and efficacy of tilsotolimod, administered intratumorally, in combination with ipilimumab, in patients with metastatic melanoma (refractory to treatment with a PD1 inhibitor, also referred to as anti-PD1 refractory), which we refer to as ILLUMINATE-204. We subsequently amended the trial protocol to enable an additional arm to study the combination of tilsotolimod with pembrolizumab in the same patient population. In this clinical trial, tilsotolimod is administered intratumorally into a selected tumor lesion at weeks 1, 2, 3, 5, 8, 11, 17, 23 and 29 (total of 9 doses) together with the standard dosing regimen of ipilimumab or pembrolizumab, administered intravenously. For patients who lack superficially accessible disease for injection, tilsotolimod is administered via injection into deep lesions, such as liver metastases, using interventional radiology guidance.

The trial was initiated at the University of Texas, MD Anderson Cancer Center, or MD Anderson, under the strategic research alliance we entered into with MD Anderson in June 2015, and additional sites have been added through the second quarter of 2018. We anticipate that more sites will be added, to bring the total number of participating sites for the trial to ten. The primary objectives of the Phase 1 portion of the trial include characterizing the safety of the combinations and determining the recommended Phase 2 dose. A secondary objective of the Phase 1 portion of the trial is describing the anti-tumor activity of tilsotolimod when administered intratumorally in combination with ipilimumab or pembrolizumab. The primary objective of the Phase 2 portion of the trial is to determine the objective response rate to the combinations using immune-related response criteria (irRC) and RECIST v1.1 criteria. The secondary objectives of the Phase 2 portion of the trial include the assessment of treatment response utilizing irRC, determination of median progression free survival (PFS) and median overall survival (OS), and to continue to characterize the safety of the combinations. In the Phase 1 portion of the trial, serial biopsies are being taken of selected injected and non-injected tumor lesions pre- and post-24 hours of the first dose of tilsotolimod, as well as at 8 and 13 weeks, to assess immune changes and response assessments. In the Phase 2 portion of the trial, biopsies are optional.

Ipilimumab Arm

In the Phase 1 portion of the ipilimumab arm of our Phase 1/2 clinical trial of tilsotolimod, escalating doses of tilsotolimod ranging from 4 mg through 32 mg were evaluated. In April 2017, we completed tilsotolimod dose escalation and based on the safety and efficacy data and data from translational immune parameters, selected the 8 mg dose level as the recommended dose level for the Phase 2 portion of the ipilimumab arm of the trial.

At the 2017 European Society for Medical Oncology Congress in September 2017, we disclosed final results from the 18 patients that were evaluated with the tilsotolimod–ipilimumab combination in the Phase 1 dose escalation portion of the trial. Each of these patients but one had progressed on nivolumab or pembrolizumab prior to enrollment in the trial. As of May 31, 2017, the safety data cutoff date for the presentation, the combination of tilsotolimod and ipilimumab had been well tolerated at all dose levels studied. Also as of the safety

data cutoff date, no dose-limiting toxicities had been observed and the maximum tolerated dose had not been reached.

In April 2017, we initiated enrollment in the Phase 2 portion of the ipilimumab arm of our Phase 1/2 clinical trial of tilsotolimod with the 8 mg dose of intratumoral tilsotolimod. The Phase 2 portion of the trial utilizes a Simon two-stage design to evaluate the objective response rate of tilsotolimod in combination with ipilimumab, compared to historical data for ipilimumab alone in the anti-PD1 refractory metastatic melanoma population. Based on the responses observed, the trial has met the pre-specified futility assessment and advanced into the second stage of the Phase 2 portion. We anticipate that the Phase 2 portion of the trial will include a total of up to 60 patients dosed at the 8 mg dose, including some patients from the Phase 1 dose escalation portion who meet the efficacy criteria for the Phase 2 population, and that enrollment in the Phase 2 portion will be completed by the end of 2018.

In June 2018, at the 2018 American Society of Clinical Oncology Annual Meeting, we provided an update on our Phase 1/2 trial evaluating tilsotolimod in combination with ipilimumab at the recommended 8 mg dose level, noting that as of May 9, 2018, the data cut-off date for the presentation, a total of 26 patients had been dosed at the 8 mg dose level and 21 patients treated at the 8 mg dose level had at least one post-baseline disease assessment. Of these 21 patients, two had a complete response and six had a partial response under RECIST v.1.1 criteria, representing an overall response rate of 38%. One of the two patients who had a complete response has been continuing off active treatment for more than one year and has remained disease free. Additionally, seven other patients that were treated at the 8 mg dose level experienced stable disease, including two patients who had stable disease for at least 24 weeks, which is considered to represent meaningful clinical benefit. In the aggregate, 15 of the 21 patients achieved stable disease or better, representing a disease control rate of 71%. Additionally, as of the response data cutoff date, one patient who was treated at the 4 mg dose had an ongoing partial response and had been off active treatment for more than two years. The combination of tilsotolimod and ipilimumab continues to be well-tolerated.

Pembrolizumab Arm

In the Phase 1 portion of the pembrolizumab arm of our Phase 1/2 clinical trial of tilsotolimod, we are evaluating escalating doses of tilsotolimod ranging from 8 mg through 32 mg.

We have completed enrollment of a total of six patients in the 8 mg and 16 mg dosing cohorts in the Phase 1 dose escalation portion of the pembrolizumab arm of the trial and are continuing to enroll patients in the 32 mg dosing cohort. One patient who was treated at the 16 mg dose has experienced an ongoing complete response by RECIST v1.1 criteria.

Phase 3 Trial of Tilsotolimod (IMO-2125) in Combination with Ipilimumab in Patients with Anti-PD1 Refractory Metastatic Melanoma

In the first quarter of 2018, we initiated a Phase 3 trial of the tilsotolimod–ipilimumab combination in patients with anti-PD1 refractory metastatic melanoma, which we refer to as ILLUMINATE-301. We expect that this trial will compare the results of the tilsotolimod–ipilimumab combination to those of ipilimumab alone in a 1:1 randomization, will have a sample size of approximately 300 patients and will be conducted at approximately 80 sites worldwide, which are selected to not overlap with the trial sites for ILLUMINATE-204. The primary endpoints of the trial are overall response rate by RECIST v1.1 and median overall survival. Key secondary endpoints include ORR by irRECIST, durable response rate, median time to response, median progression free survival (PFS) and patient reported outcomes using a validated scale.

We have held discussions with and plan to continue to engage with regulatory authorities regarding the paths to registration for tilsotolimod in combination with ipilimumab in anti-PD1 refractory metastatic melanoma patients, including potentially through an accelerated approval process based on an interim analysis of the Phase 3 trial with the final analysis providing the confirmatory data for full approval.

As discussed below under the heading “Collaborative Alliances,” in May 2018, we entered into a clinical trial collaboration and supply agreement with Bristol-Myers Squibb Company, or BMS, under which BMS has agreed to manufacture and supply YERVOY® (ipilimumab), at its cost and for no charge to us, for use in ILLUMINATE-301.

Refractory Solid Tumors

illuminate 101

Phase 1b Trial of Intratumoral Tilsotolimod (IMO-2125) Monotherapy in Patients with Refractory Solid Tumors

In March 2017, we initiated a Phase 1b dose escalation trial of tilsotolimod administered intratumorally as a monotherapy in multiple tumor types, which we refer to as ILLUMINATE-101. In this trial, tilsotolimod is administered intratumorally on days 1, 8 and 15 of cycle 1 and on day 1 of each subsequent 21-day cycle, up to 17 cycles (19 total doses). We anticipate enrolling dose-escalation cohorts of approximately eight patients at doses of 8mg (cohort 1), 16mg (cohort 2), 23mg (cohort 3) and 32mg (cohort 4). We expect that a fifth cohort will be enrolled based on the recommended Phase 2 dose. After the last patient in each cohort reaches day 21 of the 21-day dose-limiting toxicity period, the Cohort Review Committee will review safety and provide a recommendation regarding dose escalation to the next dose.

We have completed enrollment in the first three cohorts and are enrolling in the fourth cohort. Additionally, we are enrolling a melanoma expansion cohort to assess the clinical activity of tilsotolimod monotherapy (8mg dose) in patients with metastatic melanoma who have progressed on or after treatment with a PD-(L)1 inhibitor. We anticipate that this cohort will enroll up to 22 subjects. The melanoma expansion cohort will use a Simon’s optimal two-stage design to test for clinically and statistically relevant clinical activity. The melanoma expansion cohort will stop if an interim futility analysis shows there is insufficient evidence of a clinically relevant response rate after eight patients (Stage 1).

CLINICAL RESEARCH SUPPORT AGREEMENT

In April 2018, we entered into a clinical development support agreement with Pillar Partners Foundation, or Pillar Partners. Under the terms of the agreement, Pillar Partners has agreed to provide direct funding to support three investigator initiated clinical trials to further strategically expand the clinical research of tilsotolimod into broader melanoma populations and other solid tumors. For these trials, we have agreed to provide tilsotolimod. We believe these trials will allow us to expand our knowledge and understanding of the various cancer types and combinations in which tilsotolimod could play a significant role in improving outcomes of patients.

Other Programs

In July 2018, following an analysis of our gene-silencing technology platform and our research portfolio, we decided to suspend our rare disease and discovery programs as part of our overall strategy to more narrowly focus our capital resources on the development and commercialization of tilsotolimod.

IMO-8400 for Rare Diseases

We have been developing IMO-8400, an antagonist of TLR7, TLR8 and TLR9, for the treatment of rare diseases, and had selected dermatomyositis as our lead clinical target. In December 2015, we initiated a Phase 2, randomized, double-blind, placebo-controlled clinical trial designed to assess the safety, tolerability and treatment effect of IMO-8400 in adult patients with dermatomyositis. In June 2018, we reported that the trial did not meet its primary endpoint of statistically significant change from baseline in the Cutaneous Dermatomyositis Disease Area and Severity Index (CDASI) activity score versus placebo. As a result, we have decided to discontinue this clinical program.

IMO-9200 for Autoimmune Disease

We have developed a second novel synthetic oligonucleotide antagonist of TLR7, TLR8, and TLR9, IMO-9200, as a drug candidate for potential use in selected autoimmune disease indications. In 2015, we completed a Phase 1 clinical trial of IMO-9200 in healthy subjects as well as additional preclinical studies of IMO-9200 for autoimmune diseases. In 2015, we determined not to proceed with the development of IMO-9200 because the large autoimmune disease indications for which IMO-9200 had been developed did not fit within the strategic focus of our company. In November 2016, we entered into an exclusive license and collaboration agreement with Vivelix Pharmaceuticals, Ltd., or Vivelix, granting Vivelix worldwide rights to develop and market IMO-9200 for non-malignant gastrointestinal disorders, which agreement we refer to as the Vivelix Agreement.

IDRA-008 Development

In January 2017, we announced that we had selected IDRA-008 as our first nucleic acid chemistry research program candidate that we plan to enter into clinical development and that we were planning to develop IDRA-008 for a well-established liver target. In January 2018, we announced that IDRA-008 was targeted at Apolipoprotein C-III (APOC-III) and was being developed for the treatment of Familial Chylomicronemia Syndrome (FCS) and Familial Partial Lipodystrophy (FPL) which had available pre-clinical animal models and well-known clinical endpoints. During the first quarter of 2018, we completed our pre-clinical analysis for IDRA-008 and based upon the outcome of pre-clinical pharmacology studies, including a comparative pharmacology study with the competitive development asset Volanesorsen, and IND-enabling safety evaluation, we made a data-driven decision to not advance IDRA-008 into clinical development.

Nucleic Acid Chemistry Compound—Undisclosed Renal Target

In November 2015, we entered into a collaboration and license agreement with GlaxoSmithKline Intellectual Property Development Limited, or GSK, to license, research, develop and commercialize pharmaceutical compounds from our nucleic acid chemistry technology for the treatment of selected targets in renal disease, which agreement we refer to as the GSK Agreement. Under this collaboration, we have created multiple development candidates to address the target designated by GSK in connection with entering into the GSK Agreement. From the population of identified development candidates, GSK may designate one development candidate in its sole discretion to move forward into clinical development. If GSK designates a development candidate, GSK would be solely responsible for the development and commercialization activities for that designated development candidate.

Collaborative Alliances

In addition to our current alliances, we may explore potential collaborative alliances to support development and commercialization of our TLR agonists and antagonists. Our current alliances include collaborations with BMS, as described below, and Vivelix, GSK, and Abbott Molecular as described in Note 8 of the notes to our condensed financial statements in this Quarterly Report on Form 10-Q and in our Annual Report on Form 10-K for the year ended December 31, 2017.

Collaboration with Bristol-Myers Squibb

Effective May 18, 2018, we entered into a clinical trial collaboration and supply agreement with BMS to clinically evaluate the combination of our TLR-9 agonist tilsotolimod (IMO-2125) with BMS's therapy YERVOY® (ipilimumab), which agreement we refer to as the BMS Collaboration and Supply Agreement.

Under the BMS Collaboration and Supply Agreement, we will sponsor, fund and conduct our ongoing global, open-label, multi-center Phase 3 clinical trial of tilsotolimod in combination with YERVOY® entitled "A Randomized Phase 3 Comparison of IMO-2125 with Ipilimumab versus Ipilimumab Alone in Patients with Anti-PD-1 Refractory Melanoma" in accordance with an agreed-upon protocol, which we refer to as ILLUMINATE-301. Under the BMS Collaboration and Supply Agreement, BMS has granted us a non-exclusive, non-transferrable, royalty-free license (with a right to sublicense) under its intellectual property to use YERVOY® in ILLUMINATE-301 and has agreed to manufacture and supply YERVOY®, at its cost and for no charge to us, for use in ILLUMINATE-301.

Critical Accounting Policies and Estimates

This management's discussion and analysis of financial condition and results of operations is based on our condensed financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States. The preparation of these financial statements requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities, revenues and expenses, and the disclosure of contingent assets and liabilities. On an ongoing basis, management evaluates its estimates and judgments, which are affected by the application of our accounting policies. Management bases its estimates and judgments on historical experience and on various other factors that are believed to be appropriate under the circumstances. Actual results may differ from these estimates under different assumptions or conditions.

We regard an accounting estimate or assumption underlying our financial statements as a "critical accounting estimate" where:

(i) the nature of the estimate or assumption is material due to the level of subjectivity and judgment necessary to account for highly uncertain matters or the susceptibility of such matters to change; and

(ii) the impact of the estimates and assumptions on financial condition or operating performance is material.

Our significant accounting policies are described in Note 2 of the notes to our financial statements included in our 2017 Form 10-K. However, please refer to Note 2 in the accompanying notes to the condensed financial statements contained in this Quarterly Report on Form 10-Q for updated policies and estimates, if applicable, that could impact our results of operations, financial position, and cash flows. Not all of these significant policies, however, fit the definition of critical accounting policies and estimates. We believe that our accounting policies relating to revenue recognition, stock-based compensation and research and development prepayments, accruals and related expenses, as described under the caption "Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations — Critical Accounting Policies and Estimates" in our 2017 Form 10-K, fit the description of critical accounting estimates and judgments.

New Accounting Pronouncements

New accounting pronouncements are discussed in Note 2 in the notes to the condensed financial statements in this Quarterly Report on Form 10-Q.

Financial Condition, Liquidity and Capital Resources

Financial Condition

We have incurred operating losses in all fiscal years since our inception except 2002, 2008 and 2009. As of June 30, 2018, we had an accumulated deficit of $640.6 million. To date, substantially all of our revenues have been from collaboration and license agreements and we have received no revenues from the sale of commercial products. We have devoted substantially all of our efforts to research and development, including clinical trials, and we have not completed development of any commercial products. Our research and development activities, together with our selling, general and administrative expenses, are expected to continue to result in substantial operating losses for the foreseeable future. These losses, among other things, have had and will continue to have an adverse effect on our stockholders' equity, total assets and working capital. Because of the numerous risks and uncertainties associated with developing drug candidates, and if approved, commercial products, we are unable to predict the extent of any future losses, whether or when any of our drug candidates will become commercially available or when we will become profitable, if at all.

Liquidity and Capital Resources

Overview

We require cash to fund our operating expenses and to make capital expenditures. Historically, we have funded our cash requirements primarily through the following:

(i) sale of common stock, preferred stock and warrants;

(ii) exercise of warrants;

(iii) debt financing, including capital leases;

(iv) license fees, research funding and milestone payments under collaborative and license agreements; and

(v) interest income.

We filed a shelf registration statement on Form S-3 on August 10, 2017, which was declared effective on September 8, 2017. Under this registration statement, we may sell, in one or more transactions, up to $250.0 million of common stock, preferred stock, depository shares and warrants. As of July 31, 2018, we may sell up to an additional $192.5 million of securities under this registration statement.

Funding Requirements

We had cash and cash equivalents of approximately $94.0 million at June 30, 2018. We believe that, based on our current operating plan, our existing cash and cash equivalents will enable us to fund our operations into the first quarter of 2020. Specifically, we believe that our available funds will be sufficient to enable us to complete enrollment and continue to execute on the following studies:

(i) Phase 1 portion of our ongoing Phase 1/2 clinical trial of tilsotolimod in combination with pembrolizumab in anti-PD1 refractory melanoma;

(ii) Phase 2 portion of our ongoing Phase 1/2 clinical trial of tilsotolimod in combination with ipilimumab in anti-PD1 refractory melanoma;

(iii) Phase 3 clinical trial of tilsotolimod in combination with ipilimumab for the treatment of anti-PD1 refractory metastatic melanoma; and

(iv) Phase 1b monotherapy clinical trial of tilsotolimod in multiple refractory tumor types.

We expect that we will need to raise additional funds in order to complete our ongoing clinical trials of tilsotolimod and to fund our operations. We are seeking and expect to continue to seek additional funding through

collaborations, the sale or license of assets or financings of equity or debt securities. We believe that the key factors that will affect our ability to obtain funding are:

(i) the results of our clinical development activities in our tilsotolimod program and our ability to advance tilsotolimod or any other drug candidates we develop on the timelines anticipated;

(ii) the cost, timing, and outcome of regulatory reviews;

(iii) competitive and potentially competitive products and technologies and investors' receptivity tilsotolimod or any other drug candidates we develop and the technology underlying them in light of competitive products and technologies;

(iv) the receptivity of the capital markets to financings by biotechnology companies generally and companies with drug candidates and technologies such as ours specifically; and

(v) our ability to enter into additional collaborations with biotechnology and pharmaceutical companies and the success of such collaborations.

In addition, increases in expenses or delays in clinical development may adversely impact our cash position and require additional funds or cost reductions.

Financing may not be available to us when we need it or may not be available to us on favorable or acceptable terms or at all. We could be required to seek funds through collaborative alliances or through other means that may require us to relinquish rights to some of our technologies, drug candidates or drugs that we would otherwise pursue on our own. In addition, if we raise additional funds by issuing equity securities, our then existing stockholders will experience dilution. The terms of any financing may adversely affect the holdings or the rights of existing stockholders. An equity financing that involves existing stockholders may cause a concentration of ownership. Debt financing, if available, may involve agreements that include covenants limiting or restricting our ability to take specific actions, such as incurring additional debt, making capital expenditures or declaring dividends, and are likely to include rights that are senior to the holders of our common stock. Any additional debt or equity financing may contain terms which are not favorable to us or to our stockholders, such as liquidation and other preferences, or liens or other restrictions on our assets. As discussed in Note 12 of the notes to our financial statements included in our 2017 Form 10-K, additional equity financings may also result in cumulative changes in ownership over a three-year period in excess of 50% which would limit the amount of net operating loss and tax credit carryforwards that we may utilize in any one year.

If we are unable to obtain adequate funding on a timely basis or at all, we will be required to terminate, modify or delay our clinical trials or relinquish rights to portions of our technology, drug candidates and/or products.

Cash Flows

The following table presents a summary of the primary sources and uses of cash for the six months ended June 30, 2018 and 2017:

	Six months ended June 30,	
(in thousands)	**2018**	**2017**
Net cash provided by (used in):		
Operating activities	$ (28,652)	$ (31,875)
Investing activities	(42)	25,595
Financing activities	10,111	272
Decrease in cash, cash equivalents and restricted cash	**$ (18,583)**	**$ (6,008)**

Operating Activities. Net cash used in operating activities for each of the six months ended June 30, 2018 and 2017 consists primarily of our net losses adjusted for non-cash charges and changes in components of working capital. The decrease in cash used in operating activities for the six months ended June 30, 2018, as compared to the 2017 period, was primarily due to decreases in cash outflows related to our discovery and development programs, including payments to contract research organizations.

Investing Activities. Net cash (used in) provided by investing activities primarily consisted of the following amounts relating to our investments in available-for-sale securities and purchases of property and equipment:

- for the six months ended June 30, 2018, purchases of less than $0.1 million of property and equipment; and
- for the six months ended June 30, 2017, proceeds from the maturity of $25.7 million of available-for-sale securities, partially offset by the purchase of $0.1 million of property and equipment.

Financing Activities. Net cash provided by financing activities primarily consisted of the following amounts received in connection with the issuances of common stock and payments on our note under our loan and security agreement with Oxford Finance LLC, or our note payable:

- for the six months ended June 30, 2018, $10.2 million in aggregate proceeds from the exercise of common stock options and warrants, $0.2 million in proceeds from employee stock purchases under our 2017 Employee Stock Purchase Plan, partially offset by $0.2 million in payments made on our note payable; and
- for the six months ended June 30, 2017, proceeds of $0.3 million from the exercise of common stock options and warrants and proceeds of $0.1 million from employee stock purchases under our 1995 Employee Stock Purchase Plan, partially offset by approximately $0.1 million of payments made on our note payable.

Contractual Obligations

During the six months ended June 30, 2018, there were no material changes outside the ordinary course of our business to our contractual obligations as disclosed in our Annual Report on Form 10-K for the year ended December 31, 2017. However, as more fully described in Note 12 to the condensed financial statements appearing elsewhere in this Quarterly Report on Form 10-Q, subsequent to June 30, 2018, we have agreed to the termination of the operating lease for our facility in Cambridge, Massachusetts effective September 30, 2018. Upon such termination, our lease obligations as disclosed in our Annual Report on Form 10-K for the year ended December 31, 2017 will be significantly reduced.

Off-Balance Sheet Arrangements

As of June 30, 2018, we had no off-balance sheet arrangements.

Results of Operations

Three and Six Months Ended June 30, 2018 and 2017

Alliance Revenue

Alliance revenue for the three and six months ended June 30, 2018 and 2017 was comprised of the following:

	Three months ended June 30,			Six months ended June 30,			
($ in thousands)	2018	2017	% Change	2018	2017	% Change	
GSK collaboration	$ 141	$ 186	(24%)	$ 283	$ 557	(49%)	(1)
Vivelix collaboration	—	—	0%	56	—	100%	(2)
Other	22	1	2100%	79	8	888%	(3)
Total Alliance revenue	$ 163	$ 187	(13%)	$ 418	$ 565	(26%)	

(1) GSK collaboration revenues for the three and six months ended June 30, 2018 and 2017 primarily relate to the recognition of a $2.5 million upfront payment received in connection with the execution of the GSK Agreement in November 2015, which was initially recorded as deferred revenue. We are recognizing this deferred revenue as revenue on a straight line basis over the anticipated performance period under the GSK Agreement. The decrease in GSK collaboration revenues during each of the three and six months ended June 30, 2018 as compared to the corresponding 2017 periods is due primarily to a change that we made during the second quarter of 2017 with respect to our anticipated performance period under our collaboration with GSK from the original estimate of 27 months to an updated estimate of 36 months, which we accounted for on a prospective basis. Additionally, the six months ended June 30, 2017 period includes $0.1 million recognized for additional services provided for under the GSK Agreement. See Note 8 to the condensed financial statements appearing elsewhere in this Quarterly Report on Form 10-Q for additional information on our collaboration with GSK and the related accounting treatment.

(2) Vivelix collaboration revenues for the six months ended June 30, 2018 relate to research services provided for under the Vivelix Agreement. No such services were performed in the six months ended 2017. See Note 8 to the condensed financial statements appearing elsewhere in this Quarterly Report on Form 10-Q for additional information on our collaboration with Vivelix and the related accounting treatment.

(3) Other revenues are comprised of amounts earned in connection with collaborations which are not material to our current operations nor expected to be material in the future, including reimbursements by licensees of costs associated with patent maintenance.

Research and Development Expenses

For each of our research and development programs, we incur both direct and indirect expenses. We track direct research and development expenses by program, which include third party costs such as contract research, consulting and clinical trial and manufacturing costs. We do not allocate indirect research and development expenses, which may include regulatory, laboratory (equipment and supplies), personnel, facility and other overhead costs (including depreciation and amortization), to specific programs.

In the table below, research and development expenses are set forth in the following categories which are discussed beneath the table:

($ in thousands)	Three months ended June 30, 2018	2017	% Change	Six months ended June 30, 2018	2017	% Change	
IMO-2125 external development expense	$ 4,275	$ 3,437	24%	$ 10,793	$ 5,832	85%	(1)
IMO-8400 external development expense	1,391	3,252	(57%)	2,607	5,681	(54%)	(2)
IMO-9200 external development expense	—	2	(100%)	—	6	(100%)	
Other drug development expense	3,070	3,774	(19%)	6,825	7,840	(13%)	(3)
Basic discovery expense	2,144	1,849	16%	4,211	4,440	(5%)	(4)
Severance and option modification expense	—	5,577	(100%)	—	5,577	(100%)	(5)
Total research and development expenses	$ 10,880	$ 17,891	(39%)	$ 24,436	$ 29,376	(17%)	

(1) *IMO-2125 External Development Expenses.* These expenses include external expenses that we have incurred in connection with the development of tilsotolimod as part of our immuno-oncology program. These external expenses include payments to independent contractors and vendors for drug development activities conducted after the initiation of tilsotolimod clinical development in immuno-oncology, but exclude internal costs such as payroll and overhead expenses. We commenced clinical development of tilsotolimod as part of our immuno-oncology program in July 2015 and from July 2015 through June 30, 2018 we incurred approximately $27.1 million in tilsotolimod external development expenses as part of our immuno-oncology program, including costs associated with the preparation for and conduct of the ongoing Phase 1/2 clinical trial to assess the safety and efficacy of tilsotolimod in combination with ipilimumab and with pembrolizumab in patients with metastatic melanoma (ILLUMINATE-204), the preparation and conduct of our ongoing Phase 1b clinical trial of tilsotolimod monotherapy in patients with refractory solid tumors (ILLUMINATE-101), the preparation for, initiation and conduct of our ongoing Phase 3 clinical trial of tilsotolimod in combination with ipilimumab in patients with metastatic melanoma (ILLUMINATE-301), and the manufacture of additional drug substance for use in our clinical trials and additional nonclinical studies.

The increase in our IMO-2125 external development expenses during each of the three and six months ended June 30, 2018, as compared to the corresponding 2017 period, was primarily due to increases in drug manufacturing costs to support our ongoing ILLUMINATE-204 trial and our ongoing ILLUMINATE-301 trial, which we initiated in the first quarter of 2018, as well as increases in costs incurred with contract research organizations associated with the initiation of ILLUMINATE-301.

(2) *IMO-8400 External Development Expenses.* These expenses include external expenses that we have incurred in connection with IMO-8400 since October 2012, when we commenced clinical development of IMO-8400. These external expenses include payments to independent contractors and vendors for drug development activities conducted after the initiation of IMO-8400 clinical development but exclude internal costs such as payroll and overhead expenses. Since October 2012, we have incurred approximately $45.4 million in IMO-8400 external development expenses through June 30, 2018, including costs associated with our Phase 1 clinical trial in healthy subjects; our Phase 2 clinical trial in patients with psoriasis, our Phase 1/2 clinical trial in patients with Waldenström's macroglobulinemia and our Phase 1/2 clinical trial in patients with diffuse large B-cell lymphoma, or DLBCL, harboring the MYD88 L265P oncogenic mutation, which we discontinued in September 2016; our Phase 2 clinical trial in patients with dermatomyositis; the manufacture of drug substance for use in our clinical trials; and expenses associated with our collaboration with Abbott Molecular for the development of a companion diagnostic for identification of patients with DLBCL harboring the MYD88 L265P oncogenic mutation. In July 2018, we terminated further development of IMO-8400. As a result, we expect IMO-8400 external development expenses to be lower in future periods.

The decrease in our IMO-8400 external development expenses during each of the three and six months ended June 30, 2018, as compared to the corresponding 2017 period, was primarily due to costs incurred during the 2017 period on clinical development of IMO-8400 for B-cell lymphomas, including our trials in Waldenström's macroglobulinemia and DLBCL harboring the MYD88 L265P oncogenic mutation, which we did not incur in 2018 as a result of our decision in September 2016 to discontinue

development of IMO-8400 for treatment of B-cell lymphomas and focus on the development of IMO-8400 for the treatment of dermatomyositis.

(3) *Other Drug Development Expenses.* These expenses include external expenses associated with preclinical development of identified compounds in anticipation of advancing these compounds into clinical development, including IDRA-008. In addition, these expenses include internal costs, such as payroll and overhead expenses, associated with preclinical development and products in clinical development. The external expenses associated with preclinical compounds include payments to contract vendors for manufacturing and the related stability studies, preclinical studies, including animal toxicology and pharmacology studies, and professional fees. Other drug development expenses also include costs associated with compounds that were previously being developed but are not currently being developed. In July 2018, we suspended further preclinical research. As a result, we expect other drug development expenses to be lower in future periods

The decrease in other drug development expenses during each of the three and six months ended June 30, 2018, as compared to the corresponding 2017 period, was primarily due to a decrease in external costs of preclinical programs, including related toxicology studies and awareness and education programs, as we focused on the development of our clinical drug candidates.

(4) *Basic Discovery Expenses.* These expenses include our internal and external expenses relating to our discovery efforts with respect to our TLR-targeted programs, including agonists and antagonists of TLR3, TLR7, TLR8 and TLR9, and our nucleic acid chemistry research programs. These expenses reflect charges for laboratory supplies, external research, and professional fees, as well as payroll and overhead expenses. In July 2018, we suspended internal discovery programs. As a result, we expect basic discovery expenses to be lower in future periods.

The increase in basic discovery expenses during the three months ended June 30, 2018, as compared to the 2017 period, was primarily due to increases in non-cash stock-based compensation expenses and allocation of overhead expenses. Basic discovery expenses for the six months ended June 30, 2018 remained consistent with the 2017 period.

(5) *Severance and Options Modification Expense.* These expenses include charges for severance benefits provided pursuant to a separation agreement entered into in April 2017 in connection with the resignation of our former President of Research, effective May 31, 2017. Of the $5.6 million incurred, $1.3 million relates to severance pay in the form of salary continuation payments which is being paid over a two-year period through May 31, 2019 and a pro-rated 2017 bonus payment, and $4.3 million relates to non-cash stock-based compensation expense resulting from modifications to previously issued stock option awards.

We do not know if we will be successful in developing and commercializing any drug candidate. At this time, and without knowing the results from our ongoing clinical trial of tilsotolimod, we cannot reasonably estimate or know the nature, timing, and costs of the efforts that will be necessary to complete the remainder of the development of, or the period, if any, in which material net cash inflows may commence from, any drug candidate. Moreover, the clinical development of tilsotolimod is subject to numerous risks and uncertainties associated with the duration and cost of clinical trials, which vary significantly over the life of a project as a result of unanticipated events arising during clinical development.

General and Administrative Expenses

General and administrative expenses consist primarily of payroll, stock-based compensation expense, consulting fees and professional legal fees associated with our patent applications and maintenance, our corporate regulatory filing requirements, our corporate legal matters, and our business development initiatives.

For the three months ended June 30, 2018 and 2017, general and administrative expenses totaled $5.6 million and $3.9 million, respectively. For the six months ended June 30, 2018 and 2017, general and administrative expenses totaled $12.6 million and $8.0 million, respectively. The increase in general and administrative expenses during each of the three and six months ended June 30, 2018, as compared to the corresponding 2017 periods, was primarily due to increases in legal and professional fees related to our proposed merger transaction which was terminated in July 2018. Merger-related costs included in general and administrative expenses for the three and six months ended June 30, 2018 amounted to approximately $1.3 million and $4.6 million, respectively. In July 2018, we incurred an additional $1.9 million of merger-related costs, bringing the total to $7.6 million and, in accordance with the Merger Agreement, we received a fixed expense reimbursement amount of $6 million in connection with the termination of the Merger Agreement. See Note 12 to the condensed financial statements appearing elsewhere in this Quarterly Report on Form 10-Q for additional information.

Interest Income

Interest income for the three months ended June 30, 2018 and 2017 totaled approximately $0.3 million and $0.1 million, respectively. Interest income for the six months ended June 30, 2018 and 2017 totaled approximately $0.5 million and $0.3 million, respectively. Amounts may fluctuate from period to period due to changes in average investment balances, including money market funds classified as cash equivalents, and composition of investments.

Interest Expense

Interest expense for each of the three and six months ended June 30, 2018 and 2017 totaled less than $0.1 million and related to interest incurred on the outstanding principal balance of our note payable.

Net Loss Applicable to Common Stockholders

As a result of the factors discussed above, our net loss applicable to common stockholders was $16.0 million and $21.5 million for the three months ended June 30, 2018 and 2017, respectively, and $36.1 million and $36.5 million for the six months ended June 30, 2018 and 2017, respectively

Item 3. Quantitative and Qualitative Disclosures about Market Risk.

As of June 30, 2018, all of our material assets and liabilities are in U.S. dollars, which is our functional currency.

We maintain investments in accordance with our investment policy. The primary objectives of our investment activities are to preserve principal, maintain proper liquidity to meet operating needs and maximize yields. Although our investments are subject to credit risk, our investment policy specifies credit quality standards for our investments and limits the amount of credit exposure from any single issue, issuer or type of investment. We regularly review our investment holdings in light of the then current economic environment. At June 30, 2018, all of our invested funds were invested in a money market fund, classified in cash and cash equivalents on the accompanying balance sheet, and a certificate of deposit, classified in restricted cash and other assets on the accompanying balance sheet.

Based on a hypothetical 10% adverse movement in interest rates, the potential losses in future earnings, fair value of risk sensitive financial instruments, and cash flows are immaterial, although the actual effects may differ materially from the hypothetical analysis.

Item 4. Controls and Procedures.

(a) *Evaluation of Disclosure Controls and Procedures.* Our management, with the participation of our principal executive officer and principal financial officer, evaluated the effectiveness of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act) as of June 30, 2018. In designing and evaluating our disclosure controls and procedures, management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving their objectives and our management necessarily applied its judgment in evaluating the cost-benefit relationship of possible controls and procedures. Based on this evaluation, our principal executive officer and principal financial officer concluded that as of June 30, 2018, our disclosure controls and procedures were (1) designed to ensure that material information relating to us is made known to our principal executive officer and principal financial officer by others, particularly during the period in which this report was prepared, and (2) effective, in that they provide reasonable assurance that information required to be disclosed by us in the reports we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in the SEC's rules and forms.

(b) *Changes in Internal Controls*. There were no changes in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) that occurred during the fiscal quarter ended June 30, 2018 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

PART II — OTHER INFORMATION

Item 1. Legal Proceedings.

In connection with the Merger Agreement, three putative class action complaints were filed challenging the proposed merger transaction. On March 6, 2018 plaintiff Melvin Klein filed a lawsuit captioned *Klein v. BioCryst Pharmaceuticals, Inc., et al.*, No. 1:18-cv-00358, against BioCryst, along with the BioCryst board, Idera, Holdco, Island Merger Sub, Inc. and Boat Merger Sub, Inc. in United States District Court for the District of Delaware. On March 14, 2018, plaintiff Lisa Raatz filed a lawsuit captioned *Raatz v. Idera Pharmaceuticals, Inc., et al.*, No. 1:18-cv-10485, against Idera, along with the members of the Idera board, BioCryst, Holdco, Island Merger Sub, Inc. and Boat Merger Sub, Inc. in United States District Court for the District of Massachusetts. On March 22, 2018 plaintiff Ricky Cohen filed a lawsuit captioned *Cohen v. Idera Pharmaceuticals, Inc., et al.*, No. 1:18-cv-00428, against Idera, along with the members of the Idera board in United States District Court for the District of Delaware. All three lawsuits allege violations of Sections 14(a) and 20(a) of the Securities Exchange Act of 1934, and SEC Rule 14a-9, for alleged material misstatements or omissions in connection with the proposed merger transaction. The complaints included demands for, among other things, an injunction preventing defendants from closing the proposed merger transaction absent certain disclosures of information identified in the complaints. Following the termination of the Merger Agreement, on July 11, July 20, and July 26, 2018, respectively, the *Cohen*, *Klein* and *Raatz* complaints were voluntarily dismissed without prejudice.

Item 1A. Risk Factors.

Investing in our securities involves a high degree of risk. In addition to the other information contained elsewhere in this report, you should carefully consider the factors discussed in "Part I, Item 1A. Risk Factors" in our most recent Annual Report on Form 10-K for the year ended December 31, 2017, which could be materially and adversely affect our business, financial condition or future results.

We recently announced the wind-down of our discovery operations, the closing of our Cambridge, Massachusetts facility and related workforce reduction that are expected to result in significant cost savings as we focus our efforts and resources on tilsotolimod. If we are unable to realize the anticipated cost-saving benefits of these measures or we incur additional costs as we progress through the wind-down process, our operating results and financial condition could be adversely affected, and our business may be disrupted.

In July 2018, we determined to wind-down our discovery operations, close our Cambridge, Massachusetts facility and reduce the workforce in Cambridge, Massachusetts that supports our discovery operations. In connection with the reduction-in-workforce, 18 positions are being eliminated, primarily in the area of discovery, representing approximately 40% of our employees. We will incur one-time termination costs in connection with the reduction in workforce of approximately $2.9 million, which includes severance, benefits and related costs, for the quarter ended September 30, 2018. Additionally, we expect to incur non-cash fixed asset impairments of less than $1.0 and to incur other cash expenditures in the third and fourth quarters of 2018 related to the wind-down of our Cambridge, Massachusetts facility are not expected to be material to our financial condition and results of the operations. We expect these actions will result in annual cash savings to us of approximately $10 million, however, we may not realize, in full or in part, the expected cost savings.

If we are unable to realize the expected cost savings from the workforce reduction and wind-down activities, our operating results and financial condition would be adversely affected. In addition, as we progress through the wind-down activities, we may incur additional costs and expenses, including costs to decommission our laboratory facility and to terminate and wind-down our contractual and other obligations relating to our discovery operations. The workforce reduction and wind-down activities may also be disruptive to our operations. For example, the wind-down process may be difficult to manage and may increase the likelihood of turnover of other key employees, all of which may have an adverse impact on our business, as well as on our operating results and financial condition. We also cannot guarantee that we will not have to undertake additional workforce reductions or restructuring activities in the future.

Item 5. Other Information.

Termination of a Material Definitive Agreement.

On July 27, 2018, we entered into a termination agreement with ARE-MA-Region No. 23 LLC (the "Landlord") terminating the lease agreement, dated October 31, 2006, as amended, between us and the Landlord effective September 30, 2018. We leased our facility at 167 Sidney Street in Cambridge, Massachusetts under the lease agreement. Under the terms of the termination agreement, we have agreed to pay an early termination fee of $0.2 million. We expect to record a charge for the $0.2 million early termination fee and a non-cash gain of $0.4 million due to the write-off of the remaining deferred rent liability associated with the lease in the third quarter of 2018. We anticipate that the lease termination will result in annual cash savings of approximately $2.0 million.

Costs Associated with Exit or Disposal Activities

In connection with the lease termination in Cambridge, Massachusetts, on July 27, 2018, we announced to affected employees a reduction in workforce pursuant to which we are eliminating a total of 18 positions, representing approximately 40% of our current employee base in total, 15 of which are effective July 31, 2018 with an additional 3 positions expected to be eliminated by December 31, 2018. We expect to incur one-time termination costs in connection with the reduction in workforce of approximately $2.9 million, which includes severance, benefits and related costs, in the quarter ended September 30, 2018. We anticipate that these termination costs will be paid over the course of 15 months, with approximately $1.5 million being paid during the third and fourth quarters of 2018. Additionally, we expect to incur non-cash fixed asset impairments of less than $1.0 million and to incur other cash expenditures in the third and fourth quarters of 2018 related to the wind-down of our Cambridge, Massachusetts facility, which, including the $0.2 million early lease termination fee, are not expected to be material to our financial condition and results of the operations. We anticipate that the closing of our facility in Massachusetts, the elimination of the positions and the related actions will result in annual cash savings of approximately $10.0 million, which includes the expected savings related to the lease termination described above.

Amendments to Articles of Incorporation

On July 27, 2018 (the "Effective Date"), we filed a Certificate of Amendment to the our Restated Certificate of Incorporation with the Secretary of State of the State of Delaware (the "Certificate of Amendment"), which effected as of 5:00 p.m., Eastern Time, on the Effective Date a one-for-eight reverse stock split (the "Reverse Split") of our issued and outstanding common stock, $0.001 par value per share (the "Common Stock").

As a result of the Reverse Split, every eight shares of Common Stock issued and outstanding was converted into one share of Common Stock, reducing the number of issued and outstanding shares of Common Stock from approximately 217 million shares to approximately 27 million shares. No fractional shares were issued in connection with the Reverse Split. Stockholders who would otherwise be entitled to a fractional share of Common Stock are instead entitled to receive a proportional cash payment.

The Certificate of Amendment also set the number of authorized shares of Common Stock at 70 million shares. The Reverse Split did not change the par value of the Common Stock. The Reverse Split did not change the number of authorized shares or par value of our preferred stock. All outstanding stock options and warrants entitling their holders to purchase shares of Common Stock will be adjusted as a result of the Reverse Split, as required by the terms of these securities.

As previously disclosed in a Current Report on Form 8-K filed on June 21, 2018, at our 2018 Annual Meeting of Stockholders held on June 20, 2018, our stockholders voted to approve the Certificate of Amendment.

Trading of our Common Stock on the Nasdaq Capital Market on a Reverse Split-adjusted basis began at the opening of trading on July 30, 2018.

Item 6. Exhibits.

Exhibit No.	Description
3.1	Restated Certificate of Incorporation of Idera Pharmaceuticals, Inc., as amended
10.1*	Clinical Trial Collaboration and Supply Agreement, by and between Idera Pharmaceuticals, Inc. and Bristol-Myers Squibb Company, dated May 18, 2018
31.1	Certification of Chief Executive Officer pursuant to Exchange Act Rules 13a-14 and 15d-14, as adopted pursuant to Section 302 of Sarbanes-Oxley Act of 2002
31.2	Certification of Chief Financial Officer pursuant to Exchange Act Rules 13a-14 and 15d-14, as adopted pursuant to Section 302 of Sarbanes-Oxley Act of 2002
32.1	Certification of Chief Executive Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
32.2	Certification of Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
101.INS	XBRL Instance Document
101.SCH	XBRL Taxonomy Extension Schema
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document
101.LAB	XBRL Taxonomy Extension Labels Linkbase Document
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document

* Confidential treatment requested as to certain portions, which portions are omitted and filed separately with the Commission.

SIGNATURES

Pursuant to the requirements of the Securities Exchange Act of 1934, as amended, the registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

IDERA PHARMACEUTICALS, INC.

Date: August 2, 2018

/s/ Vincent J. Milano

Vincent J. Milano
President and Chief Executive Officer
(Principal Executive Officer)

Date: August 2, 2018

/s/ Louis J. Arcudi, III

Louis J. Arcudi, III
Chief Financial Officer
(Principal Financial and Accounting Officer)

Exhibit 3.1

RESTATED

CERTIFICATE OF INCORPORATION

OF

HYBRIDON, INC.

Hybridon, Inc., a corporation organized and existing under and by virtue of the General Corporation Law of the State of Delaware, does hereby certify as follows:

1. The Corporation filed its original Certificate of Incorporation with the Secretary of State of Delaware on May 25, 1989, which Certificate of Incorporation was amended by a Certificate of Amendment of Certificate of Incorporation filed on February 21, 1990, and amended and restated by a Restated Certificate of Incorporation filed on June 5, 1990. A Restated Certificate of Incorporation was filed with the Secretary of State of the State of Delaware on November 20, 1990, which Restated Certificate of Incorporation was amended by a Certificate of Amendment of Restated Certificate of Incorporation filed on October 16, 1991, a Certificate of Amendment of Restated Certificate of Incorporation filed on March 3, 1992, a Certificate of Amendment of Restated Certificate of Incorporation filed on March 23, 1992, a Certificate of Amendment of Restated Certificate of Incorporation filed on October 23, 1992, a Certificate of Amendment of Restated Certificate of Incorporation filed on February 12, 1993, a Certificate of Amendment of Restated Certificate of Incorporation filed on June 17, 1993, a Certificate of Amendment of Restated Certificate of Incorporation filed on July 13, 1993, a Certificate of Amendment of Restated Certificate of Incorporation filed on September 9, 1994, a Certificate of Amendment of Restated Certificate of Incorporation filed on July 7, 1995, a Certificate of Amendment of Restated Certificate of Incorporation filed on December 19, 1995, and a Certificate of Retirement of Stock filed on even date herewith.

2. At a meeting of the Board of Directors of the Corporation, a resolution was duly adopted, pursuant to Sections 141(f) and 245 of the General Corporation Law of the State of Delaware, setting forth a Restated Certificate of Incorporation of the Corporation and declaring said Restated Certificate of Incorporation advisable. The resolution setting forth the Restated Certificate of Incorporation is as follows:

RESOLVED: That the Restated Certificate of Incorporation of the Corporation, as amended, be and hereby is amended and restated in its entirety so that the same shall read as follows:

FIRST: The name of the Corporation is:

Hybridon, Inc.

SECOND: The address of its registered office in the State of Delaware is Corporation Trust Center, 1209 Orange Street, in the City of Wilmington, County of New Castle. The name of its registered agent at such address is The Corporation Trust Company.

THIRD: The nature of the business or purposes to be conducted or promoted by the Corporation is as follows:

To engage in any lawful act or activity for which corporations may be organized under the General Corporation Law of Delaware.

FOURTH: The total number of shares of all classes of stock which the Corporation shall have authority to issues is One Hundred Million (100,000,000) shares of Common Stock, $.001 par value per share ("Common Stock"), and (ii) Five Million ($5,000,000) shares of Preferred Stock, $.01 par value per share ("Preferred Stock"), which may be issued from time to time in one or more series as set forth in Part B of this Articles FOURTH.

The following is a statement of the designations and the powers, privileges and rights, and the qualifications, limitations or restrictions thereof in respect of each class of capital stock of the Corporation.

A. COMMON STOCK.

1. General. The voting, dividend and liquidation rights of the holders of the Common Stock are subject to and qualified by the rights of the holders of the Preferred Stock of any series as may be designated by the Board of Directors upon any issuance of the Preferred Stock of any series.

2. Voting. The holders of the Common Stock are entitled to one vote for each share held at all meetings of stockholders (and written actions in lieu of meetings). There shall be no cumulative voting.

The number of authorized shares of Common Stock may be increased or decreased (but not below the number of shares thereof then outstanding) by the affirmative vote of the holders of a majority of the stock of the Corporation entitled to vote, irrespective of the provisions of Section 242(b)(2) of the General Corporation Law of Delaware.

3. Dividends. Dividends may be declared and paid on the Common Stock from funds lawfully available therefor as and when determined by the Board of Directors and subject to any preferential dividend rights of any then outstanding Preferred Stock.

4. Liquidation. Upon the dissolution or liquidation of the Corporation, whether voluntary or involuntary, holders of Common Stock will be entitled to receive all assets of the Corporation available for distribution to its stockholders, subject to any preferential rights of any then outstanding Preferred Stock.

B. PREFERRED STOCK.

Preferred Stock may be issued from time to time in one or more series, each of such series to have such terms as stated or expressed herein and in the resolution or resolutions providing for the issue of such series adopted by the Board of Directors of the Corporation as hereinafter provided. Any shares of Preferred Stock which may be redeemed, purchased or acquired by the Corporation may be reissued except as otherwise provided by law. Different series of Preferred Stock shall not be construed to constitute different classes of shares for the purposes of voting by classes unless expressly provided.

Authority is hereby expressly granted to the Board of Directors from time to time to issue the Preferred Stock in one or more series, and in connection with the creation of any such series, by resolution or resolutions providing for the issue of the shares thereof, to determine and fix such voting powers, full or limited, or no voting powers, and such designations, preferences and relative participating, optional or other special rights, and qualifications, limitations or restrictions thereof, including without limitation thereof, dividend rights, conversion rights, redemption privileges and liquidation preferences, as shall be stated and expressed in such resolutions, all to the full extent now or hereafter permitted by the General Corporation Law of Delaware. Without limiting the generality of the foregoing, the resolutions providing for issuance of any series of Preferred Stock may provide that such series shall be superior or rank equally or be junior to the Preferred Stock of any other series to the extent permitted by law. Except as otherwise specifically provided in this Certificate of Incorporation, no vote of the holders of the Preferred Stock or Common Stock shall be a prerequisite to the issuance of any shares of any series of the Preferred Stock authorized by and complying with the conditions of the Certificate of Incorporation, the right to have such vote being expressly waived by all present and future holders of the capital stock of the Corporation.

FIFTH: The name and mailing address of the sole incorporator are as follows:

Name	Mailing Address
David P. Johst	60 State Street Boston, MA 02109

SIXTH: In furtherance of and not in limitation of powers conferred by statute, it is further provided:

1. Election of directors need not be by written ballot.

2. The Board of Directors is expressly authorized to adopt, amend or repeal the By-Laws of the Corporation.

SEVENTH: Whenever a compromise or arrangement is proposed between this corporation and its creditors or any class of them and/or between this corporation and its stockholders or any class of them, any court of equitable jurisdiction within the State of Delaware may, on the application in a summary way of this corporation or of any creditor or stockholder thereof, or on the application of any receiver or receivers appointed for this corporation under the provisions of section 291 of Title 8 of the Delaware Code or on the application of trustees in dissolution or of any receiver or receivers appointed for this corporation under the provisions of section 279 of Title 8 of the Delaware Code order a meeting of the creditors or class of creditors, and/or of the stockholders or class of stockholders of this corporation, as the case may be, to be summoned in such manner as the said court directs. If a majority in number representing three-fourths in value of the creditors or class of creditors, and/or of the stockholders or class of stockholders of this corporation, as the case may be, agree to any compromise or arrangement and to any promise or arrangement, the said compromise or arrangement and the said reorganization shall, if sanctioned by the court to which the said application has been made, be binding on all the creditors or class of creditors, and/or on all the stockholders or class of stockholders, of this corporation, as the case may be, and also on this corporation.

EIGHTH: Except to the extent that the General Corporation Law of the State of Delaware prohibits the elimination or limitation of liability of directors for breaches of fiduciary duty, no director of the Corporation shall be personally liable to the Corporation or its stockholders for monetary damages for any breach of fiduciary duty as a director, notwithstanding any provision of law imposing such liability. No amendment to or repeal of this provision shall apply to or have any effect on the liability or alleged liability of any director of the Corporation for or with respect to any acts or omissions of such director occurring prior to such amendment.

NINTH: 1. Action, Suits And Proceedings Other than by or in the Right of the Corporation. The Corporation shall indemnify each person who was or is a party or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (other than an action by or in the right of the Corporation), by reason of the fact that he is or was, or has agreed to become, a director or officer of the Corporation, or is or was serving, or has agreed to serve, at the request of the Corporation, as a director, officer or trustee of, or in a similar capacity with, another corporation, partnership, joint venture, trust or other enterprise (including any employee benefit plan) (all such persons being referred to hereafter as an "Indemnitee"), or by reason of any action alleged to have been taken or omitted in such capacity, against all expenses (including attorneys' fees) judgment, fines and amounts paid in settlement actually and reasonably incurred by him or on his behalf in connection with such action, suit or proceeding and any appeal therefrom, if he acted in good faith and in a manner he reasonably believed to be in, or not opposed to, the best interests of the Corporation, and, with respect to any criminal action or proceeding, had no reasonable cause to believe his conduct was unlawful. The termination of any action, suit or proceeding by judgment, order, settlement, conviction or upon a plea of nolo contendere or its equivalent, shall not, of itself, create a presumption that the person did not act in good faith and in a manner which he reasonably believed to be in, or not opposed to, the best interests of the Corporation, and, with respect to any criminal action or proceeding, had reasonable cause to believe that his conduct was unlawful. Notwithstanding anything to the contrary in this Article, except as set forth in Section 6 below, the Corporation shall not indemnify an Indemnitee seeking indemnification in connection with a proceeding (or part thereof) initiated by the Indemnitee unless the initiation thereof was approved by the Board of Directors of the Corporation.

2. Actions or Suits By or in the Right of the Corporation. The Corporation shall indemnify any Indemnitee who was or is a party or is threatened to be made a party to any threatened, pending or completed action or suit by or in the right of the Corporation to procure a judgment in its favor by reason of the fact that he is or was, or has agreed to become, a director or officer of the Corporation, or is or was serving, or has agreed to serve, at the request of the Corporation, as a director, officer or trustee of, or in a similar capacity with, another corporation, partnership, joint venture, trust or other enterprise (including any employee benefit plan), or by reason of any action alleged to have been taken or omitted in such capacity, against all expenses (including attorneys' fees) and amounts paid in settlement actually and reasonably incurred by him or on his behalf in connection with such action, suit or proceeding and any appeal therefrom, if he acted in good faith and in a manner he reasonably believed to be in, or not opposed to, the best interests of the Corporation, except that no indemnification shall be made in respect of any claim, issue or matter as to which such person shall have been adjudged to be liable to the Corporation unless and only to the extent that the Court of Chancery of Delaware or the court in which such action or suit was brought shall determine upon application that, despite the adjudication of such liability but in view of all the circumstances of the case, such person is fairly and reasonably entitled to indemnity for such expenses (including attorneys' fees) which the Court of Chancery of Delaware or such other court shall deem proper.

3. Indemnification For Expenses Of Successful Party. Notwithstanding the other provisions of this Article, to the extent that an Indemnitee has been successful, on the merits or otherwise, in defense of any action, suit or proceeding referred to in Sections 1 and 2 of this Article, or in defense of any claim, issue or matter therein, or on appeal from any such action, suit or proceeding, he shall be indemnified against all expenses (including attorneys' fees) actually and reasonably incurred by him or on his behalf in connection therewith. Without limiting the foregoing, if any action, suit or proceeding is disposed of, on the merits or otherwise (including a disposition without prejudice), without (i) the disposition being adverse to the Indemnitee, (ii) an adjudication that the Indemnitee was liable to the Corporation, (iii) a plea of guilty or nolo contendere by the Indemnitee, (iv) an adjudication that the Indemnitee did not act in good faith and in a manner he reasonably believed to be in or not opposed to the best interests of the Corporation, and (v) with respect to any criminal proceeding, an adjudication that the Indemnitee had reasonable cause to believe his conduct was unlawful, the Indemnitee shall be considered for the purposes hereof to have been wholly successful with respect thereto.

4. Notification and Defense of Claim. As a condition precedent to his right to be indemnified, the Indemnitee must notify the Corporation in writing as soon as practicable of any action, suit, proceeding or investigation involving him for which indemnity will or could be sought. With respect to any action, suit, proceeding or investigation of which the Corporation is so notified, the Corporation will be entitled to participate therein at its own expense and/or to assume the defense thereof at its own expense, with legal counsel reasonably acceptable to the Indemnitee. After notice from the Corporation to the Indemnitee of its election so to assume such defense, the Corporation shall not be liable to the Indemnitee for any legal or other expenses subsequently incurred by the Indemnitee in connection with such claim, other than as provided below in this Section 4. The Indemnitee shall have the right to employ his own counsel in connection with such claim, but the fees and expenses of such counsel incurred after notice from the Corporation of its assumption of the defense thereof shall be at the expense of the Indemnitee unless (i) the employment of counsel by the Indemnitee has been authorized by the

Corporation, (ii) counsel to the Indemnitee shall have reasonably concluded that there may be a conflict of interest or position on any significant issue between the Corporation and the Indemnitee in the conduct of the defense of such action or (iii) the Corporation shall not in fact have employed counsel to assume the defense of such action, in each of which cases the fees and expenses of counsel for the Indemnitee shall be at the expense of the Corporation, except as otherwise expressly provided by this Article. The Corporation shall not be entitled, without the consent of the Indemnitee, to assume the defense of any claim brought by or in the right of the Corporation or as to which counsel for the Indemnitee shall have reasonably made the conclusion provided for in clause (ii) above.

5. Advance of Expenses. Subject to the provisions of Section 6 below, in the event that the Corporation does not assume the defense pursuant to Section 4 of this Article of any action, suit, proceeding or investigation of which the Corporation receives notice under this Article, any expenses (including attorneys' fees) incurred by an Indemnitee in defending a civil or criminal action, suit, proceeding or investigation or any appeal therefrom shall be paid by the Corporation in advance of the final disposition of such matter, provided, however, that the payment of such expense incurred by an Indemnitee in advance of the final disposition of such matter shall be made only upon receipt of an undertaking by or on behalf of the Indemnitee to repay all amounts so advanced in the event that it shall ultimately be determined that the Indemnitee is not entitled to be indemnified by the Corporation as authorized in this Article. Such undertaking may be accepted without reference to the financial ability of such person to make such repayment.

6. Procedure for Indemnification. In order to obtain indemnification or advancement of expenses pursuant to Section 1, 2, 3 or 5 of this Article, the Indemnitee shall submit to the Corporation a written request, including in such request such documentation and information as is reasonably available to the Indemnitee and is reasonably necessary to determine whether and to what extent the Indemnitee is entitled to indemnification or advancement of expenses. Any such indemnification or advancement of expenses shall be made promptly, and in any event within 60 days after receipt by the Corporation of the written request of the Indemnitee, unless with respect to requests under Section 1, 2 or 5 the Corporation determines, by clear and convincing evidence, within such 60-day period that the Indemnitee did not meet the applicable standard of conduct set forth in Section 1 or 2, as the case may be. Such determination shall be made in each instance by (a) a majority vote of a quorum of the directors of the Corporation consisting of persons who are not at that time parties to the action, suit or proceeding in question ("disinterested directors'), (b) if no such quorum is obtainable, a majority vote of a committee of two or more disinterested directors, (c) a majority vote of a quorum of the outstanding shares of stock of all classes entitled to vote for directors, voting as a single class, which quorum shall consist of stockholders who are not at that time parties to the action, suit or proceeding in question, (d) independent legal counsel (who may be regular legal counsel to the Corporation), or (e) a court of competent jurisdiction.

7. Remedies. The right to indemnification or advances as granted by this Article shall be enforceable by the Indemnitee in any court of competent jurisdiction if the Corporation denies such request, in whole or in part, or if no disposition thereof is made within the 60-day period referred to above in Section 6. Unless otherwise provided by law, the burden of proving that the Indemnitee is not entitled to indemnification or advanced of expenses under this Article

shall be on the Corporation. Neither the failure of the Corporation to have made a determination prior to the commencement of such action that indemnification is proper in the circumstances because the Indemnitee has met the applicable standard of conduct, nor an actual determination by the Corporation pursuant to Section 6 that the Indemnitee has not met such applicable standard of conduct, shall be a defense to the action or create a presumption that the Indemnitee has not met the applicable standard of conduct. The Indemnitee's expenses (including attorneys' fees) incurred in connection with successfully establishing his right to indemnification, in whole or in part, in any such proceeding shall also be indemnified by the Corporation.

8. Subsequent Amendment. No amendment, termination or repeal of this Article or of the relevant provisions of the General Corporation Law of Delaware or any other applicable laws shall affect or diminish in any way the rights of any Indemnitee to indemnification under the provisions hereof with respect to any action, suit, proceeding or investigation arising out of or relating to any actions, transactions or facts occurring prior to the final adoption of such amendment, termination or repeal.

9. Other Rights. The indemnification and advancement of expenses provided by this Article shall not be deemed exclusive of any other rights to which an Indemnitee seeking indemnification or advancement of expenses may be entitled under any law (common or statutory), agreement or vote of stockholders or disinterested directors or otherwise, both as to action in his official capacity and as to action in any other capacity while holding office for the Corporation, and shall continue as to an Indemnitee who has ceased to be a director or officer, and shall inure to the benefit of the estate, heirs, executors and administrators of the Indemnitee. Nothing contained in this Article shall be deemed to prohibit, and the Corporation is specifically authorized to enter into, agreements with officers and directors providing indemnification rights and procedures different from those set forth in this Article. In addition, the Corporation may, to the extent authorized from time to time by its Board of Directors, grant indemnification rights to other employees or agents of the Corporation or other persons serving the Corporation and such rights may be equivalent to, or greater or less than, those set forth in this Article.

10. Partial Indemnification. If an Indemnitee is entitled under any provision of this Article to indemnification by the Corporation for some or a portion of the expenses (including attorneys' fees), judgments, fines or amounts paid in settlement actually and reasonably incurred by him or on his behalf in connection with any action, suit, proceeding or investigation and any appeal, therefrom but not, however, for the total amount thereof, the Corporation shall nevertheless indemnify the Indemnitee for the portion of such expenses (including attorneys' fees), judgments, fines or amounts paid in settlement to which the Indemnitee is entitled.

11. Insurance. The Corporation may purchase and maintain insurance, at its expense, to protect itself and any director, officer, employee or agent of the Corporation or another corporation, partnership, joint venture, trust or other enterprise (including any employee benefit plan) against any expense, liability or loss incurred by him in any such capacity, or arising out of his status as such, whether or not the Corporation would have the power to indemnify such person against such expense, liability or loss under the General Corporation law of Delaware.

12. Merger or Consolidation. If the Corporation is merged into or consolidated with another corporation and the Corporation is not the surviving corporation, the surviving corporation shall assume the obligations of the Corporation under this Article with respect to any action, suit, proceeding or investigation arising out of or relating to any actions, transactions or facts occurring prior to the date of such merger or consolidation.

13. Savings Clause. If this Article or any portion hereof shall be invalidated on any ground by any court of competent jurisdiction, then the Corporation shall nevertheless indemnify each Indemnitee as to any expenses (including attorneys' fees) judgments, fines and amounts paid in settlement in connection with any action, suit, proceeding or investigation, whether civil, criminal or administrative, including an action by or in the right of the Corporation, to the fullest extent permitted by any applicable portion of this Article that shall not have been invalidated and to the fullest extent permitted by applicable law.

14. Definitions. Terms used herein and defined in Section 145(h) and Section 145(i) of the General Corporation Law of Delaware shall have the respective meanings assigned to such terms in such Section 145(h) and Section 145(i).

15. Subsequent Legislation. If the General Corporation Law of Delaware is amended after adoption of this Article to expand further the indemnification permitted to Indemnitees, then the Corporation shall indemnify such persons to the fullest extent permitted by the General Corporation Law of Delaware, as so amended.

TENTH: The Corporation reserves the right to amend, alter, change or repeal any provision contained in this Restated Certificate of Incorporation, in the manner now or hereafter prescribed by statute and this Restated Certificate of Incorporation, and all rights conferred upon stockholders herein are granted subject to this reservation.

ELEVENTH: This Article is inserted for the management of the business and for the conduct of the affairs of the Corporation and shall not become effective until the closing of the sale of shares of Common Stock in an underwritten public offering pursuant to an effective registration statement under the Securities Act of 1933, as amended, resulting in at least $10,000,000 of gross proceeds to the Corporation (a "Public Offering").

1. Number of Directors. The number of directors of the Corporation shall not be less than three. The exact number of directors within the limitations specified in the preceding sentence shall be fixed from time to time by, or in the manner provided in, the Corporation's By-Laws.

2. Classes of Directors. The Board of Directors shall be and is divided into three classes: Class I, Class II and Class III. No one class shall have more than one director more than any other class. If a fraction is contained in the quotient arrived at by dividing the designated number of directors by three, then, if such fraction is one-third, the extra director shall be a member of Class II, and if such fraction is two-thirds, one of the extra directors shall be a member of Class I and one of the extra directors shall be a member of Class II, unless otherwise provided from time to time by resolution adopted by the Board of Directors.

3. Election of Directors. Elections of directors need not be by written ballot except as and to the extent provided in the By-Laws of the Corporation.

4. Terms of Office. Each director shall serve for a term ending on the date of the third annual meeting following the annual meeting at which such director was elected; provided, that each initial director in Class I shall serve for a term ending on the date of the annual meeting in 1996; each initial director in Class II shall serve for a term ending on the date of the annual meeting in 1997; and each initial director in Class III shall serve for a term ending on the date of the annual meeting in 1998; and provided further, that the term of each director shall be subject to the election and qualification of his successor and to his earlier death, resignation or removal.

5. Allocation of Directors Among Classes in the Event of Increases or Decreases in the Number of Directors. In the event of any increase or decrease in the authorized number of directors, (i) each director then serving as such shall nevertheless continue as a director of the class of which he is a member and (ii) the newly created or eliminated directorships resulting from such increase or decrease shall be apportioned by the Board of Directors among the three classes of directors so as to ensure that no one class has more than one director more than any other class. To the extent possible, consistent with the foregoing rule, any newly created directorships shall be added to those classes whose terms of office are to expire at the latest dates following such allocation, and any newly eliminated directorships shall be subtracted from those classes whose terms of offices are to expire at the earliest dates following such allocation, unless otherwise provided from time to time by resolution adopted by the Board of Directors.

6. Quorum; Action at Meeting. A majority of the directors at any time in office shall constitute a quorum for the transaction of business. In the event one or more of the directors shall be disqualified to vote at any meeting, then the required quorum shall be reduced by one for each director so disqualified, provided that in no case shall less than one-third of the number of directors fixed pursuant to Section 1 above constitute a quorum. If at any meeting of the Board of Directors there shall be less than such a quorum, a majority of those present may adjourn the meeting from time to time. Every act or decision done or made by a majority of the directors present at a meeting duly held at which a quorum is present shall be regarded as the act of the Board of Directors unless a greater number is required by law, by the By-Laws of the Corporation or by this Restated Certificate of Incorporation.

7. Removal. Directors of the Corporation may be removed only for cause by the affirmative vote of the holders of at least two-thirds of the shares of the capital stock of the Corporation issued and outstanding and entitled to vote.

8. Vacancies. Any vacancy in the Board of Directors, however occurring, including a vacancy resulting from an enlargement of the board, shall be filled only by a vote of a majority of the directors then in office, although less than a quorum, or by a sole remaining director. A director elected to fill a vacancy shall be elected to hold office until the next election of the class for which such director shall have been chosen, subject to the election and qualification of his successor and to his earlier death, resignation or removal.

9. Stockholder Nominations and Introduction of Business, Etc. Advance notice of stockholder nominations for election of directors and other business to be brought by stockholders before a meeting of stockholders shall be given in the manner provided by the By-Laws of the Corporation.

10. Amendments to Article. Notwithstanding any other provisions of law, this Restated Certificate of Incorporation or the By-Laws of the Corporation, and notwithstanding the fact that a lesser percentage may be specified by law, the affirmative vote of the holders of at least seventy-five percent (75%) of the shares of capital stock of the Corporation issued and outstanding and entitled to vote shall be required to amend or repeal, or to adopt any provision inconsistent with, this Article ELEVENTH.

TWELFTH: Until the closing of a Public Offering, any action which is required to be taken or which may be taken at any annual or special meeting of stockholders of the Corporation may be taken without a meeting, without prior notice and without a vote, if a consent in writing, setting forth the action so taken, is signed by the holders of outstanding stock having not less than the minimum number of votes that would be necessary to authorize or take such action at a meeting at which all shares entitled to vote on such action were present and voted. Effective upon the closing of a Public Offering, stockholders of the Corporation may not take any action by written consent in lieu of a meeting. Notwithstanding any other provisions of law, the Restated Certificate of Incorporation or the By-Laws of the Corporation, and notwithstanding the fact that a lesser percentage may be specified by law, the affirmative vote of the holders of at least seventy-five percent (75%) of the shares of capital stock of the Corporation issued and outstanding and entitled to vote shall be required to amend or repeal, or to adopt any provision inconsistent with, this Article TWELFTH.

THIRTEENTH: Effective upon the closing of a Public Offering, special meetings of stockholders may be called at any time by only the Chief Executive Officer (or if there is no Chief Executive Officer, the President) or the Board of Directors. Business transacted at any special meeting of stockholders shall be limited to matters relating to the purpose or purposes stated in the notice of meeting. Notwithstanding any other provision of law, this Restated Certificate of Incorporation or the By-Laws of the Corporation, as amended, and notwithstanding the fact that a lesser percentage may be specified by law, the affirmative vote of the holders of at least seventy-five percent (75%) of the shares of capital stock of the Corporation issued and outstanding and entitled to vote shall be required to amend or repeal, or to adopt any provision inconsistent with this Article THIRTEENTH.

IN WITNESS WHEREOF, the Corporation has caused its corporate seal to be affixed hereto and this Restated Certificate of Incorporation to be signed by its Chairman this 28th March, 1996.

HYBRIDON, INC.

By: /s/ E. Andrews Grinstead, III
Chairman

[Corporate Seal]

CERTIFICATE OF AMENDMENT
OF RESTATED
CERTIFICATE OF INCORPORATION
OF HYBRIDON, INC.

Pursuant to Section 242 of the General
Corporation Law of the State of Delaware

HYBRIDON, INC. (the "Corporation"), organized and existing under and by virtue of the General Corporation Law of the State of Delaware, does hereby certify as follows:

By written action of the Board of Directors of the Corporation, dated October 20, 1997, the Board of Directors duly adopted resolutions pursuant to Sections 141(f) and 242 of the General Corporation Law of the State of Delaware setting forth an amendment to the Restated Certificate of Incorporation of the Corporation, as amended, and declaring said amendment to be advisable. The stockholders of the Corporation duly approved, pursuant to said Section 242, said proposed amendment at a Special Meeting of Stockholders held on November 18, 1997. The resolution setting forth the amendment to the Restated Certificate of Incorporation is as follows:

RESOLVED: That, subject to stockholder approval, the following paragraph be inserted prior to the first paragraph of Article FOURTH of the Certificate of Incorporation:

"That upon the filing date of the Certificate of Amendment of Restated Certificate of Incorporation of the Corporation (the "Effective Date"), a one-for-five reverse split of the Corporation's Common Stock (as defined below) shall become effective, such that each five shares of Common Stock outstanding and held of record by each stockholder of the Corporation (including treasury shares) immediately prior to the Effective Date shall represent one share of Common Stock from and after the Effective Date."

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to be executed by its Chairman of the Board of Directors, President and Chief Executive Officer this 10th day of December, 1997.

HYBRIDON, INC.

By: /s/ E. Andrews Grinstead, III
E. Andrews Grinstead, III
Chairman of the Board of Directors,
President and Chief Executive Officer

CERTIFICATE OF DESIGNATION

for

SERIES A CONVERTIBLE PREFERRED STOCK

of

HYBRIDON, INC.

Pursuant to Section 151 of the
General Corporation Law of the State of Delaware

HYBRIDON INC., a corporation organized and existing under the laws of the State of Delaware (the "Corporation"), does hereby certify that pursuant to the authority conferred on the board of directors of the Corporation (the "Board of Directors") by the Restated Certificate of Incorporation, as amended (the "Certificate of Incorporation") of the Corporation and in accordance with Section 151 of the General Corporation Law of the State of Delaware, the Board of Directors adopted the following resolution establishing a series of 1,500,000 shares of preferred stock of the Corporation designated as "Series A Convertible Preferred Stock":

> RESOLVED, that pursuant to the authority conferred on the Board of Directors by the Certificate of Incorporation, a series of preferred stock, par value $.01 per share, of the Corporation is hereby established and created, and that the designation and number of shares thereof and the voting and other powers, preferences and relative participating, optional or other special rights of, the shares of such series and the qualifications, limitations and restrictions thereof are as follows:

Series A Convertible Preferred Stock

1. Designation and Amount and Definitions. (a) There shall be a series of Preferred Stock designated as "Series A Convertible Preferred Stock" and the number of shares constituting such series shall be 1,500,000. Such series is referred to herein as the "Series A Preferred Stock". Notwithstanding any other provision in this Certificate of Designation of the Series A Preferred Stock (the "Certificate of Designation") to the contrary, such series shall be senior to the common stock, par value $.001 per share of the Corporation (the "Common Stock") with respect to dividends and the distribution of assets upon liquidation, dissolution or winding up. Such number of shares may be increased or decreased by resolution of the Board of Directors, subject to the provisions of Section 7 hereof; provided, however, that no decrease shall reduce the number of shares of Series A Preferred Stock to fewer than the number of shares then issued and outstanding.

(b) As used in this Certificate of Designation, except as otherwise provided in Subsection 4(c), the following terms shall have the following meanings:

> (i) The "Closing Bid Price" for any security for each trading day shall be the reported per share closing bid price of such security regular way on the Stock Market on such trading day, or, if there were no transactions on such trading day, the average of the reported closing bid and asked prices, regular way, of such security on the relevant Stock Market on such trading day.

(ii) “Fair Market Value” of any asset (including any security) means the fair market value thereof as mutually determined by the Corporation and the holders of a majority of the Series A Preferred Stock then outstanding. If the Corporation and the holders of a majority of the Series A Preferred Stock then outstanding are unable to reach agreement on any valuation matter, such valuation shall be submitted to and determined by a nationally recognized independent investment bank selected by the Board of Directors and the holders of a majority of the Series A Preferred Stock then outstanding (or, if such selection cannot be agreed upon promptly, or in any event within ten days, then such valuation shall be made by a nationally recognized independent investment banking firm selected by the American Arbitration Association in New York City in accordance with its rules), the costs of which valuation shall be paid for by the Corporation.

(iii) “Market Price” shall mean the average Closing Bid Price for twenty (20) consecutive trading days, ending with the trading day prior to the date as of which the Market Price is being determined (with appropriate adjustments for subdivisions or combinations of shares effected during such period), provided that if the prices referred to in the definition of Closing Bid Price cannot be determined on any trading day, the Closing Bid Price for such trading day will be deemed to equal Fair Market Value of such security on such trading day.

(iv) “Registered Holders” shall mean, at any time, the holders of record of the Series A Preferred Stock.

(v) The “Stock Market” shall mean, with respect to any security, the principal national securities exchange on which such security is listed or admitted to trading or, if such security is not listed or admitted to trading on any national securities exchange, shall mean The Nasdaq National Market System (“NNM”) or The Nasdaq SmallCap Market (“SCM” and, together with NNM, “Nasdaq”) or, if such security is not quoted on Nasdaq, shall mean the OTC Bulletin Board or, if such security is not quoted on the OTC Bulletin Board, shall mean the over-the-counter market as furnished by any NASD member firm selected from time to time by the Corporation for that purpose.

(vi) A “trading day” shall mean a day on which the relevant Stock Market is open for the transaction of business.

2. Dividends and Distributions. (a) The holders, as of the Dividend Record Date (as defined below), of the Series A Preferred Stock shall be entitled to receive semi-annual dividends on their respective shares of Series A Preferred Stock (aggregating, for this purpose, all shares of Series A Preferred Stock held of record or, to the Corporation’s knowledge, beneficially by such holder), payable, at the option of the Corporation, in cash or additional shares of Series A Preferred Stock, at the rate of 6.5% per annum (computed on the basis of a 360-day year of twelve 30 day months) of the Dividend Base Amount (as defined below),

payable semi-annually in arrears; provided that, to the extent the declaration or payment of such dividend is prohibited by applicable law, such dividend need not be paid but shall nevertheless accrue and shall be paid promptly when applicable law permits. Such dividends shall accrue from the date of issuance of such share and shall be paid semi-annually on April 1 and October 1 of each year or, if any such day is not a business day, on the next succeeding business day. Such dividends shall be paid, at the election of the Corporation, either in cash or additional duly authorized, fully paid and non assessable shares of Series A Preferred Stock. In calculating the number of shares of Series A Preferred Stock to be paid with respect to each dividend, the Series A Preferred Stock shall be valued at $100.00 per share (subject to appropriate adjustment to reflect any stock split, combination, reclassification or reorganization of the Series A Preferred Stock). Notwithstanding the foregoing, the Corporation shall not be required to issue fractional shares of Series A Preferred Stock; the Corporation may elect, in its sole discretion, independently for each holder, whether such number of shares (on an aggregated basis) will be rounded to the nearest whole share (with .5 of a share rounded upward) or whether such holder will be given cash in lieu of any fractional shares. The "Dividend Base Amount" of a share of Series A Preferred Stock shall be $100.00 plus all accrued but unpaid dividends (subject to appropriate adjustment to reflect any stock split, combination, reclassification or reorganization of the Series A Preferred Stock). The "Dividend Record Date" shall mean, for each semi-annual dividend, the March 15 or September 15, as the case may be, immediately preceding the dividend payment date.

(b) In addition to the foregoing, subject to the rights of the holders of any shares of any series or class of capital stock ranking prior, and superior to, or pari passu with, the shares of Series A Preferred Stock with respect to dividends, the holders of shares of Series A Preferred Stock shall be entitled to receive, as, when and if declared by the Board of Directors, out of assets legally available for that purpose, dividends or distributions in cash, stock or otherwise.

(c) The Corporation shall not declare any dividend or distribution on any Junior Stock (as defined below) of the Corporation unless all dividends required by Section 2(a) have been or contemporaneously are declared and paid, or declared and a sum sufficient for the payment thereof set apart for such payment, on the Series A Preferred Stock.

(d) [Reserved]

(e) All dividends or distributions declared upon the Series A Preferred Stock shall be declared pro rata per share.

(f) Any reference to "distribution" contained in this Section 2 shall not be deemed to include any distribution made in connection with or in lieu of any Liquidation Event (as defined below).

(g) No interest, or sum of money in lieu of interest, shall be payable in respect of any dividend payment or payments on the Series A Preferred Stock which may be in arrears (it being understood that this provision does not alter the Corporation's obligations under Section 2(a)).

(h) So long as any shares of the Series A Preferred Stock are outstanding, no dividends, except as described in the next succeeding sentence, shall be declared or paid or set apart for payment on any class or series of stock of the Corporation ranking, as to dividends, on a parity with the Series A Preferred Stock, for any period unless all dividends have been or contemporaneously are declared and paid, or declared and a sum sufficient for the payment thereof set apart for such payment, on the Series A Preferred Stock. When dividends are not paid in full or a sum sufficient for such payment is not set apart, as aforesaid, upon the shares of the Series A Preferred Stock and any other class or series of stock ranking on a parity as to dividends with the Series A Preferred Stock, all dividends declared upon such other stock shall be declared pro rata so that the amounts of dividends per share declared on the Series A Preferred Stock and such other stock shall in all cases bear to each other the same ratio that accrued dividends per share on the shares of the Series A Preferred Stock and on such other stock bear to each other.

(i) So long as any shares of the Series A Preferred Stock are outstanding, no other stock of the Corporation ranking on a parity with the Series A Preferred Stock as to dividends or upon liquidation, dissolution or winding up shall be redeemed, purchased or otherwise acquired for any consideration (or any moneys be paid to or made available for a sinking fund or otherwise for the purchase or redemption of any shares of any such stock) by the Corporation unless the dividends, if any, accrued on all outstanding shares of the Series A Preferred Stock shall have been paid or set apart for payment.

(j) “Junior Stock” shall mean the Common Stock and any shares of preferred stock of any series or class of the Corporation, whether presently outstanding or hereafter issued, which are junior to the shares of Series A Preferred Stock with respect to (i) the distribution of assets on any voluntary or involuntary liquidation, dissolution or winding up of the Corporation, (ii) dividends or (iii) voting.

3. Liquidation Preference. (a) In the event of a (i) liquidation, dissolution or winding up of the Corporation, whether voluntary or involuntary, (ii) a sale or other disposition of all or substantially all of the assets of the Corporation or (iii) any consolidation, merger, combination, reorganization or other transaction in which the Corporation is not the surviving entity or shares of Common Stock constituting in excess of 50% of the voting power of the Corporation are exchanged for or changed into stock or securities of another entity, cash and/or any other property (a “Merger Transaction”) (items (i), (ii) and (iii) of this sentence being collectively referred to as a “Liquidation Event”), after payment or provision for payment of debts and other liabilities of the Corporation, the holders of the Series A Preferred Stock then outstanding shall be entitled to be paid out of the assets of the Corporation available for distribution to its stockholders, whether such assets are capital, surplus, or earnings, before any payment or declaration and setting apart for payment of any amount shall be made in respect of any Junior Stock of the Corporation, an amount equal to the Dividend Base Amount at such time; provided, however, in the case of a Merger Transaction, such payment may be made in cash, property (valued as provided in Subsection 3(b)) and/or securities (valued as provided in Subsection 3(b)) of the entity surviving such Merger Transaction. In the case of property or in the event that any such securities are subject to an investment letter or other similar restriction on transferability, the value of such property or securities shall be determined by agreement between the Corporation and the holders of a majority of the Series A Preferred Stock then outstanding. If upon any Liquidation Event, whether voluntary or involuntary, the assets to be distributed to

the holders of the Series A Preferred Stock shall be insufficient to permit the payment to such shareholders of the full preferential amounts aforesaid, then all of the assets of the Corporation to be distributed shall be so distributed ratably to the holders of the Series A Preferred Stock on the basis of the number of shares of Series A Preferred Stock held. Notwithstanding item (iii) of the first sentence of this Subsection 3(a), any consolidation, merger, combination, reorganization or other transaction in which the Corporation is not the surviving entity but the stockholders of the Corporation immediately prior to such transaction own in excess of 50% of the voting power of the corporation surviving such transaction and own amongst themselves such interest in substantially the same proportions as prior to such transaction, shall not be considered a Liquidation Event provided that the surviving corporation shall make appropriate provisions to ensure that the terms of this Certificate of Designation survive any such transaction. All shares of Series A Preferred Stock shall rank as to payment upon the occurrence of any Liquidation Event senior to the Common Stock and, unless the terms of such series shall provide otherwise, senior to all other series of the Corporation's preferred stock.

(b) Any securities or other property to be delivered to the holders of the Series A Preferred Stock pursuant to Subsection 3(a) hereof shall be valued as follows:

(i) Securities not subject to an investment letter or other similar restriction on free marketability:

(A) If actively traded on a Stock Market, the per share value shall be deemed to be the Market Price of such securities as of the third day prior to the date of valuation.

(B) If not actively traded on a Stock Market, the value shall be the Fair Market Value of such securities.

(ii) For securities for which there is an active public market but which are subject to an investment letter or other restrictions on free marketability, the value shall be the Fair Market Value thereof, determined by discounting appropriately the per share Market Price thereof.

(iii) For all other securities, the value shall be the Fair Market Value thereof.

4. Conversion.

(a) Right of Conversion. Commencing after the expiration of 12 months following the Alternative Equity Closing Date (as hereinafter defined), but not prior thereto, the shares of Series A Preferred Stock shall be convertible, in whole or in part, at the option of the holder thereof and upon notice to the Corporation as set forth in Subsection 4(b), into fully paid and nonassessable shares of Common Stock and such other securities and property as hereinafter provided. The initial conversion price per share of Common Stock (the "Conversion Price"), shall be equal to the product of 2.125 multiplied by the per share price (the "Stated Common Price") of Common Stock sold by the Corporation in connection with the Alternative Equity Offering (as such term is defined in the Corporation's Offer to Exchange dated February 6, 1998 (the "Original Offer to Exchange"), as amended by the Amendment thereto (the "Amendment")

dated March 30, 1998 (collectively, the "Offer to Exchange")) and shall be subject to adjustment as provided herein. The rate at which each share Series A Preferred Stock is convertible at any time into Common Stock (the "Conversion Rate") shall be determined by dividing the then existing Conversion Price (determined in accordance with this Section 4, including the last paragraph hereof) into the Dividend Base Amount.

The Corporation shall prepare a certificate signed by the Chairman or President, and by the Treasurer or an Assistant Treasurer or the Secretary or an Assistant Secretary, of the Corporation setting forth the Conversion Rate as of the date of the closing of the Alternative Equity Offering (the "Alternative Equity Closing Date"), showing in reasonable detail the facts upon which such Conversion Rate is based, and such certificate shall forthwith be filed with the transfer agent of the Series A Preferred Stock.

(b) Conversion Procedures. Any holder of shares of Series A Preferred Stock desiring to convert such shares into Common Stock shall surrender the certificate or certificates evidencing such shares of Series A Preferred Stock at the office of the transfer agent for the Series A Preferred Stock, which certificate or certificates, if the Corporation shall so require, shall be duly endorsed to the Corporation or in blank, or accompanied by proper instruments of transfer to the Corporation or in blank, accompanied by irrevocable written notice to the Corporation that the holder elects so to convert such shares of Series A Preferred Stock and specifying the name or names (with address) in which a certificate or certificates evidencing shares of Common Stock are to be issued. The Corporation need not deem a notice of conversion to be received unless the holder complies with all the provisions hereof. The Corporation will instruct the transfer agent (which may be the Corporation) to make a notation of the date that a notice of conversion is received, which date of receipt shall be deemed to be the date of receipt for purposes hereof.

The Corporation shall, as soon as practicable after such deposit of certificates evidencing shares of Series A Preferred Stock accompanied by the written notice and compliance with any other conditions herein contained, deliver at such office of such transfer agent to the person for whose account such shares of Series A Preferred Stock were so surrendered, or to the nominee or nominees of such person, certificates evidencing the number of full shares of Common Stock to which such person shall be entitled as aforesaid, subject to Section 4(d). Subject to the following provisions of this paragraph, such conversion shall be deemed to have been made as of the date of such surrender of the shares of Series A Preferred Stock to be converted, and the person or persons entitled to receive the Common Stock deliverable upon conversion of such Series A Preferred Stock shall be treated for all purposes as the record holder or holders of such Common Stock on such date; provided, however, that the Corporation shall not be required to convert any shares of Series A Preferred Stock while the stock transfer books of the Corporation are closed for any purpose, but the surrender of Series A Preferred Stock for conversion during any period while such books are so closed shall become effective for conversion immediately upon the reopening of such books as if the surrender had been made on the date of such reopening, and the conversion shall be at the conversion rate in effect on such date. No adjustments in respect of any dividends on shares surrendered for conversion or any dividend on the Common Stock issued upon conversion shall be made upon the conversion of any shares of Series A Preferred Stock.

The Corporation shall at all times, reserve and keep available out of its authorized but unissued shares of Common Stock, solely for the purpose of effecting the conversion of the shares of Series A Preferred Stock, such number of shares of Common Stock as shall from time to time be sufficient to effect the conversion of all outstanding shares of the Series A Preferred Stock.

All notices of conversion shall be irrevocable; *provided, however*, that if the Corporation has sent notice of an event pursuant to Subsection 4(g) hereof, a holder of Series A Preferred Stock may, at its election, provide in its notice of conversion that the conversion of its shares of Series A Preferred Stock shall be contingent upon the occurrence of the record date or effectiveness of such event (as specified by such holder), provided that such notice of conversion is received by the Corporation prior to such record date or effective date, as the case may be.

(c) Adjustment of Conversion Rate and Conversion Price.

(i) As used in this Subsection 4(c), the following terms shall have the following meanings:

"Capital Stock" of any Person means the Common Stock or Preferred Stock of such Person. Unless otherwise stated herein or the context otherwise requires, "Capital Stock" means Capital Stock of the Corporation;

"Common Stock" of any Person other than the Corporation means the common equity (however designated), including, without limitation, common stock or partnership or membership interests of, or participation or interests in such Person (or equivalents thereof). "Common Stock" of the Corporation means the Common Stock, par value $.001 per share, of the Corporation, any successor class or classes of common equity (however designated) of the Corporation into or for which such Common Stock may hereafter be converted, exchanged or reclassified and any class or classes of common equity (however designated) of the Corporation which may be distributed or issued with respect to such Common Stock or successor class of classes to holders thereof generally. Unless otherwise stated herein or the context requires otherwise, "Common Stock" means Common Stock of the Corporation;

"Current Market Price" means, when used with respect to any security as of any date, the last sale price, regular way, or, in case no such sale takes place on such date, the average of the closing bid and asked prices, regular way, of such security in either case as reported for consolidated transactions on the New York Stock Exchange or, if such security is not listed or admitted to trading on the New York Stock Exchange, as reported for consolidated transactions with respect to securities listed on the principal national securities exchange on which such security is listed or admitted to trading or, if such security is not listed or admitted to trading on any national securities exchange, as reported on the Nasdaq National Market, or, if such security is not listed or admitted to trading on the Nasdaq National Market, as reported on the Nasdaq SmallCap Market, or if such security is not listed or admitted to trading on any national securities exchange or the

Nasdaq National Market or the Nasdaq SmallCap Market, the average of the high bid and low asked prices of such security in the over-the-counter market, as reported by the National Association of Securities Dealers, Inc. Automated Quotations System or such other system then in use or, if such security is not quoted by any such organization, the average of the closing bid and asked prices of such security furnished by an NASD member firm selected by the Corporation. If such security is not quoted by any such organization and no such NASD member firm is able to provide such prices, the Current Market Price of such security shall be the Fair Market Value thereof;

"Fair Market Value" means, at any date as to any asset, Property or right (including without limitation, Capital Stock of any Person, evidence of indebtedness or other securities, but excluding cash), the fair market value of such item as determined in good faith by the Board of Directors, whose determination shall be conclusive; provided, however, that such determination is described in an Officers' Certificate filed with the transfer agent and that, if there is a Current Market Price for such item on such date, "Fair Market Value" means such Current Market Price (without giving effect to the last sentence of the definition thereof);

"GAAP" means, as of any date, generally accepted accounting principles in the United States and does not include any interpretations or regulations that have been proposed but that have not become effective;

"Officer" means, with respect to any Person, the Chairman of the Board, the Chief Executive Officer, the President, the Chief Operating Officer, the Chief Financial Officer, the Treasurer, any Assistant Treasurer, the Controller, the Secretary, any Assistant Secretary or any Vice President of such Person;

"Officers' Certificate" means a certificate signed on behalf of the Corporation by two Officers, one of whom must be the Chairman of the Board, the President, the Treasurer or a Vice-President of the Corporation;

"Person" means any individual, corporation, partnership, association, trust or any other entity or organization, including a government or political subdivision or any agency or instrumentality thereof;

"Preferred Stock" of any Person means the class or classes of equity, ownership or participation interests (however designated) in such Person, including, without limitation, stock, share, partnership and membership interests, which are preferred as to the payment of dividends or distributions by, or as to the distribution of assets upon any voluntary or involuntary liquidation or dissolution of, such Person (or equivalent thereof) over interests of any other class of interests of such Person. Unless otherwise stated herein or the context otherwise requires, "Preferred Stock" means Preferred Stock of the Corporation;

"Property" of any Person means any and all types of real, personal, tangible, intangible or mixed property owned by such Person whether or not included on the most recent consolidated balance sheet of such Person in accordance with GAAP;

"Subsidiary" of a Person on any date means any other Person of whom such Person owns, directly or indirectly through a Subsidiary or Subsidiaries of such Person, Capital Stock with voting power, acting independently and under ordinary circumstances, entitling such person to elect a majority of the board of directors or other governing body of such other Person. Unless otherwise stated herein or the context otherwise requires, "Subsidiary" means a Subsidiary of the Corporation.

(ii) If the Corporation shall (i) pay a dividend or other distribution, in Common Stock, on any class of Capital Stock of the Corporation, (ii) subdivide the outstanding Common Stock into a greater number of shares by any means or (iii) combine the outstanding Common Stock into a smaller number of shares by any means including, without limitation, a reverse stock split), then in each such case the Conversion Price in effect immediately prior thereto shall be adjusted so that the Registered Holder of any shares of Series A Preferred Stock thereafter surrendered for conversion shall be entitled to receive the number of shares of Common Stock that such Registered Holder would have owned or have been entitled to receive upon the happening of such event had such Series A Preferred Stock been converted immediately prior to the relevant record date or, if there is no such record date, the effective date of such event. An adjustment made pursuant to this Paragraph 4(c)(ii) shall become effective immediately after the record date for the determination of stockholders entitled to receive such dividend or distribution and shall become effective immediately after the effective date of such subdivision or combination, as the case may be.

(iii) If the Corporation shall (i) issue or distribute (at a price per share less than the Current Market Price per share of such Capital Stock on the date of such issuance or distribution) Capital Stock generally to holders of Common Stock or to holders of any class or series of Capital Stock which is convertible into or exchangeable or exercisable for Common Stock (excluding an issuance or distribution of Common Stock described in Paragraph 4(c)(ii)) or (ii) issue or distribute generally to such holders rights, warrants, options or convertible or exchangeable securities entitling the holder thereof to subscribe for, purchase, convert into or exchange for Capital Stock at a price per share less than the Current Market Price per share of such Capital Stock on the date of issuance or distribution, then, in each such case, at the earliest of (A) the date the Corporation enters into a firm contract for such issuance or distribution, (B) the record date for the determination of stockholders entitled to receive any such Capital Stock or any such rights, warrants, options or convertible or exchangeable securities or (C) the date of actual issuance or distribution of any such Capital Stock or any such rights, warrants, options or convertible or exchangeable securities, the Conversion Price shall be reduced by multiplying the Conversion Price in effect immediately prior to such earliest date by:

(A) if such Capital Stock is Common Stock, a fraction the numerator of which is the number of shares of Common Stock outstanding, on such earliest date plus the number of shares of Common Stock which could be purchased at the Current Market Price per share of Common Stock on the date of such issuance or distribution with the aggregate consideration (based on the Fair Market Value thereof) received or receivable by the Corporation either (A) in connection with such issuance or distribution or (B) upon the conversion, exchange, purchase or subscription of all such rights, warrants, options or convertible or exchangeable securities (the "Aggregate Consideration"), and the denominator of which is the number of shares of Common Stock outstanding on such earliest date plus the number of shares of Common Stock to be so issued or distributed or to be issued upon the conversion, exchange, purchase or subscription of all such rights, warrants, options or convertible or exchangeable securities; or

(B) if such Capital Stock is other than Common Stock, a fraction the numerator of which is the Current Market Price per share of Common Stock on such earliest date minus an amount equal to (A) the difference between (1) the Current Market Price per share of such Capital Stock multiplied by the number of shares of such Capital Stock to be so issued and (2) the Aggregate Consideration, divided by (B) the number of shares of Common Stock outstanding on such date, and the denominator of which is the Current Market Price per share of Common Stock on such earliest date.

Such adjustment shall be made successively whenever any such Capital Stock, rights, warrants, options or convertible or exchangeable securities are so issued or distributed. In determining whether any rights, warrants, options or convertible or exchangeable securities entitle the holders thereof to subscribe for, purchase, convert into or exchange for shares of such Capital Stock at less than such Current Market Price, there shall be taken into account the Fair Market Value of any consideration received or receivable by the Corporation for such rights, warrants, options or convertible or exchangeable securities. If any right, warrant, option or convertible or exchangeable security, the issuance of which resulted in an adjustment in the Conversion Price pursuant to this Paragraph 4(c)(iii), shall expire and shall not have been exercised, the Conversion Price shall immediately upon such expiration be recomputed to the Conversion Price which would have been in effect if such right, warrant, option or convertible or exchangeable securities had never been distributed or issued. Notwithstanding anything contained in this paragraph to the contrary, (i) the issuance of Capital Stock upon the exercise of such rights, warrants or options or the conversion or exchange of such convertible or exchangeable securities will not cause an adjustment in the Conversion Price if no such adjustment would have been required at the time such right, warrant, option or convertible or exchangeable security was issued or distributed; *provided*, *however*, that, if the consideration payable upon such exercise, conversion or exchange and/or the Capital Stock receivable thereupon

are changed after the time of the issuance or distribution of such right, warrant, option or convertible or exchangeable security then such change shall be deemed to be the expiration thereof without having been exercised and the issuance or distribution of new options, rights, warrants or convertible or exchangeable securities and (ii) the issuance of convertible preferred stock of the Corporation as a dividend on convertible preferred stock of the Corporation will not cause an adjustment in the Conversion Price if no such adjustment would have been required at the time such underlying convertible preferred stock was issued (or as a result of any subsequent modification to the terms thereof) and the conversion provisions of such convertible stock so issued as a dividend are the same as in such underlying convertible preferred stock.

Notwithstanding any contained in this Certificate of Designation to the contrary, options, rights or warrants issued or distributed by the Corporation, including options, rights or warrants distributed prior to the date of filing of this Certificate of Designation, to holders of Common Stock generally which, until the occurrence of a specified event or events (a "Trigger Event"), (i) are deemed to be transferred with Common Stock, (ii) are not exercisable and (iii) are also issued on a pro rata basis with respect to future issuances of Common Stock, shall be deemed not to have been issued or distributed for purposes of this Subsection 4(c) (and no adjustment to the Conversion Price under this Subsection 4(c) will be required) until the occurrence of the earliest Trigger Event. Upon the occurrence of a Trigger Event, such options, rights or warrants shall continue to be deemed not to have been issued or distributed for purposes of this Subsection 4(c) (and no adjustment to the Conversion Price under this Subsection 4(c) will be required) if and for so long as each Registered Holder who thereafter converts such Registered Holder's Series A Preferred Stock shall be entitled to receive upon such conversion, in addition to the shares of Common Stock issuable upon such conversion, a number of such options, rights or warrants, as the case may be, equal to the number of options, rights or warrants to which a holder of the number of shares of Common Stock equal to the number of shares of Common Stock issuable upon conversion of such Registered Holder's Series A Preferred Stock is entitled to receive at the time of such conversion in accordance with the terms and provisions of, and applicable to, such options, rights or warrants. Upon the expiration of any such options, rights or warrants or at such time, if any, as a Registered Holder is not entitled to receive such options, rights or warrants upon conversion of such Registered Holder's Series A Preferred Stock, an adjustment (if any is required) to the Conversion Price shall be made in accordance with this Paragraph 4(c)(iii) with respect to the issuance of all such options, rights and warrants as of the date of issuance thereof, but subject to the provisions of the preceding paragraph, if any such option, right or warrant, including any such options right or warrants distributed prior to the date of filing of this Certificate of Designation, are subject to events, upon the occurrence of which such options, rights or warrants become exercisable to purchase different securities, evidence of indebtedness, cash, Properties or other assets or different amounts thereof, then, subject to the preceding provision of this paragraph, the date of the occurrence of any and each such event shall be deemed to be the date of distribution and record

date with respect to new options, right or warrants with such new purchase rights (and a termination or expiration of the existing options, rights or warrants without exercise thereof). In addition, in the event of any distribution (or deemed distribution) of options, rights or warrants, or any Trigger Event or other event of the type described in the preceding sentence, that required (or would have required but for the provisions of Paragraph 4(c)(vi) or this paragraph) an adjustment to the Conversion Price under this Subsection 4(c) and such options, rights or warrants shall thereafter have been redeemed or repurchased without having been exercised, then the Conversion Price shall be adjusted upon such redemption or repurchase to give effect to such distribution, Trigger Event or other event, as the case may, as though it had instead been a cash distribution, equal on a per share basis to the result of the aggregate redemption or repurchase price received by holders of such options, rights or warrants divided by the number of shares of Common Stock outstanding as of the date of such repurchase or redemption, made to holders of Common Stock generally as of the date of such redemption or repurchase.

(iv) If the Corporation shall pay or distribute, as a dividend or otherwise, generally to holders of Common Stock or any class or series of Capital Stock which is convertible into or exercisable or exchangeable for Common Stock any assets, Properties or rights (including, without limitation, evidences of indebtedness of the Corporation, any Subsidiary or any other Person, cash or Capital Stock or other securities of the Corporation, any Subsidiary or any other Person, but excluding payments and distributions as described in Paragraphs 4(c)(ii) or (iii), dividends and distributions in connection with a Liquidation Event and distributions consisting solely of cash described in Paragraph 4(c)(v)), then in each such case the Conversion Price shall be reduced by multiplying the Conversion Price in effect immediately prior to the date of such payment or distribution by a fraction, the numerator of which is the Current Market Price per share of Common Stock on the record date for the determination of stockholders entitled to receive such payment or distribution less the Fair Market Value per share of Common Stock on such record date of the assets, Properties or rights so paid or distributed, and the denominator of which is the Current Market Price per share of Common Stock on such record date. Such adjustment shall become effective immediately after such record date. For purposes of this Paragraph 4(c)(iv), such Fair Market Value per share shall equal the aggregate Fair Market Value on such record date of the assets, Properties or rights so paid or distributed divided by the number of shares of Common Stock outstanding on such record date. For all purposes of this Certificate of Designation, adjustments to any security’s conversion or exercise price pursuant to such security’s original terms shall not be deemed a distribution or dividend to holders thereof.

(v) If the Corporation shall, by dividend or otherwise, make a distribution (other than in connection with the liquidation, dissolution or winding up of the Corporation in its entirety), generally to holders of Common Stock or any class or series of Capital Stock which is convertible into or exercisable or exchangeable for Common Stock, consisting solely of cash where (x) the sum of (i) the

aggregate amount for such cash plus (ii) the aggregate amount of all cash so distributed (by dividend or otherwise) to such holders within the 12-month period ending on the record date for determining stockholder entitled to receive such distribution with respect to which no adjustment has been made to the Conversion Price pursuant to this Paragraph 4(c)(v) exceeds (y) 10% of the result of the multiplication of (1) the Current Market Price per share of Common Stock on such record date times (2) the number of shares of Common Stock outstanding on such record date, then the Conversion Price shall be reduced, effective immediately prior to the opening of business on the day following such record date, by multiplying the Conversion Price in effect immediately prior to the close of business on the day prior to such record date by a fraction, the numerator of which is the Current Market Price per share of Common Stock on such record date less the aggregate amount of cash per share so distributed and the denominator of which is such Current Market Price; *provided, however*, that, if the aggregate amount of cash per share is equal to or greater than such Current Market Price, then, in lieu of the foregoing adjustment, adequate provisions shall be made so that each Registered Holder shall have the right to receive upon conversion (with respect to each share of Common Stock issued upon such conversion and in addition to the Common Stock issuable upon conversion) the aggregate amount of cash per share such Registered Holder would have received had such Registered Holder's Series A Preferred Stock been converted immediately prior to such record date. In no event shall the Conversion Price be increased pursuant to this Paragraph 4(c)(v); *provided, however*, that if such distribution is not so made, the Conversion Price shall be adjusted to be the Conversion Price which would have been in effect if such distribution had not been declared. For purposes of this Paragraph 4(c)(v), such aggregate amount of cash per share shall equal such sum divided by the number of shares of Common Stock outstanding on such record date.

(vi) The provisions of this Subsection 4(c) shall similarly apply to all successive events of the type described in this Subsection 4(c). Notwithstanding anything contained herein to the contrary, no adjustment in the Conversion Price shall be required unless such adjustment would require an increase or decrease of at least 1% in the Conversion Price then in effect; *provided, however*, that any adjustments which by reason of this Paragraph 4(c)(vi) are not required to be made shall be carried forward and taken into account in any subsequent adjustment. All calculations under this Section 4 shall be made by the Corporation and shall be made to the nearest cent or to the nearest one hundredth of a share, as the case may be, and the transfer agent shall be entitled to rely conclusively thereon. Except as provided in this Section 4, no adjustment in the Conversion Price will be made for the issuance of Common Stock or any securities convertible into or exchangeable for Common Stock or carrying the right to purchase Common Stock or any securities so convertible or exchangeable.

(vii) Whenever the Conversion Price is adjusted as provided herein, the Corporation shall promptly file with the transfer agent an Officers' Certificate setting forth the Conversion Price in effect after such adjustment and setting forth

a brief statement of the facts requiring such adjustment. Promptly after delivery of such Officers' Certificate, the Corporation shall give or cause to be given to each Registered Holder a notice of such adjustment of the Conversion Price setting forth the adjusted Conversion Price and the date on which such adjustment becomes effective.

(viii) Notwithstanding anything contained herein to the contrary, in any case in which this Subsection 4(c) provides that an adjustment in the Conversion Price shall become effective immediately after a record date for an event, the Corporation may defer until the occurrence of such event (i) issuing to the Registered Holder of any Series A Preferred Stock converted after such record date and before the occurrence of such event the additional shares of Common Stock issuable upon such conversion by reason of the adjustment required by such event over and above the number of shares of Common Stock issuable upon such conversion before giving effect to such adjustment and (ii) paying to such Registered Holder any amount in cash in lieu of any fractional share of Common Stock pursuant to Subsection 4(d).

(ix) Notwithstanding any other provision hereof, no adjustment to the Conversion Price shall be made upon the issuance or exercise or conversion of (1) options or warrants to purchase, in the aggregate, up to 25% of the securities sold in the offerings of securities of the Corporation described in the Original Offer to Exchange or any options or warrants described in the Amendment in respect of the Alternative Equity Offering, in each case issued to (or to the designee of) any placement agent or financial advisor (such options or warrants, the "Offering Warrants"), (2) any equity securities or warrants of the Corporation (including, without limitation, the Series A Preferred Stock, warrants and equity securities underlying warrants) issued in exchange for 9% Convertible Subordinated Notes due 2004 (the "9% Notes") of the Corporation or accrued interest thereon or pursuant to the conversion or exercise provisions thereof, (3) any warrants issued in connection with the offerings described in the Original Offer to Exchange or the Amendment (collectively, the "Offering"), (4) any warrants issued to Forum Capital Markets, LLC ("Forum") in exchange for or in addition to, or any amendment to, any warrants held by Forum, in each case, pursuant to a letter agreement dated January 5, 1998, between the Corporation and Forum, and any other warrants to purchase Common Stock or shares of Common Stock issued to Forum or its designee, (5) any Series A Preferred Stock issued in the Offering, (6) any Capital Stock issued or cash paid as dividends on the Series A Preferred Stock or (7) any Capital Stock issued or cash paid upon the mandatory conversion or redemption of any Series A Preferred Stock in accordance with Section 5 of this Certificate of Designation.

(d) No Fractional Shares. No fractional shares or scrip representing fractional shares of Common Stock shall be issued upon conversion of Series A Preferred Stock. If more than one certificate evidencing shares of Series A Preferred Stock shall be surrendered for conversion at one time by the same holder, the number of full shares issuable upon conversion thereof shall be computed on the basis of the aggregate number of shares of Series A Preferred

Stock so surrendered. Instead of any fractional share of Common Stock which would otherwise be issuable upon conversion of such aggregate number of shares of Series A Preferred Stock, the Corporation may elect, in its sole discretion, independently for each holder, whether such number of shares of Common Stock will be rounded to the nearest whole share (with a .5 of a share rounded upward) or whether such holder will be given cash, in lieu of any fractional share, in an amount equal to the same fraction of the Market Price of the Common Stock as of the close of business on the day of conversion.

(e) [Reserved]

(f) Reservation of Shares; Transfer Taxes, Etc. The Corporation shall at all times reserve and keep available, out of its authorized and unissued shares of Common Stock, solely for the purpose of effecting the conversion of the Series A Preferred Stock, such number of shares of its Common Stock free of preemptive rights as shall be sufficient to effect the conversion of all shares of Series A Preferred Stock from time to time outstanding. The Corporation shall use its best efforts from time to time, in accordance with the laws of the State of Delaware to increase the authorized number of shares of Common Stock if at any time the number of shares of authorized, unissued and unreserved Common Stock shall not be sufficient to permit the conversion of all the then-outstanding shares of Series A Preferred Stock.

The Corporation shall pay any and all issue or other taxes (excluding any income taxes) that may be payable in respect of any issue or delivery of shares of Common Stock on conversion of the Series A Preferred Stock. The Corporation shall not, however, be required to pay any tax which may be payable in respect of any transfer involved in the issue or delivery of Common Stock (or other securities or assets) in a name other than that in which the shares of Series A Preferred Stock so converted were registered, and no such issue or delivery shall be made unless and until the person requesting such issue has paid to the Corporation the amount of such tax or has established, to the satisfaction of the Corporation, that such tax has been paid or need not be paid.

(g) Prior Notice of Certain Events. In case:

(i) the Corporation shall declare any dividend (or any other distribution); or

(ii) the Corporation shall authorize the granting to the holders of Common Stock of rights or warrants to subscribe for or purchase any shares of stock of any class or of any other rights or warrants; or

(iii) of any reclassification of Common Stock (other than a subdivision or combination of the outstanding Common Stock, or a change in par value, or from par value to no par value, or from no par value to par value); or

(iv) of any consolidation or merger to which the Corporation is a party and for which approval of any stockholders of the Corporation shall be required, or of the sale or transfer of all or substantially all of the assets of the Corporation or of any compulsory share exchange whereby the Common Stock is converted into other securities, cash or other property; or

(v) of any Liquidation Event;

then the Corporation shall cause to be filed with the transfer agent for the Series A Preferred Stock, and shall cause to be mailed to the Registered Holders, at their last addresses as they shall appear upon the stock transfer books of the Corporation, at least 20 days prior to the applicable record date hereinafter specified, a notice stating (x) the date on which a record (if any) is to be taken for the purpose of such dividend. distribution or granting of rights or warrants or, if a record is not to be taken, the date as of which the holders of Common Stock of record to be entitled to such dividend, distribution, rights or warrants are to be determined and a description of the cash, securities or other property to be received by such holders upon such dividend, distribution or granting of rights or warrants or (y) the date on which such reclassification, consolidation, merger, sale, transfer, share exchange or Liquidation Event is expected to become effective, the date as of which it is expected that holders of Common Stock of record shall be entitled to exchange their shares of Common Stock for securities or other property deliverable upon such exchange or Liquidation Event and the consideration, including securities or other property, to be received by such holders upon such exchange; *provided, however*, that no failure to mail such notice or any defect therein or in the mailing thereof shall affect the validity of the corporate action required to be specified in such notice.

(h) Other Changes in Conversion Rate. The Corporation from time to time may increase the Conversion Rate by any amount for any period of time if the period is at least 20 days and if the increase is irrevocable during the period. Whenever the Conversion Rate is so increased, the Corporation shall mail to the Registered Holders a notice of the increase at least 15 days before the date the increased Conversion Rate takes effect, and such notice shall state the increased Conversion Rate and the period it will be in effect.

The Corporation may make such increases in the Conversion Rate, in addition to those required or allowed by this Section 4, as shall be determined by it, as evidenced by a resolution of the Board of Directors, to be advisable in order to avoid or diminish any income tax to holders of Common Stock resulting from any dividend or distribution of stock or issuance of rights or warrants to purchase or subscribe for stock or from any event treated as such for income tax purposes.

Notwithstanding anything to the contrary herein, in no case shall the Conversion Price be adjusted to an amount less than $.001 per share, the current par value of the Common Stock into which the Series A Preferred Stock is convertible.

(i) Ambiguities/Errors. The Board of Directors of the Corporation shall have the power to resolve any ambiguity or correct any error in the provisions relating to the convertibility of the Series A Preferred Stock, and its actions in so doing shall be final and conclusive.

5. Mandatory Conversion and Redemption. (a) At any time after the expiration of 12 months after the Alternative Equity Closing Date, the Corporation at its option, may cause the Series A Preferred Stock to be converted in whole or in part, on a *pro rata* basis, into fully paid and nonassessable shares of Common Stock using a conversion price equal to 200% of the Stated Common Price if the Closing Bid Price (or, if the price referenced in the

definition of Closing Bid Price cannot be determined, the Fair Market Value) of the Common Stock shall have equalled or exceeded 250% of the Conversion Price for at least 20 trading days in any 30 consecutive trading day period ending three days prior to the date of notice of conversion (such event, the "Market Trigger"). Any shares of Series A Preferred Stock so converted shall be treated as having been surrendered by the holder thereof for conversion pursuant to Section 4 on the date of such mandatory conversion (unless previously converted at the option of the holder).

(b) At any time after April 1, 2000, the Corporation, at its option, may redeem the Series A Preferred Stock for cash equal to the Dividend Base Amount at such time, if the Market Trigger has occurred in the period ending three days prior to the date of notice of redemption (unless previously converted at the option of the holder).

(c) No greater than 60 nor fewer than 20 days prior to the date of any such mandatory conversion or redemption, notice by first class mail, postage prepaid, shall be given to the holders of record of the Series A Preferred Stock to be converted or redeemed, addressed to such holders at their last addresses as shown on the stock transfer books of the Corporation. Each such notice shall specify the date fixed for conversion or redemption, the place or places for surrender of shares of Series A Preferred Stock and the then effective Conversion Rate pursuant to Section 4.

Any notice which is mailed as herein provided shall be conclusively presumed to have been duly given by the Corporation on the date deposited in the mail, whether or not the holder of the Series A Preferred Stock receives such notice; and failure properly to give such notice by mail, or any defect in such notice, to the holders of the shares to be converted or redeemed shall not affect the validity of the proceedings for the conversion or redemption of any other shares of Series A Preferred Stock. On or after the date fixed for conversion or redemption (the "Take-Out Date") as stated in such notice, each holder of shares called to be converted or redeemed shall surrender the certificate evidencing such shares to the Corporation at the place designated in such notice for conversion or redemption. After the mailing of such notice, but before the Take-Out Date as stated therein, all rights whatsoever with respect to the shares so called for conversion or redemption (except the right of the holders to convert such shares pursuant to Section 4 and to have such shares converted or redeemed, as the case may be, upon surrender of their certificates therefor, pursuant to this Section 5) shall terminate. On or after the Take-Out Date, notwithstanding that the certificates evidencing any shares properly called for conversion or redemption shall not have been surrendered, such shares shall no longer be deemed outstanding and all rights whatsoever with respect to the shares so called for conversion or redemption (except the right of the holders to have such shares converted or redeemed, as the case may be, upon surrender of their certificates therefor, pursuant to this Section 5) shall terminate.

6. Outstanding Shares. For purposes of this Certificate of Designation, a share of Series A Preferred Stock, when issued, shall be deemed outstanding except (i) from the date, or the deemed date, of surrender of certificates evidencing shares of Series A Preferred Stock, all shares of Series A Preferred Stock converted into Common Stock or redeemed pursuant to Section 5 and (ii) from the date of registration of transfer, all shares of Series A Preferred Stock held of record by the Corporation or any subsidiary of the Corporation.

7. Class Voting Rights. The Corporation shall not, without the affirmative vote or consent of the holders of at least 50% of all outstanding Series A Preferred Stock, voting separately as a class, (i) amend, alter or repeal any provision of the Certificate of Incorporation or the Bylaws of the Corporation so as adversely to affect the relative rights, preferences, qualifications, limitations or restrictions of the Series A Preferred Stock (it being understood that the issuance of securities ranking prior to, or *pari passu* with, the Series A Preferred Stock (A) upon a Liquidation Event or (B) with respect to the payment of dividends or distributions shall not be considered adversely to affect such relative rights, preferences, qualifications, limitations or restrictions); or (ii) authorize or issue, or increase the authorized amount of, Series A Preferred Stock, other than Series A Preferred Stock issuable in connection with the Offering, issuable in exchange for 9% Notes or accrued interest thereon or issuable as dividends on Series A Preferred Stock.

8. Status of Acquired Shares. Shares of Series A Preferred Stock received upon conversion or redemption pursuant to Section 4 or Section 5 or otherwise acquired by the Corporation will be restored to the status of authorized but unissued shares of Preferred Stock, without designation as to class, and may thereafter be issued, but not as shares of Series A Preferred Stock.

9. Preemptive Rights. The Series A Preferred Stock is not entitled to any preemptive or subscription rights in respect of any securities of the Corporation.

10. Severability of Provisions. Whenever possible, each provision hereof shall be interpreted in a manner as to be effective and valid under applicable law, but if any provision hereof is held to be prohibited by or invalid under applicable law, such provision shall be ineffective only to the extent of such prohibition or invalidity, without invalidating or otherwise adversely affecting the remaining provisions hereof. If a court of competent jurisdiction should determine that a provision hereof would be valid or enforceable if a period of time were extended or shortened or a particular percentage were increased or decreased, then such court may make such changes as shall be necessary to render the provision in question effective and valid under applicable law.

11. Restrictions on Change of Control. Notwithstanding anything to the contrary contained in this Certificate of Designation, without the prior written consent of the Corporation, so long as any 9% Notes remain outstanding under that certain Indenture dated as of March 26, 1997 (as amended, the “Indenture”) in respect of the 9% Notes, no holder of Series A Preferred Stock shall have voting rights granted hereunder, be entitled to receive any voting securities of the Corporation pursuant hereto or be entitled to exercise any of the conversion rights set forth herein (each, a “Restricted Event”), to the extent that any such Restricted Event could, in the Corporation’s reasonable judgment, either alone or in conjunction with other issuances or holdings of capital stock, warrants or convertible securities of the Corporation, result in a Change of Control (as defined in the Indenture).

[Signature page follows]

IN WITNESS WHEREOF, E. Andrews Grinstead, III, President and Chief Executive Officer of the Corporation, acting for and on behalf of the Corporation, has hereunto subscribed his name this 5th day of May, 1998.

HYBRIDON, INC.

By: /s/ E. Andrews Grinstead, III
Name: E. Andrews Grinstead, III
Title: President and Chief Executive Officer

CERTIFICATE OF AMENDMENT OF RESTATED CERTIFICATE OF INCORPORATION

OF

HYBRIDON, INC.

It is hereby certified that:

1. The name of the corporation (hereinafter called the "Corporation") is Hybridon, Inc.

2. The Certificate of Incorporation of the Corporation is hereby amended by inserting a new sentence at the end of paragraph 4 of Subsection A of Articles FOURTH thereof so that said paragraph as so amended shall read as follows:

> "4. LIQUIDATION. Upon the dissolution or liquidation of the Corporation, whether voluntary or involuntary, holders of Common Stock will be entitled to receive all assets of the Corporation available for distribution to its stockholders, subject to any preferential rights of any then outstanding Preferred Stock. Notwithstanding the foregoing, and notwithstanding any amendments to, or resolutions of the Board of Directors in connection with, this Certificate of Incorporation, the transaction between the Corporation and Boston Biosystems, Inc. pursuant to that certain Asset Purchase Agreement of June 29, 2000, shall not constitute a dissolution or liquidation of the Corporation such as would entitle any holder of the Series A Preferred Stock to a preferred distribution."

3. Paragraph 3 of the Certificate of Designation of the Corporation shall be amended by inserting a new sentence at the end of the paragraph such that said paragraph shall read as follows:

> "3(c) Notwithstanding the foregoing, and notwithstanding any amendments to, or resolutions of the Board of Directors in connection with, this Certificate of Incorporation or Certificate of Designation, the transaction between the Corporation and Boston Biosystems, Inc. pursuant to that certain Asset Purchase Agreement dated as of June 29, 2000, shall not constitute a Liquidation Event of the Corporation such as would entitle any holder of any series of Series A Preferred Stock to any preferred distribution."

4. Every other Article and provision in the Certificate of Incorporation of the Corporation remains in full force and effect.

5. The amendment of the Certificate of Incorporation herein certified has been duly adopted in accordance with the provisions of Section 242 of the General Corporation Law of the State of Delaware.

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to be duly signed by its President this 19 day of September, 2000.

HYBRIDON, INC.

By: /s/ Robert G. Andersen
Robert G. Andersen, Vice President
and CFO

CERTIFICATE OF DESIGNATION
for
SERIES B CONVERTIBLE PREFERRED STOCK
of
HYBRIDON, INC.

Pursuant to Section 151 of the
General Corporation Law of the State of Delaware

HYBRIDON, INC., a corporation organized and existing under the laws of the State of Delaware (the "Corporation"), does hereby certify that pursuant to the authority conferred on the board of directors of the Corporation (the "Board of Directors") by the Restated Certificate of Incorporation, as amended (the "Certificate of Incorporation") of the Corporation and in accordance with Section 151 of the General Corporation Law of the State of Delaware, the Board of Directors adopted the following resolution establishing a series of 85,000 shares of preferred stock of the Corporation designated as "Series B Convertible Preferred Stock":

RESOLVED, that pursuant to the authority conferred on the Board of Directors by the Certificate of Incorporation, a series of preferred stock, par value $.01 per share, of the Corporation is hereby established and created, and that the designation and number of shares thereof and the voting and other powers, preferences and relative participating, optional or other special rights of, the shares of such series and the qualifications, limitations and restrictions thereof are as follows:

Series B Convertible Preferred Stock

1. Designation and Amount and Definitions. (a) There shall be a series of Preferred Stock designated as "Series B Convertible Preferred Stock" and the number of shares constituting such series shall be 85,000. Such series is referred to herein as the "Series B Preferred Stock". Notwithstanding any other provision in this Certificate of Designation of the Series B Preferred Stock (the "Certificate of Designation") to the contrary, such series shall be senior to the common stock, par value $.001 per share of the Corporation (the "Common Stock"), and the Series A Convertible Preferred Stock, $.01 par value per share, of the Corporation (the "Series A Preferred Stock"), with respect to dividends and the distribution of assets upon liquidation, dissolution or winding up. Such number of shares may be increased or decreased by resolution of the Board of Directors, subject to the provisions of Section 7 hereof; provided, however, that no decrease shall reduce the number of shares of Series B Preferred Stock to fewer than the number of shares then issued and outstanding.

(b) As used in this Certificate of Designation, except as otherwise provided in Subsection 4(c), the following terms shall have the following meanings:

(i) "Closing Bid Price" for any security for each trading day shall be the reported per share closing bid price of such security regular way on the Stock Market on such trading day, or, if there were no transactions on such trading day, the average of the reported closing bid and asked prices, regular way, of such security on the relevant Stock Market on such trading day.

(ii) “Fair Market Value” of any asset (including any security) means the fair market value thereof as mutually determined by the Corporation and the holders of a majority of the Series B Preferred Stock then outstanding. If the Corporation and the holders of a majority of the Series B Preferred Stock then outstanding are unable to reach agreement on any valuation matter, such valuation shall be submitted to and determined by a nationally recognized independent investment bank selected by the Board of Directors and the holders of a majority of the Series B Preferred Stock then outstanding (or, if such selection cannot be agreed upon promptly, or in any event within ten (10) days, then such valuation shall be made by a nationally recognized independent investment banking firm selected by the American Arbitration Association in New York City in accordance with its rules), the costs of which valuation shall be paid for by the Corporation.

(iii) “Market Price” shall mean the average Closing Bid Price for twenty (20) consecutive trading days, ending with the trading day prior to the date as of which the Market Price is being determined (with appropriate adjustments for subdivisions or combinations of shares effected during such period), provided that if the prices referred to in the definition of Closing Bid Price cannot be determined on any trading day, the Closing Bid Price for such trading day will be deemed to equal Fair Market Value of such security on such trading day.

(iv) “Registered Holders” shall mean, at any time, the holders of record of the Series B Preferred Stock.

(v) “Stock Market” shall mean, with respect to any security, the principal national securities exchange on which such security is listed or admitted to trading or, if such security is not listed or admitted to trading on any national securities exchange, shall mean The Nasdaq National Market System (“NNM”) or The Nasdaq SmallCap Market (“SCM” and, together with NNM, “Nasdaq”) or, if such security is not quoted on Nasdaq, shall mean the OTC Bulletin Board or, if such security is not quoted on the OTC Bulletin Board, shall mean the over-the-counter market as furnished by any NASD member firm selected from time to time by the Corporation for that purpose.

(vi) “Trading Day” shall mean a day on which the relevant Stock Market is open for the transaction of business.

2. Dividends and Distributions. (a) The holders, as of the Dividend Record Date (as defined below), of the Series B Preferred Stock shall be entitled to receive semi-annual dividends on their respective shares of Series B Preferred Stock (aggregating, for this purpose, all shares of Series B Preferred Stock held of record or, to the Corporation’s knowledge, beneficially by such holder), payable, at the option of the Corporation, in cash or additional shares of Series B Preferred Stock, at the rate of 8% per annum (computed on the basis of a 360-day year of twelve 30 day months) of the Dividend Base Amount (as defined below), payable semi-annually in arrears; provided that, to the extent the declaration or payment of such dividend is prohibited by applicable law, such dividend need not be paid but shall nevertheless accrue and

shall be paid promptly when applicable law permits. Such dividends shall accrue (i) from March 6, 2001 for shares of Series B Preferred Stock issued within thirty days of the date of the filing of this Certificate of Designation, or (ii) from the date of issuance for shares of Series B Preferred Stock issued after thirty days from the date of filing of this Certificate of Designation, and shall be paid semi-annually on April 1 and October 1 of each year or, if any such day is not a business day, on the next succeeding business day. Such dividends shall be paid, at the election of the Corporation, either in cash or additional duly authorized, fully paid and non assessable shares of Series B Preferred Stock. In calculating the number of shares of Series B Preferred Stock to be paid with respect to each dividend, the Series B Preferred Stock shall be valued at $100.00 per share (subject to appropriate adjustment to reflect any stock split, combination, reclassification or reorganization of the Series B Preferred Stock). Notwithstanding the foregoing, the Corporation shall not be required to issue fractional shares of Series B Preferred Stock; the Corporation may elect, in its sole discretion, independently for each holder, whether such number of shares (on an aggregated basis) will be rounded to the nearest whole share (with .5 of a share rounded upward) or whether such holder will be given cash in lieu of any fractional shares. The “Dividend Base Amount” of a share of Series B Preferred Stock shall be $100.00 plus all accrued but unpaid dividends (subject to appropriate adjustment to reflect any stock split, combination, reclassification or reorganization of the Series B Preferred Stock). The “Dividend Record Date” shall mean, for each semi-annual dividend, the March 15 or September 15, as the case may be, immediately preceding the dividend payment date.

(b) In addition to the foregoing, subject to the rights of the holders of any shares of any series or class of capital stock ranking prior, and superior to, or pari passu with, the shares of Series B Preferred Stock with respect to dividends, and prior to the rights of the holders of Common Stock, Series A Preferred Stock and any other series or class of capital stock, the holders of shares of Series B Preferred Stock shall be entitled to receive, as, when and if declared by the Board of Directors, out of assets legally available for that purpose, dividends or distributions in cash, stock or otherwise.

(c) The Corporation shall not declare or pay any dividend or distribution on any Junior Stock (as defined below) of the Corporation unless all dividends required by Section 2(a) have been or contemporaneously are declared and paid, or declared and a sum sufficient for the payment thereof set apart for such payment, on the Series B Preferred Stock

(d) [Reserved]

(e) All dividends or distributions declared upon the Series B Preferred Stock shall be declared pro rata per share.

(f) Any reference to “distribution” contained in this Section 2 shall not be deemed to include any distribution made in connection with or in lieu of any Liquidation Event (as defined below).

(g) No interest, or sum of money in lieu of interest, shall be payable in respect of any dividend payment or payments on the Series B Preferred Stock which may be in arrears (it being understood that this provision does not alter the Corporation’s obligations under Section 2(a)).

(h) So long as any shares of the Series B Preferred Stock are outstanding, no dividends, except as described in the next succeeding sentence, shall be declared or paid or set apart for payment on any class or series of stock of the Corporation ranking, as to dividends, on a parity with the Series B Preferred Stock, for any period unless all dividends have been or contemporaneously are declared and paid, or declared and a sum sufficient for the payment thereof set apart for such payment, on the Series B Preferred Stock. When dividends are not paid in full or a sum sufficient for such payment is not set apart, as aforesaid, upon the shares of the Series B Preferred Stock and any other class or series of stock ranking on a parity as to dividends with the Series B Preferred Stock, all dividends declared upon such other stock shall be declared pro rata so that the amounts of dividends per share declared on the Series B Preferred Stock and such other stock shall in all cases bear to each other the same ratio that accrued dividends per share on the shares of the Series B Preferred Stock and on such other stock bear to each other.

(i) So long as any shares of the Series B Preferred Stock are outstanding, no other stock of the Corporation ranking on a parity with the Series B Preferred Stock as to dividends or upon liquidation, dissolution or winding up shall be redeemed, purchased or otherwise acquired for any consideration (or any moneys be paid to or made available for a sinking fund or otherwise for the purchase or redemption of any shares of any such stock) by the Corporation unless the dividends, if any, accrued on all outstanding shares of the Series B Preferred Stock shall have been paid or set apart for payment.

(j) “Junior Stock” shall mean the Common Stock, Series A Preferred Stock, and any shares of preferred stock of any series or class of the Corporation, whether presently outstanding or hereafter issued, which are junior to the shares of Series B Preferred Stock with respect to (i) the distribution of assets on any voluntary or involuntary liquidation, dissolution or winding up of the Corporation, (ii) dividends or (iii) voting.

3. Liquidation Preference. (a) In the event of a (i) liquidation, dissolution or winding up of the Corporation, whether voluntary or involuntary, (ii) a sale or other disposition of all or substantially all of the assets of the Corporation or (iii) any consolidation, merger, combination, reorganization or other transaction in which the Corporation is not the surviving entity or shares of Common Stock constituting in excess of 50% of the voting power of the Corporation are exchanged for or changed into stock or securities of another entity, cash and/or any other property (a “Merger Transaction”) (items (i), (ii) and (iii) of this sentence being collectively referred to as a “Liquidation Event”), after payment or provision for payment of debts and other liabilities of the Corporation, the holders of the Series B Preferred Stock then outstanding shall be entitled to be paid out of the assets of the Corporation available for distribution to its stockholders, whether such assets are capital, surplus, or earnings, before any payment or declaration and setting apart for payment of any amount shall be made in respect of any Junior Stock of the Corporation, an amount equal to the Dividend Base Amount at such time; provided, however, in the case of a Merger Transaction, such payment may be made in cash, property (valued as provided in Subsection 3(b)) and/or securities (valued as provided in Subsection 3(b)) of the entity surviving such Merger Transaction. In the case of property or in the event that any such securities are subject to an investment letter or other similar restriction on transferability, the value of such property or securities shall be determined by agreement between the Corporation and the holders of a majority of the Series B Preferred Stock then outstanding. If upon any Liquidation Event, whether voluntary or involuntary, the assets to be distributed to

the holders of the Series B Preferred Stock shall be insufficient to permit the payment to such shareholders of the full preferential amounts aforesaid, then all of the assets of the Corporation to be distributed shall be so distributed ratably to the holders of the Series B Preferred Stock on the basis of the number of shares of Series B Preferred Stock held. Notwithstanding item (iii) of the first sentence of this Subsection 3(a), any consolidation, merger, combination, reorganization or other transaction in which the Corporation is not the surviving entity but the stockholders of the Corporation immediately prior to such transaction own in excess of 50% of the voting power of the corporation surviving such transaction and own amongst themselves such interest in substantially the same proportions as prior to such transaction, shall not be considered a Liquidation Event provided that the surviving corporation shall make appropriate provisions to ensure that the terms of this Certificate of Designation survive any such transaction. All shares of Series B Preferred Stock shall rank as to payment upon the occurrence of any Liquidation Event senior to the Common Stock, the Series A Preferred Stock, and, unless the terms of such series shall provide otherwise, senior to all other series of the Corporation's preferred stock.

(b) Any securities or other property to be delivered to the holders of the Series B Preferred Stock pursuant to Subsection 3(a) hereof shall be valued as follows:

(i) Securities not subject to an investment letter or other similar restriction on free marketability:

(A) If actively traded on a Stock Market, the per share value shall be deemed to be the Market Price of such securities as of the third day prior to the date of valuation.

(B) If not actively traded on a Stock Market, the value shall be the Fair Market Value of such securities.

(ii) For securities for which there is an active public market but which are subject to an investment letter or other restrictions on free marketability, the value shall be the Fair Market Value thereof, determined by discounting appropriately the per share Market Price thereof.

(iii) For all other securities, the value shall be the Fair Market Value thereof.

4. Conversion.

(a) Right of Conversion. The shares of Series B Preferred Stock are convertible, in whole or in part, at the option of the holder thereof and upon notice to the Corporation as set forth in Subsection 4(b), into fully paid and nonassessable shares of Common Stock and such other securities and property as hereinafter provided. The initial conversion price per share of Common Stock (the "Conversion Price"), shall be $.50, subject to adjustment as provided herein. The rate at which each share of Series B Preferred Stock is convertible at any time into Common Stock (the "Conversion Rate") shall be determined by dividing the then existing Conversion Price (determined in accordance with this Section 4, including the last paragraph hereof) into the Dividend Base Amount.

(b) Conversion Procedures. Any holder of shares of Series B Preferred Stock desiring to convert such shares into Common Stock shall surrender the certificate or certificates evidencing such shares of Series B Preferred Stock at the office of the transfer agent for the Series B Preferred Stock, which certificate or certificates, if the Corporation shall so require, shall be duly endorsed to the Corporation or in blank, or accompanied by proper instruments of transfer to the Corporation or in blank, accompanied by irrevocable written notice to the Corporation that the holder elects so to convert such shares of Series B Preferred Stock and specifying the name or names (with address) in which a certificate or certificates evidencing shares of Common Stock are to be issued. The Corporation need not deem a notice of conversion to be received unless the holder complies with all the provisions hereof. The Corporation will instruct the transfer agent (which may be the Corporation) to make a notation of the date that a notice of conversion is received, which date of receipt shall be deemed to be the date of receipt for purposes hereof.

The Corporation shall, as soon as practicable after such deposit of certificates evidencing shares of Series B Preferred Stock accompanied by the written notice and compliance with any other conditions herein contained, deliver at such office of such transfer agent to the person for whose account such shares of Series B Preferred Stock were so surrendered, or to the nominee or nominees of such person, certificates evidencing the number of full shares of Common Stock to which such person shall be entitled as aforesaid, subject to Section 4(d). Subject to the following provisions of this paragraph, such conversion shall be deemed to have been made as of the date of such surrender of the shares of Series B Preferred Stock to be converted, and the person or persons entitled to receive the Common Stock deliverable upon conversion of such Series B Preferred Stock shall be treated for all purposes as the record holder or holders of such Common Stock on such date; provided, however, that the Corporation shall not be required to convert any shares of Series B Preferred Stock while the stock transfer books of the Corporation are closed for any purpose, but the surrender of Series B Preferred Stock for conversion during any period while such books are so closed shall become effective for conversion immediately upon the reopening of such books as if the surrender had been made on the date of such reopening, and the conversion shall be at the conversion rate in effect on such date. No adjustments in respect of any dividends on shares surrendered for conversion or any dividend on the Common Stock issued upon conversion shall be made upon the conversion of any shares of Series B Preferred Stock.

The Corporation shall at all times, reserve and keep available out of its authorized but unissued shares of Common Stock, solely for the purpose of effecting the conversion of the shares of Series B Preferred Stock, such number of shares of Common Stock as shall from time to time be sufficient to effect the conversion of all outstanding shares of the Series B Preferred Stock.

All notices of conversion shall be irrevocable; provided, however, that if the Corporation has sent notice of an event pursuant to Subsection 4(g) hereof, a holder of Series B Preferred Stock may, at its election, provide in its notice of conversion that the conversion of its shares of Series B Preferred Stock shall be contingent upon the occurrence of the record date or effectiveness of such event (as specified by such holder), provided that such notice of conversion is received by the Corporation prior to such record date or effective date, as the case may be.

(c) Adjustment of Conversion Rate and Conversion Price.

(i) As used in this Subsection 4(c), the following terms shall have the following meanings:

"Capital Stock" of any Person means the Common Stock or Preferred Stock of such Person. Unless otherwise stated herein or the context otherwise requires, "Capital Stock" means Capital Stock of the Corporation; "Common Stock" of any Person other than the Corporation means the common equity (however designated), including, without limitation, common stock or partnership or membership interests of, or participation or interests in such Person (or equivalents thereof).

"Common Stock" of the Corporation means the Common Stock, par value $.001 per share, of the Corporation, any successor class or classes of common equity (however designated) of the Corporation into or for which such Common Stock may hereafter be converted, exchanged or reclassified and any class or classes of common equity (however designated) of the Corporation which may be distributed or issued with respect to such Common Stock or successor class of classes to holders thereof generally. Unless otherwise stated herein or the context requires otherwise, "Common Stock" means Common Stock of the Corporation;

"Current Market Price" means, when used with respect to any security as of any date, the last sale price, regular way, or, in case no such sale takes place on such date, the average of the closing bid and asked prices, regular way, of such security in either case as reported for consolidated transactions on the New York Stock Exchange or, if such security is not listed or admitted to trading on the New York Stock Exchange, as reported for consolidated transactions with respect to securities listed on the principal national securities exchange on which such security is listed or admitted to trading or, if such security is not listed or admitted to trading on any national securities exchange, as reported on the Nasdaq National Market, or, if such security is not listed or admitted to trading on the Nasdaq National Market, as reported on the Nasdaq SmallCap Market, or if such security is not listed or admitted to trading on any national securities exchange or the Nasdaq National Market or the Nasdaq SmallCap Market, the average of the high bid and low asked prices of such security in the over-the-counter market, as reported by the National Association of Securities Dealers, Inc. Automated Quotations System or such other system then in use or, if such security is not quoted by any such organization, the average of the closing bid and asked prices of such security furnished by an NASD member firm selected by the Corporation. If such security is not quoted by any such organization and no such NASD member firm is able to provide such prices, the Current Market Price of such security shall be the Fair Market Value thereof;

"Fair Market Value" means, at any date as to any asset, Property or right (including without limitation, Capital Stock of any Person, evidence of indebtedness or other securities, but excluding cash), the fair market value of such

item as determined in good faith by the Board of Directors, whose determination shall be conclusive; provided, however, that such determination is described in an Officers' Certificate filed with the transfer agent and that, if there is a Current Market Price for such item on such date, "Fair Market Value" means such Current Market Price (without giving effect to the last sentence of the definition thereof);

"GAAP" means, as of any date, generally accepted accounting principles in the United States and does not include any interpretations or regulations that have been proposed but that have not become effective;

"Officer" means, with respect to any Person, the Chairman of the Board, the Chief Executive Officer, the President, the Chief Operating Officer, the Chief Financial Officer, the Treasurer, any Assistant Treasurer, the Controller, the Secretary, any Assistant Secretary or any Vice President of such Person;

"Officers' Certificate" means a certificate signed on behalf of the Corporation by two Officers, one of whom must be the Chairman of the Board, the President, the Treasurer or a Vice-President of the Corporation;

"Person" means any individual, corporation, partnership, association, trust or any other entity or organization, including a government or political subdivision or any agency or instrumentality thereof;

"Preferred Stock" of any Person means the class or classes of equity, ownership or participation interests (however designated) in such Person, including, without limitation, stock, share, partnership and membership interests, which are preferred as to the payment of dividends or distributions by, or as to the distribution of assets upon any voluntary or involuntary liquidation or dissolution of, such Person (or equivalent thereof) over interests of any other class of interests of such Person. Unless otherwise stated herein or the context otherwise requires, "Preferred Stock" means Preferred Stock of the Corporation;

"Property" of any Person means any and all types of real, personal, tangible, intangible or mixed property owned by such Person whether or not included on the most recent consolidated balance sheet of such Person in accordance with GAAP;

"Subsidiary" of a Person on any date means any other Person of whom such Person owns, directly or indirectly through a Subsidiary or Subsidiaries of such Person, Capital Stock with voting power, acting independently and under ordinary circumstances, entitling such person to elect a majority of the board of directors or other governing body of such other Person. Unless otherwise stated herein or the context otherwise requires, "Subsidiary" means a Subsidiary of the Corporation.

(ii) If the Corporation shall (i) pay a dividend or other distribution, in Common Stock, on any class of Capital Stock of the Corporation, subdivide the outstanding Common Stock into a greater number of shares by any means or (iii)

combine the outstanding Common Stock into a smaller number of shares by any means including, without limitation, a reverse stock split), then in each such case the Conversion Price in effect immediately prior thereto shall be adjusted so that the Registered Holder of any shares of Series B Preferred Stock thereafter surrendered for conversion shall be entitled to receive the number of shares of Common Stock that such Registered Holder would have owned or have been entitled to receive upon the happening of such event had such Series B Preferred Stock been converted immediately prior to the relevant record date or, if there is no such record date, the effective date of such event. An adjustment made pursuant to this Paragraph 4(c)(ii) shall become effective immediately after the record date for the determination of stockholders entitled to receive such dividend or distribution and shall become effective immediately after the effective date of such subdivision or combination, as the case may be.

(iii) If the Corporation shall (i) issue or distribute (at a price per share less than the Current Market Price per share of such Capital Stock on the date of such issuance or distribution) Capital Stock generally to holders of Common Stock or to holders of any class or series of Capital Stock which is convertible into or exchangeable or exercisable for Common Stock (excluding an issuance or distribution of Common Stock described in Paragraph 4(c)(ii)) or (ii) issue or distribute generally to such holders rights, warrants, options or convertible or exchangeable securities entitling the holder thereof to subscribe for, purchase, convert into or exchange for Capital Stock at a price per share less than the Current Market Price per share of such Capital Stock on the date of issuance or distribution, then, in each such case, at the earliest of (A) the date the Corporation enters into a firm contract for such issuance or distribution, (B) the record date for the determination of stockholders entitled to receive any such Capital Stock or any such rights, warrants, options or convertible or exchangeable securities or (C) the date of actual issuance or distribution of any such Capital Stock or any such rights, warrants, options or convertible or exchangeable securities, the Conversion Price shall be reduced by multiplying the Conversion Price in effect immediately prior to such earliest date by:

(A) if such Capital Stock is Common Stock, a fraction the numerator of which is the number of shares of Common Stock outstanding, on such earliest date plus the number of shares of Common Stock which could be purchased at the Current Market Price per share of Common Stock on the date of such issuance or distribution with the aggregate consideration (based on the Fair Market Value thereof) received or receivable by the Corporation either (A) in connection with such issuance or distribution or (B) upon the conversion, exchange, purchase or subscription of all such rights, warrants, options or convertible or exchangeable securities (the “Aggregate Consideration”), and the denominator of which is the number of shares of Common Stock outstanding on such earliest date plus the number of shares of Common Stock to be so issued or distributed or to be issued upon the conversion, exchange, purchase or subscription of all such rights, warrants, options or convertible or exchangeable securities; or

(B) if such Capital Stock is other than Common Stock, a fraction the numerator of which is the Current Market Price per share of Common Stock on such earliest date minus an amount equal to (A) the difference between (1) the Current Market Price per share of such Capital Stock multiplied by the number of shares of such Capital Stock to be so issued and (2) the Aggregate Consideration, divided by (B) the number of shares of Common Stock outstanding on such date, and the denominator of which is the Current Market Price per share of Common Stock on such earliest date.

Such adjustment shall be made successively whenever any such Capital Stock, rights, warrants, options or convertible or exchangeable securities are so issued or distributed. In determining whether any rights, warrants, options or convertible or exchangeable securities entitle the holders thereof to subscribe for, purchase, convert into or exchange for shares of such Capital Stock at less than such Current Market Price, there shall be taken into account the Fair Market Value of any consideration received or receivable by the Corporation for such rights, warrants, options or convertible or exchangeable securities. If any right, warrant, option or convertible or exchangeable security, the issuance of which resulted in an adjustment in the Conversion Price pursuant to this Paragraph 4(c)(iii), shall expire and shall not have been exercised, the Conversion Price shall immediately upon such expiration be recomputed to the Conversion Price which would have been in effect if such right, warrant, option or convertible or exchangeable securities had never been distributed or issued. Notwithstanding anything contained in this paragraph to the contrary, (i) the issuance of Capital Stock upon the exercise of such rights, warrants or options or the conversion or exchange of such convertible or exchangeable securities will not cause an adjustment in the Conversion Price if no such adjustment would have been required at the time such right, warrant, option or convertible or exchangeable security was issued or distributed; provided, however, that, if the consideration payable upon such exercise, conversion or exchange and/or the Capital Stock receivable thereupon are changed after the time of the issuance or distribution of such right, warrant, option or convertible or exchangeable security then such change shall be deemed to be the expiration thereof without having been exercised and the issuance or distribution of new options, rights, warrants or convertible or exchangeable securities and (ii) the issuance of convertible preferred stock of the Corporation as a dividend on convertible preferred stock of the Corporation will not cause an adjustment in the Conversion Price if no such adjustment would have been required at the time such underlying convertible preferred stock was issued (or as a result of any subsequent modification to the terms thereof) and the conversion provisions of such convertible stock so issued as a dividend are the same as in such underlying convertible preferred stock.

Notwithstanding any contained in this Certificate of Designation to the contrary, options, rights or warrants issued or distributed by the Corporation, including options, rights or warrants distributed prior to the date of filing of this Certificate of Designation, to holders of Common Stock generally which, until the

occurrence of a specified event or events (a "Trigger Event"), (i) are deemed to be transferred with Common Stock, (ii) are not exercisable and (iii) are also issued on a pro rata basis with respect to future issuances of Common Stock, shall be deemed not to have been issued or distributed for purposes of this Subsection 4(c) (and no adjustment to the Conversion Price under this Subsection 4(c) will be required) until the occurrence of the earliest Trigger Event. Upon the occurrence of a Trigger Event, such options, rights or warrants shall continue to be deemed not to have been issued or distributed for purposes of this Subsection 4(c) (and no adjustment to the Conversion Price under this Subsection 4(c) will be required) if and for so long as each Registered Holder who thereafter converts such Registered Holder's Series B Preferred Stock shall be entitled to receive upon such conversion, in addition to the shares of Common Stock issuable upon such conversion, a number of such options, rights or warrants, as the case may be, equal to the number of options, rights or warrants to which a holder of the number of shares of Common Stock equal to the number of shares of Common Stock issuable upon conversion of such Registered Holder's Series B Preferred Stock is entitled to receive at the time of such conversion in accordance with the terms and provisions of, and applicable to, such options, rights or warrants. Upon the expiration of any such options, rights or warrants or at such time, if any, as a Registered Holder is not entitled to receive such options, rights or warrants upon conversion of such Registered Holder's Series B Preferred Stock, an adjustment (if any is required) to the Conversion Price shall be made in accordance with this Paragraph 4(c)(iii) with respect to the issuance of all such options, rights and warrants as of the date of issuance thereof, but subject to the provisions of the preceding paragraph, if any such option, right or warrant, including any such options right or warrants distributed prior to the date of filing of this Certificate of Designation, are subject to events, upon the occurrence of which such options, rights or warrants become exercisable to purchase different securities, evidence of indebtedness, cash, Properties or other assets or different amounts thereof, then, subject to the preceding provision of this paragraph, the date of the occurrence of any and each such event shall be deemed to be the date of distribution and record date with respect to new options, right or warrants with such new purchase rights (and a termination or expiration of the existing options, rights or warrants without exercise thereof). In addition, in the event of any distribution (or deemed distribution) of options, rights or warrants, or any Trigger Event or other event of the type described in the preceding sentence, that required (or would have required but for the provisions of Paragraph 4(c)(vi) or this paragraph) an adjustment to the Conversion Price under this Subsection 4(c) and such options, rights or warrants shall thereafter have been redeemed or repurchased without having been exercised, then the Conversion Price shall be adjusted upon such redemption or repurchase to give effect to such distribution, Trigger Event or other event, as the case may, as though it had instead been a cash distribution, equal on a per share basis to the result of the aggregate redemption or repurchase price received by holders of such options, rights or warrants divided by the number of shares of Common Stock outstanding as of the date of such repurchase or redemption, made to holders of Common Stock generally as of the date of such redemption or repurchase.

(iv) If the Corporation shall pay or distribute, as a dividend or otherwise, generally to holders of Common Stock or any class or series of Capital Stock which is convertible into or exercisable or exchangeable for Common Stock any assets, Properties or rights (including, without limitation, evidences of indebtedness of the Corporation, any Subsidiary or any other Person, cash or Capital Stock or other securities of the Corporation, any Subsidiary or any other Person, but excluding payments and distributions as described in Paragraphs 4(c)(ii) or (iii), dividends and distributions in connection with a Liquidation Event and distributions consisting solely of cash described in Paragraph 4(c)(v)), then in each such case the Conversion Price shall be reduced by multiplying the Conversion Price in effect immediately prior to the date of such payment or distribution by a fraction, the numerator of which is the Current Market Price per share of Common Stock on the record date for the determination of stockholders entitled to receive such payment or distribution less the Fair Market Value per share of Common Stock on such record date of the assets, Properties or rights so paid or distributed, and the denominator of which is the Current Market Price per share of Common Stock on such record date. Such adjustment shall become effective immediately after such record date. For purposes of this Paragraph 4(c)(iv), such Fair Market Value per share shall equal the aggregate Fair Market Value on such record date of the assets, Properties or rights so paid or distributed divided by the number of shares of Common Stock outstanding on such record date. For all purposes of this Certificate of Designation, adjustments to any security's conversion or exercise price pursuant to such security's original terms shall not be deemed a distribution or dividend to holders thereof.

(v) If the Corporation shall, by dividend or otherwise, make a distribution (other than in connection with the liquidation, dissolution or winding up of the Corporation in its entirety), generally to holders of Common Stock or any class or series of Capital Stock which is convertible into or exercisable or exchangeable for Common Stock, consisting solely of cash where (x) the sum of (i) the aggregate amount for such cash plus (ii) the aggregate amount of all cash so distributed (by dividend or otherwise) to such holders within the 12-month period ending on the record date for determining stockholder entitled to receive such distribution with respect to which no adjustment has been made to the Conversion Price pursuant to this Paragraph 4(c)(v) exceeds (y) 10% of the result of the multiplication of (1) the Current Market Price per share of Common Stock on such record date times (2) the number of shares of Common Stock outstanding on such record date, then the Conversion Price shall be reduced, effective immediately prior to the opening of business on the day following such record date, by multiplying the Conversion Price in effect immediately prior to the close of business on the day prior to such record date by a fraction, the numerator of which is the Current Market Price per share of Common Stock on such record date less the aggregate amount of cash per share so distributed and the denominator of which is such Current Market Price; provided, however, that, if

the aggregate amount of cash per share is equal to or greater than such Current Market Price, then, in lieu of the foregoing adjustment, adequate provisions shall be made so that each Registered Holder shall have the right to receive upon conversion (with respect to each share of Common Stock issued upon such conversion and in addition to the Common Stock issuable upon conversion) the aggregate amount of cash per share such Registered Holder would have received had such Registered Holder's Series B Preferred Stock been converted immediately prior to such record date. In no event shall the Conversion Price be increased pursuant to this Paragraph 4(c)(v); provided, however, that if such distribution is not so made, the Conversion Price shall be adjusted to be the Conversion Price which would have been in effect if such distribution had not been declared. For purposes of this Paragraph 4(c)(v), such aggregate amount of cash per share shall equal such sum divided by the number of shares of Common Stock outstanding on such record date.

(vi) The provisions of this Subsection 4(c) shall similarly apply to all successive events of the type described in this Subsection 4(c). Notwithstanding anything contained herein to the contrary, no adjustment in the Conversion Price shall be required unless such adjustment would require an increase or decrease of at least 1% in the Conversion Price then in effect; provided, however, that any adjustments which by reason of this Paragraph 4(c)(vi) are not required to be made shall be carried forward and taken into account in any subsequent adjustment. All calculations under this Section 4 shall be made by the Corporation and shall be made to the nearest cent or to the nearest one hundredth of a share, as the case may be, and the transfer agent shall be entitled to rely conclusively thereon. Except as provided in this Section 4, no adjustment in the Conversion Price will be made for the issuance of Common Stock or any securities convertible into or exchangeable for Common Stock or carrying the right to purchase Common Stock or any securities so convertible or exchangeable.

(vii) Whenever the Conversion Price is adjusted as provided herein, the Corporation shall promptly file with the transfer agent an Officers' Certificate setting forth the Conversion Price in effect after such adjustment and setting forth a brief statement of the facts requiring such adjustment. Promptly after delivery of such Officers' Certificate, the Corporation shall give or cause to be given to each Registered Holder a notice of such adjustment of the Conversion Price setting forth the adjusted Conversion Price and the date on which such adjustment becomes effective.

(viii) Notwithstanding anything contained herein to the contrary, in any case in which this Subsection 4(c) provides that an adjustment in the Conversion Price shall become effective immediately after a record date for an event, the Corporation may defer until the occurrence of such event (i) issuing to the Registered Holder of any Series B Preferred Stock converted after such record date and before the occurrence of such event the additional shares of Common Stock issuable upon such conversion by reason of the adjustment required by such event over and above the number of shares of Common Stock issuable upon such conversion before giving effect to such adjustment and (ii) paying to such Registered Holder any amount in cash in lieu of any fractional share of Common Stock pursuant to Subsection 4(d).

(ix) Notwithstanding any other provision hereof, no adjustment to the Conversion Price shall be made upon the issuance or exercise or conversion of (1) any Capital Stock issued or cash paid as dividends on the Series B Preferred Stock, or (2) any Capital Stock issued or cash paid upon the mandatory conversion or redemption of any Series B Preferred Stock in accordance with Section 5 of this Certificate of Designation.

(d) No Fractional Shares. No fractional shares or scrip representing fractional shares of Common Stock shall be issued upon conversion of Series B Preferred Stock. If more than one certificate evidencing shares of Series B Preferred Stock shall be surrendered for conversion at one time by the same holder, the number of full shares issuable upon conversion thereof shall be computed on the basis of the aggregate number of shares of Series B Preferred Stock so surrendered. Instead of any fractional share of Common Stock which would otherwise be issuable upon conversion of such aggregate number of shares of Series B Preferred Stock, the Corporation may elect, in its sole discretion, independently for each holder, whether such number of shares of Common Stock will be rounded to the nearest whole share (with a .5 of a share rounded upward) or whether such holder will be given cash, in lieu of any fractional share, in an amount equal to the same fraction of the Market Price of the Common Stock as of the close of business on the day of conversion.

(e) [Reserved]

(f) Reservation of Shares; Transfer Taxes, Etc. The Corporation shall at all times reserve and keep available, out of its authorized and unissued shares of Common Stock, solely for the purpose of effecting the conversion of the Series B Preferred Stock, such number of shares of its Common Stock free of preemptive rights as shall be sufficient to effect the conversion of all shares of Series B Preferred Stock from time to time outstanding. The Corporation shall use its best efforts from time to time, in accordance with the laws of the State of Delaware to increase the authorized number of shares of Common Stock if at any time the number of shares of authorized, unissued and unreserved Common Stock shall not be sufficient to permit the conversion of all the then-outstanding shares of Series B Preferred Stock.

The Corporation shall pay any and all issue or other taxes (excluding any income taxes) that may be payable in respect of any issue or delivery of shares of Common Stock on conversion of the Series B Preferred Stock. The Corporation shall not, however, be required to pay any tax which may be payable in respect of any transfer involved in the issue or delivery of Common Stock (or other securities or assets) in a name other than that in which the shares of Series B Preferred Stock so converted were registered, and no such issue or delivery shall be made unless and until the person requesting such issue has paid to the Corporation the amount of such tax or has established, to the satisfaction of the Corporation, that such tax has been paid or need not be paid.

(g) Prior Notice of Certain Events. In case:

(i) the Corporation shall declare any dividend (or any other distribution); or

(ii) the Corporation shall authorize the granting to the holders of Common Stock or the Series A Preferred Stock of rights or warrants to subscribe for or purchase any shares of stock of any class or of any other rights or warrants; or

(iii) of any reclassification of Common Stock (other than a subdivision or combination of the outstanding Common Stock, or a change in par value, or from par value to no par value, or from no par value to par value); or

(iv) of any consolidation or merger to which the Corporation is a party and for which approval of any stockholders of the Corporation shall be required, or of the sale or transfer of all or substantially all of the assets of the Corporation or of any compulsory share exchange whereby the Common Stock is converted into other securities, cash or other property; or

(v) of any Liquidation Event;

then the Corporation shall cause to be filed with the transfer agent for the Series B Preferred Stock, and shall cause to be mailed to the Registered Holders, at their last addresses as they shall appear upon the stock transfer books of the Corporation, at least twenty (20) days prior to the applicable record date hereinafter specified, a notice stating (x) the date on which a record (if any) is to be taken for the purpose of such dividend, distribution or granting of rights or warrants or, if a record is not to be taken, the date as of which the holders of Common Stock or Series A Preferred Stock of record to be entitled to such dividend, distribution, rights or warrants are to be determined and a description of the cash, securities or other property to be received by such holders upon such dividend, distribution or granting of rights or warrants or (y) the date on which such reclassification, consolidation, merger, sale, transfer, share exchange or Liquidation Event is expected to become effective, the date as of which it is expected that holders of Common Stock of record shall be entitled to exchange their shares of Common Stock for securities or other property deliverable upon such exchange or Liquidation Event and the consideration, including securities or other property, to be received by such holders upon such exchange; provided, however, that no failure to mail such notice or any defect therein or in the mailing thereof shall affect the validity of the corporate action required to be specified in such notice.

(h) Other Changes in Conversion Rate. The Corporation from time to time may increase the Conversion Rate by any amount for any period of time if the period is at least 20 days and if the increase is irrevocable during the period. Whenever the Conversion Rate is so increased, the Corporation shall mail to the Registered Holders a notice of the increase at least 15 days before the date the increased Conversion Rate takes effect, and such notice shall state the increased Conversion Rate and the period it will be in effect.

The Corporation may make such increases in the Conversion Rate, in addition to those required or allowed by this Section 4, as shall be determined by it, as evidenced by a resolution of the Board of Directors, to be advisable in order to avoid or diminish any income tax to holders of Common Stock resulting from any dividend or distribution of stock or issuance of rights or warrants to purchase or subscribe for stock or from any event treated as such for income tax purposes.

Notwithstanding anything to the contrary herein, in no case shall the Conversion Price be adjusted to an amount less than $.001 per share, the current par value of the Common Stock into which the Series B Preferred Stock is convertible.

(i) Ambiguities/Errors. The Board of Directors of the Corporation shall have the power to resolve any ambiguity or correct any error in the provisions relating to the convertibility of the Series B Preferred Stock, and its actions in so doing shall be final and conclusive.

5. Mandatory Conversion and Redemption. (a) In the event the Corporation causes the Series A Preferred Stock to be converted in whole or in part, into fully paid and nonassessable shares of Common Stock, then the Corporation shall also convert the Series B Preferred Stock, in whole or in part, on a pro rata basis among holders of the Series B Preferred Stock, into fully paid and nonassessable shares of Common Stock using a conversion price of $.50. Any shares of Series B Preferred Stock so converted shall be treated as having been surrendered by the holder thereof for conversion pursuant to Section 4 on the date of such mandatory conversion (unless previously converted at the option of the holder).

(b) If, at any time, the Corporation redeems the Series A Preferred Stock, the Corporation may, at its option, redeem the Series B Preferred Stock, in whole or in part, on a pro rata basis among holders of the Series B Preferred Stock.

(c) No greater than 60 nor fewer than 20 days prior to the date of any such mandatory conversion or redemption, notice by first class mail, postage prepaid, shall be given to the holders of record of the Series B Preferred Stock to be converted or redeemed, addressed to such holders at their last addresses as shown on the stock transfer books of the Corporation. Each such notice shall specify the date fixed for conversion or redemption, the place or places for surrender of shares of Series B Preferred Stock and the then effective Conversion Rate pursuant to Section 4.

Any notice which is mailed as herein provided shall be conclusively presumed to have been duly given by the Corporation on the date deposited in the mail, whether or not the holder of the Series B Preferred Stock receives such notice; and failure properly to give such notice by mail, or any defect in such notice, to the holders of the shares to be converted or redeemed shall not affect the validity of the proceedings for the conversion or redemption of any other shares of Series B Preferred Stock. On or after the date fixed for conversion or redemption (the “Take-Out Date”) as stated in such notice, each holder of shares called to be converted or redeemed shall surrender the certificate evidencing such shares to the Corporation at the place designated in such notice for conversion or redemption. After the mailing of such notice, but before the Take-Out Date as stated therein, all rights whatsoever with respect to the shares so called for conversion or redemption (except the right of the holders to convert such shares pursuant to Section 4 and to have such shares converted or redeemed, as the case may be, upon surrender of their certificates therefor, pursuant to this Section 5) shall terminate. On or after the

Take-Out Date, notwithstanding that the certificates evidencing any shares properly called for conversion or redemption shall not have been surrendered, such shares shall no longer be deemed outstanding and all rights whatsoever with respect to the shares so called for conversion or redemption (except the right of the holders to have such shares converted or redeemed, as the case may be, upon surrender of their certificates therefor, pursuant to this Section 5) shall terminate.

6. Outstanding Shares. For purposes of this Certificate of Designation, a share of Series B Preferred Stock, when issued, shall be deemed outstanding except (i) from the date, or the deemed date, of surrender of certificates evidencing shares of Series B Preferred Stock, all shares of Series B Preferred Stock converted into Common Stock or redeemed pursuant to Section 5 and (ii) from the date of registration of transfer, all shares of Series B Preferred Stock held of record by the Corporation or any subsidiary of the Corporation.

7. Class Voting Rights. The Corporation shall not, without the affirmative vote or consent of the holders of at least 50% of all outstanding Series B Preferred Stock, voting separately as a class, (i) amend, alter or repeal any provision of the Certificate of Incorporation or the Bylaws of the Corporation so as to adversely affect the relative rights, preferences, qualifications, limitations or restrictions of the Series B Preferred Stock; (ii) authorize or issue, or increase the authorized amount of, Series B Preferred Stock, other than Series B Preferred Stock issuable in exchange for 8% Notes or accrued interest thereon or issuable as dividends on Series B Preferred Stock; or (iii) issue securities ranking prior to, or pari passu with the Series B Preferred Stock.

8. Status of Acquired Shares. Shares of Series B Preferred Stock received upon conversion or redemption pursuant to Section 4 or Section 5 or otherwise acquired by the Corporation will be restored to the status of authorized but unissued shares of Preferred Stock, without designation as to class, and may thereafter be issued, but not as shares of Series B Preferred Stock.

9. Preemptive Rights. The Series B Preferred Stock is not entitled to any preemptive or subscription rights in respect of any securities of the Corporation.

10. Severability of Provisions. Whenever possible, each provision hereof shall be interpreted in a manner as to be effective and valid under applicable law, but if any provision hereof is held to be prohibited by or invalid under applicable law, such provision shall be ineffective only to the extent of such prohibition or invalidity, without invalidating or otherwise adversely affecting the remaining provisions hereof. If a court of competent jurisdiction should determine that a provision hereof would be valid or enforceable if a period of time were extended or shortened or a particular percentage were increased or decreased, then such court may make such changes as shall be necessary to render the provision in question effective and valid under applicable law.

IN WITNESS WHEREOF, Sudhir Agrawal, President and Acting Chief Executive Officer of the Corporation, acting for and on behalf of the Corporation, has hereunto subscribed his name this 15 day of March, 2001.

HYBRIDON, INC.

By: /s/ Sudhir Agrawal
Name: Sudhir Agrawal
Title: President and Acting
Chief Executive Officer

HYBRIDON, INC.

CERTIFICATE OF ELIMINATION
OF NUMBER OF SHARES OF PREFERRED STOCK
DESIGNATED AS
SERIES B CONVERTIBLE PREFERRED STOCK

Hybridon, Inc., a Delaware corporation (the "Corporation"), pursuant to authority conferred upon the Board of Directors of the Corporation by the Corporation's Restated Certificate of Incorporation, as amended (the "Certificate of Incorporation"), and in accordance with the provisions of Section 151(g) of the General Corporation Law of the State of Delaware (the "Delaware Law"), certifies that the Board of Directors of the Corporation duly adopted the following resolution:

"RESOLVED: That no shares of the Corporation's Series B Convertible Preferred Stock (the "Series B Preferred Stock") are outstanding and no shares of Series B Preferred Stock will be issued subject to the Certificate of Designation dated March 28, 2001 with respect to such series (the "Series B Certificate of Designation"); and that the proper officers of the Corporation be and hereby are authorized and directed in the name and on behalf of the Corporation to execute and file a certificate with the Secretary of State of the State of Delaware pursuant to Section 151(g) of the Delaware Law setting forth the text of this resolution, upon the filing and effectiveness of which all matters are set forth in the Series B Certificate of Designation shall be deemed to have been eliminated from the Certificate of Incorporation and the 85,000 shares of Preferred Stock previously designated as Series B Preferred Stock shall resume their status as undesignated shares of Preferred Stock available for future issuance in accordance with the Certificate of Incorporation."

IN WITNESS WHEREOF, the Corporation has caused its corporate seal to be affixed hereto and this Certificate to be signed by its Chief Executive Officer this 10th day of December, 2001.

HYBRIDON, INC.

By: /s/ Stephen R. Seiler
Stephen R. Seiler
Chief Executive Officer

CERTIFICATE OF DESIGNATIONS

OF

SERIES C JUNIOR PARTICIPATING PREFERRED STOCK

OF

HYBRIDON, INC.

Hybridon, Inc., a corporation organized and existing under the laws of the State of Delaware (hereinafter called the "Corporation"), hereby certifies that the following resolution was adopted by the Board of Directors of the Corporation at a meeting duly called and held on December 10, 2001:

RESOLVED: That pursuant to the authority granted to and vested in the Board of Directors of the Corporation (hereinafter called the "Board") in accordance with the provisions of the Certificate of Incorporation, as amended, the Board hereby creates a series of Preferred Stock, $.01 par value per share (the "Preferred Stock"), of the Corporation and hereby states the designation and number of shares, and fixes the relative rights, preferences and limitations thereof as follows:

Series C Junior Participating Preferred Stock:

Section 1. Designation and Amount. The shares of such series shall be designated as "Series C Junior Participating Preferred Stock" (the "Series C Preferred Stock") and the number of shares constituting the Series C Preferred Stock shall be one hundred thousand (100,000). Such number of shares may be increased or decreased by resolution of the Board prior to issuance; provided, that no decrease shall reduce the number of shares of Series C Preferred Stock to a number less than the number of shares then outstanding plus the number of shares reserved for issuance upon the exercise of outstanding options, rights or warrants or upon the conversion of any outstanding securities issued by the Corporation convertible into Series C Preferred Stock.

Section 2. Dividends and Distributions.

(A) Subject to the rights of the holders of any shares of any series of Preferred Stock (or any similar stock) ranking prior and superior to the Series C Preferred Stock with respect to dividends, the holders of shares of Series C Preferred Stock, in preference to the holders of Common Stock, par value $.001 per share (the "Common Stock"), of the Corporation, and of any other junior stock, shall be entitled to receive, when, as and if declared by the Board out of funds of the Corporation legally available for the payment of dividends, quarterly dividends payable in cash on the last day of each fiscal quarter of the Corporation in each year (each such date being referred to herein as a "Quarterly Dividend Payment Date"), commencing on the first Quarterly

Dividend Payment Date after the first issuance of a share or fraction of a share of Series C Preferred Stock, in an amount per share (rounded to the nearest cent) equal to the greater of (a) $10 or (b) subject to the provision for adjustment hereinafter set forth, 1,000 times the aggregate per share amount of all cash dividends, and 1,000 times the aggregate per share amount (payable in kind) of all non-cash dividends or other distributions, other than a dividend payable in shares of Common Stock or a subdivision of the outstanding shares of Common Stock (by reclassification or otherwise), declared on the Common Stock since the immediately preceding Quarterly Dividend Payment Date or, with respect to the first Quarterly Dividend Payment Date, since the first issuance of any share or fraction of a share of Series C Preferred Stock. In the event the Corporation shall at any time declare or pay any dividend on the Common Stock payable in shares of Common Stock, or effect a subdivision, combination or consolidation of the outstanding shares of Common Stock (by reclassification or otherwise than by payment of a dividend in shares of Common Stock) into a greater or lesser number of shares of Common Stock, then in each such case the amount to which holders of shares of Series C Preferred Stock were entitled immediately prior to such event under clause (b) of the preceding sentence shall be adjusted by multiplying such amount by a fraction, the numerator of which is the number of shares of Common Stock outstanding immediately after such event and the denominator of which is the number of shares of Common Stock that were outstanding immediately prior to such event. In the event the Corporation shall at any time declare or pay any dividend on the Series C Preferred Stock payable in shares of Series C Preferred Stock, or effect a subdivision, combination or consolidation of the outstanding shares of Series C Preferred Stock (by reclassification or otherwise than by payment of a dividend in shares of Series C Preferred Stock) into a greater or lesser number of shares of Series C Preferred Stock, then in each such case the amount to which holders of shares of Series C Preferred Stock were entitled immediately prior to such event under clause (b) of the first sentence of this Section 2(A) shall be adjusted by multiplying such amount by a fraction, the numerator of which is the number of shares of Series C Preferred Stock that were outstanding immediately prior to such event and the denominator of which is the number of shares of Series C Preferred Stock outstanding immediately after such event.

(B) The Corporation shall declare a dividend or distribution on the Series C Preferred Stock as provided in paragraph (A) of this Section immediately after it declares a dividend or distribution on the Common Stock (other than a dividend payable in shares of Common Stock) and the Corporation shall pay such dividend or distribution on the Series C Preferred Stock before the dividend or distribution declared on the Common Stock is paid or set apart; provided that, in the event no dividend or distribution shall have been declared on the Common Stock during the period between any Quarterly Dividend Payment Date and the next subsequent Quarterly Dividend Payment Date, a dividend of $10 per share on the Series C Preferred Stock shall nevertheless be payable on such subsequent Quarterly Dividend Payment Date.

(C) Dividends shall begin to accrue and be cumulative on outstanding shares of Series C Preferred Stock from the Quarterly Dividend Payment Date next preceding the date of issue of such shares, unless the date of issue of such shares is prior to the record date for the first Quarterly Dividend Payment Date, in which case dividends on such shares shall begin to accrue from the date of issue of such shares, or unless the date of issue is a Quarterly Dividend Payment Date or is a date after the record date for the determination of holders of shares of Series C Preferred Stock entitled to receive a quarterly dividend and before such Quarterly Dividend

Payment Date, in either of which events such dividends shall begin to accrue and be cumulative from such Quarterly Dividend Payment Date. Accrued but unpaid dividends shall not bear interest. Dividends paid on the shares of Series C Preferred Stock in an amount less than the total amount of such dividends at the time accrued and payable on such shares shall be allocated pro rata on a share-by-share basis among all such shares at the time outstanding. The Board may fix a record date for the determination of holders of shares of Series C Preferred Stock entitled to receive payment of a dividend or distribution declared thereon, which record date shall be not more than 60 days prior to the date fixed for the payment thereof.

Section 3. Voting Rights. The holders of shares of Series C Preferred Stock shall have the following voting rights:

(A) Subject to the provision for adjustment hereinafter set forth, each share of Series C Preferred Stock shall entitle the holder thereof to 1,000 votes on all matters submitted to a vote of the stockholders of the Corporation. In the event the Corporation shall at any time declare or pay any dividend on the Common Stock payable in shares of Common Stock, or effect a subdivision, combination or consolidation of the outstanding shares of Common Stock (by reclassification or otherwise than by payment of a dividend in shares of Common Stock) into a greater or lesser number of shares of Common Stock, then in each such case the number of votes per share to which holders of shares of Series C Preferred Stock were entitled immediately prior to such event shall be adjusted by multiplying such number by a fraction, the numerator of which is the number of shares of Common Stock outstanding immediately after such event and the denominator of which is the number of shares of Common Stock that were outstanding immediately prior to such event. In the event the Corporation shall at any time declare or pay any dividend on the Series C Preferred Stock payable in shares of Series C Preferred Stock, or effect a subdivision, combination or consolidation of the outstanding shares of Series C Preferred Stock (by reclassification or otherwise than by payment of a dividend in shares of Series C Preferred Stock) into a greater or lesser number of shares of Series C Preferred Stock, then in each such case the number of votes per share to which holders of shares of Series C Preferred Stock were entitled immediately prior to such event shall be adjusted by multiplying such amount by a fraction, the numerator of which is the number of shares of Series C Preferred Stock that were outstanding immediately prior to such event and the denominator of which is the number of shares of Series C Preferred Stock outstanding immediately after such event.

(B) Except as otherwise provided herein, in the Certificate of Incorporation or by law, the holders of shares of Series C Preferred Stock and the holders of shares of Common Stock and any other capital stock of the Corporation having general voting rights shall vote together as one class on all matters submitted to a vote of stockholders of the Corporation.

(C) (i) If at any time dividends on any Series C Preferred Stock shall be in arrears in an amount equal to six quarterly dividends thereon, the holders of the Series C Preferred Stock, voting as a separate series from all other series of Preferred Stock and classes of capital stock, shall be entitled to elect two members of the Board in addition to any Directors elected by any other series, class or classes of securities and the authorized number of Directors will automatically be increased by two. Promptly thereafter, the Board of the Corporation shall, as soon as may be practicable, call a special meeting of holders of Series C Preferred Stock for the purpose of electing such members of the Board. Such special meeting shall in any event be held within 45 days of the occurrence of such arrearage.

(ii) During any period when the holders of Series C Preferred Stock, voting as a separate series, shall be entitled and shall have exercised their right to elect two Directors, then, and during such time as such right continues, (a) the then authorized number of Directors shall be increased by two, and the holders of Series C Preferred Stock, voting as a separate series, shall be entitled to elect the additional Directors so provided for, and (b) each such additional Director shall not be a member of any existing class of the Board, but shall serve until the next annual meeting of stockholders for the election of Directors, or until his successor shall be elected and shall qualify, or until his right to hold such office terminates pursuant to the provisions of this Section 3(C).

(iii) A Director elected pursuant to the terms hereof may be removed with or without cause by the holders of Series C Preferred Stock entitled to vote in an election of such Director.

(iv) If, during any interval between annual meetings of stockholders for the election of Directors and while the holders of Series C Preferred Stock shall be entitled to elect two Directors, there is no such Director in office by reason of resignation, death or removal, then, promptly thereafter, the Board shall call a special meeting of the holders of Series C Preferred Stock for the purpose of filling such vacancy and such vacancy shall be filled at such special meeting. Such special meeting shall in any event be held within 45 days of the occurrence of such vacancy.

(v) At such time as the arrearage is fully cured, and all dividends accumulated and unpaid on any shares of Series C Preferred Stock outstanding are paid, and, in addition thereto, at least one regular dividend has been paid subsequent to curing such arrearage, the term of office of any Director elected pursuant to this Section 3(C), or his successor, shall automatically terminate, and the authorized number of Directors shall automatically decrease by two, the rights of the holders of the shares of the Series C Preferred Stock to vote as provided in this Section 3(C) shall cease, subject to renewal from time to time upon the same terms and conditions, and the holders of shares of the Series C Preferred Stock shall have only the limited voting rights elsewhere herein set forth.

(D) Except as set forth herein, or as otherwise provided by law, holders of Series C Preferred Stock shall have no special voting rights and their consent shall not be required (except to the extent they are entitled to vote with holders of Common Stock as set forth herein) for taking any corporate action.

Section 4. Certain Restrictions.

(A) Whenever quarterly dividends or other dividends or distributions payable on the Series C Preferred Stock as provided in Section 2 are in arrears, thereafter and until all accrued and unpaid dividends and distributions, whether or not declared, on shares of Series C Preferred Stock outstanding shall have been paid in full, the Corporation shall not:

(i) declare or pay dividends, or make any other distributions, on any shares of stock ranking junior (either as to dividends or upon liquidation, dissolution or winding up) to the Series C Preferred Stock;

(ii) declare or pay dividends, or make any other distributions, on any shares of stock ranking on a parity (either as to dividends or upon liquidation, dissolution or winding up) with the Series C Preferred Stock, except dividends paid ratably on the Series C Preferred Stock and all such parity stock on which dividends are payable or in arrears in proportion to the total amounts to which the holders of all such shares are then entitled;

(iii) redeem or purchase or otherwise acquire for consideration shares of any stock ranking junior (either as to dividends or upon liquidation, dissolution or winding up) to the Series C Preferred Stock, provided that the Corporation may at any time redeem, purchase or otherwise acquire shares of any such junior stock in exchange for shares of any stock of the Corporation ranking junior (either as to dividends or upon dissolution, liquidation or winding up) to the Series C Preferred Stock; or

(iv) redeem or purchase or otherwise acquire for consideration any shares of Series C Preferred Stock, or any shares of stock ranking on a parity with the Series C Preferred Stock, except in accordance with a purchase offer made in writing or by publication (as determined by the Board) to all holders of such shares upon such terms as the Board, after consideration of the respective annual dividend rates and other relative rights and preferences of the respective series and classes, shall determine in good faith will result in fair and equitable treatment among the respective series or classes.

(B) The Corporation shall not permit any subsidiary of the Corporation to purchase or otherwise acquire for consideration any shares of stock of the Corporation unless the Corporation could, under paragraph (A) of this Section 4, purchase or otherwise acquire such shares at such time and in such manner.

Section 5. Reacquired Shares. Any shares of Series C Preferred Stock purchased or otherwise acquired by the Corporation in any manner whatsoever shall be retired and cancelled promptly after the acquisition thereof. All such shares shall upon their cancellation become authorized but unissued shares of Preferred Stock and may be reissued as part of a new series of Preferred Stock subject to the conditions and restrictions on issuance set forth herein, in the Certificate of Incorporation, or in any other Certificate of Designations creating a series of Preferred Stock or any similar stock or as otherwise required by law.

Section 6. Liquidation, Dissolution or Winding Up.

(A) Upon any liquidation, dissolution or winding up of the Corporation, no distribution shall be made (1) to the holders of shares of stock ranking junior (either as to dividends or upon liquidation, dissolution or winding up) to the Series C Preferred Stock unless, prior thereto, the holders of shares of Series C Preferred Stock shall have received $1,000 per share, plus an

amount equal to accrued and unpaid dividends and distributions thereon, whether or not declared, to the date of such payment, provided that the holders of shares of Series C Preferred Stock shall be entitled to receive an aggregate amount per share, subject to the provision for adjustment hereinafter set forth, equal to 1,000 times the aggregate amount to be distributed per share to holders of shares of Common Stock, or (2) to the holders of shares of stock ranking on a parity (either as to dividends or upon liquidation, dissolution or winding up) with the Series C Preferred Stock, except distributions made ratably on the Series C Preferred Stock and all such parity stock in proportion to the total amounts to which the holders of all such shares are entitled upon such liquidation, dissolution or winding up.

(B) Neither the consolidation, merger or other business combination of the Corporation with or into any other corporation nor the sale, lease, exchange or conveyance of all or any part of the property, assets or business of the Corporation shall be deemed to be a liquidation, dissolution or winding up of the Corporation for purposes of this Section 6.

(C) In the event the Corporation shall at any time declare or pay any dividend on the Common Stock payable in shares of Common Stock, or effect a subdivision, combination or consolidation of the outstanding shares of Common Stock (by reclassification or otherwise than by payment of a dividend in shares of Common Stock) into a greater or lesser number of shares of Common Stock, then in each such case the aggregate amount to which holders of shares of Series C Preferred Stock were entitled immediately prior to such event under the proviso in clause (1) of paragraph (A) of this Section 6 shall be adjusted by multiplying such amount by a fraction, the numerator of which is the number of shares of Common Stock outstanding immediately after such event and the denominator of which is the number of shares of Common Stock that were outstanding immediately prior to such event. In the event the Corporation shall at any time declare or pay any dividend on the Series C Preferred Stock payable in shares of Series C Preferred Stock, or effect a subdivision, combination or consolidation of the outstanding shares of Series C Preferred Stock (by reclassification or otherwise than by payment of a dividend in shares of Series C Preferred Stock) into a greater or lesser number of shares of Series C Preferred Stock, then in each such case the aggregate amount to which holders of shares of Series C Preferred Stock were entitled immediately prior to such event under the proviso in clause (1) of paragraph (A) of this Section 6 shall be adjusted by multiplying such amount by a fraction, the numerator of which is the number of shares of Series C Preferred Stock that were outstanding immediately prior to such event and the denominator of which is the number of shares of Series C Preferred Stock outstanding immediately after such event.

Section 7. Consolidation, Merger, etc. Notwithstanding anything to the contrary contained herein, in case the Corporation shall enter into any consolidation, merger, combination or other transaction in which the shares of Common Stock are exchanged for or changed into other stock or securities, cash and/or any other property, then in any such case each share of Series C Preferred Stock shall at the same time be similarly exchanged or changed into an amount per share, subject to the provision for adjustment hereinafter set forth, equal to 1,000 times the aggregate amount of stock, securities, cash and/or any other property (payable in kind), as the case may be, into which or for which each share of Common Stock is changed or exchanged. In the event the Corporation shall at any time declare or pay any dividend on the Common Stock payable in shares of Common Stock, or effect a subdivision, combination or consolidation of the outstanding shares of Common Stock (by reclassification or otherwise than

by payment of a dividend in shares of Common Stock) into a greater or lesser number of shares of Common Stock, then in each such case the amount set forth in the preceding sentence with respect to the exchange or change of shares of Series C Preferred Stock shall be adjusted by multiplying such amount by a fraction, the numerator of which is the number of shares of Common Stock outstanding immediately after such event and the denominator of which is the number of shares of Common Stock that were outstanding immediately prior to such event. In the event the Corporation shall at any time declare or pay any dividend on the Series C Preferred Stock payable in shares of Series C Preferred Stock, or effect a subdivision, combination or consolidation of the outstanding shares of Series C Preferred Stock (by reclassification or otherwise than by payment of a dividend in shares of Series C Preferred Stock) into a greater or lesser number of shares of Series C Preferred Stock, then in each such case the amount set forth in the first sentence of this Section 7 with respect to the exchange or change of shares of Series C Preferred Stock shall be adjusted by multiplying such amount by a fraction, the numerator of which is the number of shares of Series C Preferred Stock that were outstanding immediately prior to such event and the denominator of which is the number of shares of Series C Preferred Stock outstanding immediately after such event.

Section 8. No Redemption. The shares of Series C Preferred Stock shall not be redeemable.

Section 9. Rank. The Series C Preferred Stock shall rank, with respect to the payment of dividends and the distribution of assets, junior to all series of any other class of the Preferred Stock issued either before or after the issuance of the Series C Preferred Stock (including, without limitation, the Series A Convertible Preferred Stock $.01 par value, of the Company established pursuant to the Certificate of Designation for Series A Convertible preferred Stock dated May 5, 1998), unless the terms of any such series shall provide otherwise.

Section 10. Amendment. At such time as any shares of Series C Preferred Stock are outstanding, the Certificate of Incorporation, as amended, of the Corporation shall not be amended in any manner which would materially alter or change the powers, preferences or special rights of the Series C Preferred Stock so as to affect them adversely without the affirmative vote of the holders of at least two-thirds of the outstanding shares of Series C Preferred Stock, voting together as a single class.

Section 11. Fractional Shares. Series C Preferred Stock may be issued in fractions of a share which shall entitle the holder, in proportion to such holder’s fractional shares, to exercise voting rights, receive dividends, participate in distributions and have the benefit of all other rights of holders of Series C Preferred Stock.

IN WITNESS WHEREOF, this Certificate of Designations is executed on behalf of the Corporation by its Chief Executive Officer this 10th day of December, 2001.

HYBRIDON, INC.

By: /s/ Stephen R. Seiler
Name: Stephen R. Seiler
Title: Chief Executive Officer

CERTIFICATE OF CORRECTION
OF
CERTIFICATE OF DESIGNATION FOR
SERIES A CONVERTIBLE PREFERRED STOCK
OF
HYBRIDON, INC.

Hybridon, Inc., a corporation organized and existing under and by virtue of the General Corporation Law of the State of Delaware, DOES HEREBY CERTIFY:

1. The name of the corporation is Hybridon, Inc.

2. A Certificate of Designation for Series A Convertible Preferred Stock of Hybridon, Inc. (the "Certificate of Designation") was filed with the Secretary of State of the State of Delaware on May 6, 1998, and the Certificate of Designation requires correction was permitted by Section 103(f) of the General Corporation Law of the State of Delaware.

3. The Certificate of Designation was an inaccurate record of the corporate action taken in the Section 7 thereof incorrectly provided as follows:

"7. Class Voting Rights. The Corporation shall not, without the affirmative vote or consent of the holders of at least 50% of all outstanding Series A Preferred Stock, voting separately as a class, (i) amend, alter or repeal any provisions of the Certificate of Incorporation or the Bylaws of the Corporation so as adversely to affect the relative rights, preferences, qualifications, limitations or restrictions of the Series A Preferred Stock (it being understood that the issuance of securities ranking prior to, or pari passu with, the Series A Preferred Stock (A) upon a Liquidation Event or (B) with respect to the payment of dividends or distributions shall not be considered adversely to affect such relative rights, preferences, qualifications, limitations or restrictions); or (ii) authorize or issue, or increase the authorized amount of, Series A Preferred Stock, other than Series A Preferred Stock issuable in connection with the Offering, issuable in exchange for 9% Notes or accrued interest thereon or issuable as dividends on Series A Preferred Stock."

4. As corrected hereby, Section 7 of the Certificate of Designation shall provide as follows:

"7. Voting Rights. Except as provided herein or required by law or by the Certificate of Incorporation of the Corporation, the holders of shares of Series A Preferred Stock shall not be entitled to vote on any matter presented to the stockholders of the Corporation for their action or consideration at any meeting of stockholders of the Corporation (or by written action of stockholders in lieu of a meeting). The Corporation shall not, without the affirmative vote or consent of the holders of at least 50% of all outstanding Series A Preferred Stock, voting separately as a class, (i) amend, alter or repeal any provision of the Certificate of Incorporation or the Bylaws of the Corporation so as adversely to affect the relative rights, preferences, qualifications, limitations or restrictions of the Series A Preferred Stock (it being understood that the issuance of securities ranking prior to, or pari passu with, the Series A Preferred Stock (A) upon a Liquidation Event or (B) with respect to the payment of dividends of distributions shall

not be considered adversely to affect such relative rights, preferences, qualifications, limitations or restrictions); or (ii) authorize or issue, or increase the authorized amount of, Series A Preferred Stock, other than Series A Preferred Stock issuable in connection with the Offering, issuable in exchange for 9% Notes or accrued interest thereon or issuable as dividends on Series A Preferred Stock."

IN WITNESS WHEREOF, Hybridon, Inc. has caused this Certificate of Designation to be signed by its Chief Financial Officer this 13th day of May 2002.

HYBRIDON, INC.

By: /s/ Robert Andersen
Robert G. Andersen
Chief Financial Officer

CERTIFICATE OF AMENDMENT

TO THE

RESTATED CERTIFICATE OF INCORPORATION

OF

HYBRIDON, INC.

Hybridon, Inc. (hereinafter called the "Corporation"), organized and existing under and by virtue of the General Corporation Law of the State of Delaware, does hereby certify as follows:

At a meeting of the Board of Directors of the Corporation a resolution was duly adopted, pursuant to Section 242 of the General Corporation Law of the State of Delaware, setting forth an amendment to the Restated Certificate of Incorporation of the Corporation, as amended to date (the "Certificate of Incorporation"), and declaring said amendment to be advisable. The stockholders of the Corporation duly approved said proposed amendment in accordance with Section 242 of the General Corporation Law of the State of Delaware at a meeting of stockholders held on June 19, 2002. The resolution setting forth the amendment is as follows:

RESOLVED: That the first paragraph of Article FOURTH of the Certificate of Incorporation be and hereby is amended and restated in its entirety so that the same shall read as follows:

> "FOURTH. The total number of shares of all classes of stock which the Corporation shall have authority to issue is (i) One Hundred Fifty Million (150,000,000) shares of Common Stock, $.001 par value per share ("Common Stock"), and (ii) Five Million (5,000,000) shares of Preferred Stock, $.01 par value per share ("Preferred Stock"), which may be issued from time to time in one or more series as set forth in Part B of this Article FOURTH."

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to be signed by its Chief Executive Officer on this 10th day of July, 2002.

HYBRIDON, INC.

/s/ Stephen R. Seiler

Name: Stephen R. Seiler
Title: Chief Executive Officer

CERTIFICATE OF AMENDMENT

OF

RESTATED CERTIFICATE OF INCORPORATION

OF

HYBRIDON, INC.

Hybridon, Inc. (hereinafter called the "Corporation"), organized and existing under and by virtue of the General Corporation Law of the State of Delaware, does hereby certify as follows:

By action of the Board of Directors of the Corporation at a meeting a resolution was duly adopted, pursuant to Section 242 of the General Corporation Law of the State of Delaware, setting forth amendments to the Certificate of Incorporation of the Corporation and declaring said amendments to be advisable. The stockholders of the Corporation duly approved said proposed amendments at a meeting in accordance with Section 242 of the General Corporation Law of the State of Delaware. The resolutions setting forth the amendments are as follows:

RESOLVED: That Section 2(a) of the Certificate of Designation of the Series A Convertible Preferred Stock of the Corporation filed on May 6, 1998 is hereby amended by deleting the reference to "6.5%" therein and inserting in lieu thereof "1.0%".

RESOLVED: That Section 3(a) of the Certificate of Designation of the Series A Convertible Preferred Stock of the Corporation filed on May 6, 1998 is hereby amended by deleting the first sentence of Section 3(a) in its entirety and inserting in lieu thereof the following sentence:

"3. Liquidation Preference. (a) In the event of a (i) liquidation, dissolution or winding up of the Corporation, whether voluntary or involuntary, (ii) a sale or other disposition of all or substantially all of the assets of the Corporation or (iii) any consolidation, merger, combination, reorganization or other transaction in which the Corporation is not the surviving entity or shares of Common Stock constituting in excess of 50% of the voting power of the Corporation are exchanged for or changed into stock or securities of another entity, cash and/or any other property (a "Merger Transaction") (items (i), (ii) and (iii) of this sentence being collectively referred to as a "Liquidation Event"), after payment or provision for payment of debts and other liabilities of the Corporation, the holders of the Series A Preferred Stock then outstanding shall be entitled to be paid out of the assets of the Corporation available for distribution to its stockholders, whether such assets are capital, surplus, or earnings, before any payment or declaration and setting apart for payment of any amount shall be made in respect of any Junior Stock of the Corporation, an amount equal to $1.00 per share (subject to appropriate adjustment in the event of any stock split, stock dividend, combination or other similar recapitalization affecting the Series A Preferred Stock), plus any dividends declared or accrued but unpaid on such shares; provided, however, in the case of a Merger Transaction, such payment may be made in cash, property (valued as provided in Subsection 3(b)) and/or securities (valued as provided in Subsection 3(b)) of the entity surviving such Merger Transaction."

RESOLVED: That Section 4(a) of the Certificate of Designation of the Series A Convertible Preferred Stock of the Corporation filed on May 6, 1998 is hereby amended by deleting the first paragraph of Section 4(a) in its entirety and inserting in lieu thereof the following paragraph:

"(a) Right of Conversion. Commencing after the expiration of 12 months following the Alternative Equity Closing Date (as hereinafter defined), but not prior thereto, the shares of Series A Preferred Stock shall be convertible, in whole or in part, at the option of the holder thereof and upon notice to the Corporation as set forth in Subsection 4(b), into fully paid and nonassessable shares of Common Stock and such other securities and property as hereinafter provided. The initial conversion price per share of Common Stock (the "Conversion Price"), shall be equal to the product of 2.125 multiplied by the per share price (the "Stated Common Price") of Common Stock sold by the Corporation in connection with the Alternative Equity Offering (as such term is defined in the Corporation's Offer to Exchange dated February 6, 1998 (the "Original Offer to Exchange"), as amended by the Amendment thereto (the "Amendment") dated March 30, 1998 (collectively, the "Offer to Exchange")) and shall be subject to adjustment as provided herein. The rate at which each share of Series A Preferred Stock is convertible at any time into Common Stock (the "Conversion Rate") shall be determined by dividing the then existing Conversion Price (determined in accordance with this Section 4, including the last paragraph hereof) into the Dividend Base Amount; provided, however, that, during the period beginning on the date of the filing of this Certificate of Amendment and ending on the date 60 days after the date of the filing of this Certificate of Amendment (the "Early Conversion Period"), the Conversion Rate shall be determined by dividing the Conversion Price (in effect as of the first day of the Early Conversion Period) into an amount equal to 125% of the Dividend Base Amount. For illustrative purposes only, if the Conversion Price equals $4.25 and the Dividend Base Amount equals $100.00, then each share of Series A Preferred Stock will be convertible into 23.53 shares of Common Stock ($100.00 ÷ $4.25); provided, however, that during the Early Conversion Period, each share of Series A Preferred Stock will be convertible into 29.41 shares of Common Stock ($125.00 ÷ $4.25)."

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to be signed by its authorized officer on the 4th day of December, 2003.

By: /s/ Stephen R. Seiler
Name: Stephen R. Seiler
Title: Chief Executive Officer

CERTIFICATE OF INCREASE

OF

SERIES C JUNIOR PARTICIPATING PREFERRED STOCK

OF

HYBRIDON, INC.

(Pursuant to Section 151(g) of the
Delaware General Corporation Law)

Hybridon, Inc., a corporation organized and existing under the Delaware General Corporation Law (the "Corporation") does hereby certify:

FIRST: In a Certificate of Designations filed with the Secretary of State of the State of Delaware on December 10, 2001, pursuant to Section 151 of the Delaware General Corporation Law, the Corporation was authorized to issue 100,000 shares of Series C Junior Participating Preferred Stock as a series of the Corporation's authorized Preferred Stock, par value $.01 per share; and

SECOND: The board of directors of the Corporation, by resolution adopted June 22, 2003, duly authorized and directed that the number of shares of the Corporation's Series C Junior Participating Preferred Stock be increased from 100,000 shares to 150,000 shares.

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Increase to be signed by its duly authorized officer this 4th day of December, 2003.

By: /s/ Stephen R. Seiler
Name: Stephen R. Seiler
Title: Chief Executive Officer

CERTIFICATE OF AMENDMENT

TO THE

RESTATED CERTIFICATE OF INCORPORATION

OF

HYBRIDON, INC.

Hybridon, Inc. (hereinafter called the "Corporation"), organized and existing under and by virtue of the General Corporation Law of the State of Delaware, does hereby certify as follows:

At a meeting of the Board of Directors of the Corporation a resolution was duly adopted, pursuant to Section 242 of the General Corporation Law of the State of Delaware, setting forth an amendment to the Restated Certificate of Incorporation of the Corporation, as amended to date (the "Certificate of Incorporation"), and declaring said amendment to be advisable. The stockholders of the Corporation duly approved said proposed amendment in accordance with Section 242 of the General Corporation Law of the State of Delaware at a meeting of stockholders held on June 24, 2004. The resolution setting forth the amendment is as follows:

RESOLVED: That the first paragraph of Article FOURTH of the Certificate of Incorporation be and hereby is amended and restated in its entirety so that the same shall read as follows:

> "FOURTH. The total number of shares of all classes of stock which the Corporation shall have authority to issue is (i) One Hundred Eighty Five Million (185,000,000) shares of Common Stock, $.001 par value per share ("Common Stock"), and (ii) Five Million (5,000,000) shares of Preferred Stock, $.01 par value per share ("Preferred Stock"), which may be issued from time to time in one or more series as set forth in Part B of this Article FOURTH."

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to be signed by its Chief Executive Officer on this 25th day of June 2004.

HYBRIDON, INC.

/s/ Stephen R. Seiler
Name: Stephen R. Seiler
Title: Chief Executive Officer

CERTIFICATE OF INCREASE

OF

SERIES C JUNIOR PARTICIPATING PREFERRED STOCK

OF

HYBRIDON, INC.

(Pursuant to Section 151(g) of the
Delaware General Corporation Law)

Hybridon, Inc., a corporation organized and existing under the Delaware General Corporation Law (the "Corporation") does hereby certify:

FIRST: In a Certificate of Designations filed with the Secretary of State of the State of Delaware on December 10, 2001, pursuant to Section 151 of the Delaware General Corporation Law, the Corporation was authorized to issue 100,000 shares of Series C Junior Participating Preferred Stock as a series of the Corporation's authorized Preferred Stock, par value $.01 per share;

SECOND: In a Certificate of Increase filed with the Secretary of State of the State of Delaware on December 4, 2003, pursuant to Section 151 of the Delaware General Corporation Law, the number of authorized shares of the Corporation's Series C Junior Participating Preferred Stock was increased from 100,000 to 150,000; and

THIRD: The board of directors of the Corporation, by resolution adopted March 15, 2005, duly authorized and directed that the number of authorized shares of the Corporation's Series C Junior Participating Preferred Stock be increased from 150,000 shares to 185,000 shares.

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Increase to be signed by its duly authorized officer this 24th day of March, 2005.

By: /s/ Sudhir Agrawal
Name: Sudhir Agrawal, D. Phil
Title: Chief Executive Officer, President and Chief Scientific Officer

CERTIFICATE OF AMENDMENT

TO THE

RESTATED CERTIFICATE OF INCORPORATION

OF

HYBRIDON, INC.

Hybridon, Inc. (hereinafter called the "Corporation"), organized and existing under and by virtue of the General Corporation Law of the State of Delaware, does hereby certify as follows:

At a meeting of the Board of Directors of the Corporation a resolution was duly adopted, pursuant to Section 242 of the General Corporation Law of the State of Delaware, setting forth an amendment to the Restated Certificate of Incorporation of the Corporation, as amended to date (the "Certificate of Incorporation"), and declaring said amendment to be advisable. The stockholders of the Corporation duly approved said proposed amendment in accordance with Section 242 of the General Corporation Law of the State of Delaware at a meeting of stockholders held on June 15, 2005. The resolution setting forth the amendment is as follows:

RESOLVED: That the first paragraph of Article FOURTH of the Certificate of Incorporation be and hereby is amended and restated in its entirety so that the same shall read as follows:

> "FOURTH. The total number of shares of all classes of stock which the Corporation shall have authority to issue is (i) Two Hundred Million (200,000,000) shares of Common Stock, $.001 par value per share ("Common Stock"), and (ii) Five Million (5,000,000) shares of Preferred Stock, $.01 par value per share ("Preferred Stock"), which may be issued from time to time in one or more series as set forth in Part B of this Article FOURTH."

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to be signed by its Chief Executive Officer on this 17th day of June 2005.

HYBRIDON, INC.

/s/ Sudhir Agrawal

Name: Sudhir Agrawal
Title: Chief Executive Officer

CERTIFICATE OF INCREASE

OF

SERIES C JUNIOR PARTICIPATING PREFERRED STOCK

OF

HYBRIDON, INC.

(Pursuant to Section 151(g) of the
Delaware General Corporation Law)

Hybridon, Inc., a corporation organized and existing under the Delaware General Corporation Law (the "Corporation") does hereby certify:

FIRST: In a Certificate of Designations filed with the Secretary of State of the State of Delaware on December 10, 2001, pursuant to Section 151 of the Delaware General Corporation Law, the Corporation was authorized to issue 100,000 shares of Series C Junior Participating Preferred Stock as a series of the Corporation's authorized Preferred Stock, par value $.01 per share;

SECOND: In a Certificate of Increase filed with the Secretary of State of the State of Delaware on December 4, 2003, pursuant to Section 151 of the Delaware General Corporation Law, the number of authorized shares of the Corporation's Series C Junior Participating Preferred Stock was increased from 100,000 to 150,000;

THIRD: In a Certificate of Increase filed with the Secretary of State of the State of Delaware on March 24, 2005, pursuant to Section 151 of the Delaware General Corporation Law, the number of authorized shares of the Corporation's Series C Junior Participating Preferred Stock was increased from 150,000 to 185,000; and

FOURTH: The board of directors of the Corporation, by resolution adopted March 15, 2005, duly authorized and directed that, effective as of June 15, 2005, the number of authorized shares of the Corporation's Series C Junior Participating Preferred Stock be increased from 185,000 shares to 200,000 shares.

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Increase to be signed by its duly authorized officer this 21st day of June 2005.

By: /s/ Robert G. Andersen
Name: Robert G. Andersen
Title: Chief Financial Officer

CERTIFICATE OF OWNERSHIP AND MERGER

MERGING

IDERA PHARMACEUTICALS, INC.
(a Delaware corporation)

INTO

HYBRIDON, INC.
(a Delaware corporation)

Pursuant to Section 253 of the General Corporation Law of the State of Delaware, Hybridon, Inc., a corporation organized and existing under and by virtue of the General Corporation Law of the State of Delaware (the "Corporation"), does hereby certify:

FIRST: That the Corporation was incorporated on May 25, 1989, pursuant to the General Corporation Law of the State of Delaware.

SECOND: That the Corporation owns all of the outstanding shares of the capital stock of Idera Pharmaceuticals, Inc., a corporation incorporated on August 24, 2005, pursuant to the General Corporation Law of the State of Delaware (the "Subsidiary").

THIRD: That on September 9, 2005, the Board of Directors of the Corporation, acting by written consent in accordance with Section 141(f) of the General Corporation Law of the State of Delaware, duly adopted the following resolutions and determined to merge the Subsidiary into the Corporation and change the Corporation's corporate name to "Idera Pharmaceuticals, Inc." on the conditions set forth in such resolutions:

RESOLVED: That, the Corporation shall, pursuant to Section 253 of the Delaware Code, merge into itself Idera Pharmaceuticals, Inc., a wholly owned subsidiary of the Corporation (the "Subsidiary"), and shall assume all of the Subsidiary's liabilities and obligations (the "Merger"); and that upon the effectiveness of the Merger, the Corporation's corporate name shall be changed to "Idera Pharmaceuticals, Inc."

RESOLVED: That the Corporation, as the sole stockholder of the Subsidiary, be and hereby is authorized to take such actions as are necessary or appropriate to effect the Merger.

RESOLVED: That the Chief Executive Officer and the Chief Financial Officer of the Corporation (the "Proper Officers") be, and either acting singly, hereby is authorized and directed in the name and on behalf of the Corporation to prepare, execute and file with the Secretary of State of the State of Delaware a Certificate of

Ownership and Merger setting forth a copy of the resolutions to merge the Subsidiary into the Corporation and to assume the liabilities and obligations of said Subsidiary and to change the Corporation's corporate name to "Idera Pharmaceuticals, Inc." upon the effectiveness of the Merger; and that the execution and filing thereof be conclusive evidence of such approval and the authorization therefor by the Board of Directors of the Corporation.

FOURTH: That the Merger of Subsidiary into the Corporation be effective as of September 12, 2005 at 4:01 p.m. (ET).

IN WITNESS WHEREOF, the Corporation has caused this Certificate to be signed by its authorized officer this 12th day of September, 2005.

HYBRIDON, INC.

By: /s/ Sudhir Agrawal
Name: Sudhir Agrawal
Title: Chief Executive Officer and President

CERTIFICATE OF AMENDMENT

TO THE

RESTATED CERTIFICATE OF INCORPORATION

OF

IDERA PHARMACEUTICALS, INC.

Idera Pharmaceuticals, Inc. (hereinafter called the "Corporation"), organized and existing under and by virtue of the General Corporation Law of the State of Delaware, does hereby certify as follows:

By action of the Board of Directors of the Corporation at a meeting held on April 12, 2006, the Board of Directors of the Corporation duly adopted a resolution, pursuant to Section 242 of the General Corporation Law of the State of Delaware, setting forth an amendment to the Restated Certificate of Incorporation of the Corporation, as amended to date (the "Certificate of Incorporation"), and declaring said amendment to be advisable. The stockholders of the Corporation duly approved said proposed amendment in accordance with Section 242 of the General Corporation Law of the State of Delaware at a meeting of stockholders held on June 7, 2006. The resolution setting forth the amendment is as follows:

RESOLVED: That the first paragraph of Article FOURTH of the Certificate of Incorporation be and hereby is amended and restated in its entirety so that the same shall read as follows:

"FOURTH. That, effective at 5:00 p.m., eastern time, on the filing date of this Certificate of Amendment of Restated Certificate of Incorporation, as amended, (the "Effective Time"), a one-for-eight reverse stock split of the Corporation's Common Stock (as defined below) shall become effective, pursuant to which each eight shares of Common Stock outstanding and held of record by each stockholder of the Corporation (including treasury shares) immediately prior to the Effective Time shall be reclassified and combined into one share of Common Stock automatically and without any action by the holder thereof upon the Effective Time and shall represent one share of Common Stock from and after the Effective Time. No fractional shares of Common Stock shall be issued as a result of such reclassification and combination. In lieu of any fractional shares to which the stockholder would otherwise be entitled, the Corporation shall pay cash equal to such fraction multiplied by the average of the high and low trading prices of the Common Stock on the American Stock Exchange during regular trading hours for the five trading days immediately preceding the Effective Time.

The total number of shares of all classes of stock which the Corporation shall have authority to issue is (i) Forty Million (40,000,000) shares of Common Stock, $.001 par value per share ("Common Stock"), and (ii) Five Million (5,000,000) shares of Preferred Stock, $.01 par value per share ("Preferred Stock"), which may be issued from time to time in one or more series as set forth in Part B of this Article FOURTH."

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to be signed by its duly authorized officer this 29th day of June 2006.

IDERA PHARMACEUTICALS, INC.

By: /s/ Robert G. Andersen
Robert G. Andersen
Chief Financial Officer,
Vice President Operations

CERTIFICATE OF AMENDMENT
TO THE
RESTATED CERTIFICATE OF INCORPORATION
OF
IDERA PHARMACEUTICALS, INC.

Idera Pharmaceuticals, Inc. (hereinafter called the "Corporation"), organized and existing under and by virtue of the General Corporation Law of the State of Delaware, does hereby certify as follows:

By action of the Board of Directors of the Corporation at a meeting held on March 18, 2008, the Board of Directors of the Corporation duly adopted a resolution, pursuant to Section 242 of the General Corporation Law of the State of Delaware, setting forth an amendment to the Restated Certificate of Incorporation of the Corporation, as amended to date (the "Certificate of Incorporation"), and declaring said amendment to be advisable. The stockholders of the Corporation duly approved said proposed amendment in accordance with Section 242 of the General Corporation Law of the State of Delaware at a meeting of stockholders held on June 4, 2008. The resolution setting forth the amendment is as follows:

> RESOLVED: That the first paragraph of Article FOURTH of the Certificate of Incorporation be and hereby is amended and restated in its entirety so that the same shall read as follows:
>
> > "FOURTH. The total number of shares of all classes of stock which the Corporation shall have authority to issue is (i) Seventy Million (70,000,000) shares of Common Stock, $.001 par value per share ("Common Stock"), and (ii) Five Million (5,000,000) shares of Preferred Stock, $.01 par value per share ("Preferred Stock"), which may be issued from time to time in one or more series as set forth in Part B of this Article FOURTH."

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to be signed by its duly authorized officer this 2nd day of July 2008.

IDERA PHARMACEUTICALS, INC.

By: /s/ Louis J. Arcudi, III
Name: Louis J. Arcudi, III
Title: Chief Financial Officer

CERTIFICATE OF DESIGNATIONS, PREFERENCES AND RIGHTS

OF

SERIES D PREFERRED STOCK

OF

IDERA PHARMACEUTICALS, INC.

(Pursuant to Section 151 of
the Delaware General Corporation Law)

Idera Pharmaceuticals, Inc. (the "**Corporation**"), a corporation organized and existing under the laws of the State of Delaware, hereby certifies that, pursuant to authority conferred on its Board of Directors (the "**Board**") by the Restated Certificate of Incorporation of the Corporation, as amended, the following resolution was adopted by the Board at a meeting duly called and held on November 4, 2011, which resolution remains in full force and effect on the date hereof:

RESOLVED, that there is hereby created and established a series of the Corporation's authorized Preferred Stock (the "**Preferred Stock**") having a par value of $0.01 per share, which series shall be designated as "Series D Convertible Preferred Stock" (the "**Series D Preferred Stock**") and shall consist of 1,124,260 shares. The shares of Series D Preferred Stock shall have the voting powers, designations, preferences and other special rights, and qualifications, limitations and restrictions thereof set forth below:

1. Dividends.

1.1 Each holder of Series D Preferred Stock shall be entitled to receive, with respect to each share of Series D Preferred Stock then outstanding and held by such holder of Series D Preferred Stock, dividends, commencing from the date of issuance of such share of Series D Preferred Stock, at the rate of seven percent (7%) per annum (on the basis of a 360 day year) of the Series D Original Issue Price (as defined below) (the "**Series D Preferred Dividends**"). The Series D Preferred Dividends shall be cumulative, whether or not earned or declared, shall be paid quarterly in arrears on the last day of December, March, June and September (a "**Quarterly Dividend Payment Date**") in each year that Series D Preferred Stock is outstanding, with the first Quarterly Dividend Payment Date being December 31, 2011, and shall be prorated for periods shorter than one quarter. The rights of a holder of Series D Preferred Stock as Series D Preferred Dividends shall rank senior to the rights of the Corporation's Series A Convertible Preferred Stock as to dividends. The Series D Preferred Dividends shall be paid to each holder of Series D Preferred Stock in cash out of legally available funds or, at the Corporation's election, through the issuance of such number of shares of the Corporation's Common Stock, par value $0.001 per share (the "**Common Stock**") (rounded down to the nearest whole share with any fractional shares being issued in cash in an amount equal to the Market Price (as defined in Section 4.2 below) of such fractional share of Common Stock) determined by dividing the amount of the total accrued but unpaid dividends

then outstanding on such holder's shares of Series D Preferred Stock by the Market Price then in effect (which for this purpose may not be less than $1.46 per share, subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Common Stock); provided, however, that (i) the Corporation may not pay such dividends in shares of Common Stock on or prior to December 31, 2014, (ii) the Corporation may not issue shares of Common Stock in excess of that number of shares of Common Stock which, upon giving effect to such issuance, would cause (a) the aggregate number of shares of Common Stock beneficially owned by a holder of Series D Preferred Stock and its affiliates and any other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Securities Exchange Act of 1934, as amended (the "**Exchange Act**"), to exceed 19.99% of the total number of issued and outstanding shares of Common Stock of the Corporation following such issuance, or (b) the combined voting power of the securities of the Corporation beneficially owned by a holder of Series D Preferred Stock and its affiliates and any other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Exchange Act to exceed 19.99% of the combined voting power of all of the securities of the Corporation then outstanding following such issuance, unless, in either case, the Corporation obtains the requisite stockholder approval under NASDAQ Marketplace Rule 5635(b) (the "**Issuance Limitation**"), in which case, the Issuance Limitation under this clause (ii) shall no longer apply to the payment of dividends hereunder and (iii) if clause (ii) shall in fact limit the issuance of any shares of Common Stock in payment of a given dividend, then the Corporation's election to pay such dividend in shares of Common Stock shall be ineffective to the extent of such limitation and such dividend shall instead thereupon be paid in cash by the Corporation out of legally available funds. Any election by the Corporation to pay Series D Preferred Dividends in cash or shares of Common Stock shall be made uniformly with respect to all outstanding shares of Series D Preferred Stock for a given dividend period. For purposes of this Section 1.1 the aggregate number of shares of Common Stock or voting securities beneficially owned by a holder of Series D Preferred Stock and its affiliates and any other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Exchange Act, shall include the shares of Common Stock to be issued as part of such dividend payment, but shall exclude the number of shares of Common Stock which would be issuable upon exercise or conversion of the unexercised, non-converted or non-cancelled portion of any other securities of the Corporation that do not have voting power (including without limitation any securities of the Corporation which would entitle the holder thereof to acquire at any time Common Stock, including without limitation any debt, preferred stock, right, option, warrant or other instrument that is at any time convertible into or exercisable or exchangeable for, or otherwise entitles the holder thereof to receive, Common Stock), subject to a limitation on conversion or exercise analogous to the limitation contained herein beneficially owned by the holder or any of its affiliates and other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Exchange Act.

1.2 Notwithstanding the foregoing, if any Series D Preferred Dividend is not paid by the Corporation within five trading days following a Quarterly Dividend Payment Date, such Series D Preferred Dividend shall continue to accrue and the Corporation shall be obligated to pay the holders a late fee with respect to such Series D Preferred Dividend, which shall be paid by the Corporation in cash, at the rate of sixteen percent (16%) per annum (or such lesser

rate permitted by applicable law) (the "**Dividend Late Fee**"), and shall accrue daily from the applicable Quarterly Dividend Payment Date through and including the date the Corporation pays such Series D Preferred Dividend plus the Dividend Late Fee in full (which amount shall be paid as liquidated damages and not as a penalty); provided however, that no Dividend Late Fee shall accrue or be owed with respect to any Series D Preferred Dividend (i) that the Corporation is not permitted to pay under Delaware law or (ii) to be paid in cash that is not paid at a time when the Corporation has less than $10 million of cash and cash equivalents as of the applicable Quarterly Dividend Payment Date as certified in writing by the Corporation to the holders.

1.3 The Corporation shall not declare, pay or set aside any dividends on shares of any other class or series of capital stock of the Corporation (other than dividends on shares of Common Stock payable in shares of Common Stock and dividends on the Series A Convertible Preferred Stock in accordance with Section 2(a) of the Certificate of Designations for the Series A Convertible Preferred Stock) unless the holders of the Series D Preferred Stock then outstanding shall first receive, or simultaneously receive, a dividend on each outstanding share of Series D Preferred Stock in an amount at least equal to the sum of (i) the amount of the aggregate dividends then accrued on such share of Series D Preferred Stock and not previously paid and (ii) (A) in the case of a dividend on Common Stock or any class or series that is convertible into Common Stock, that dividend per share of Series D Preferred Stock as would equal the product of (1) the dividend payable on each share of such class or series determined, if applicable, as if all shares of such class or series had been converted into Common Stock and (2) the number of shares of Common Stock issuable upon conversion of a share of Series D Preferred Stock, in each case calculated on the record date for determination of holders entitled to receive such dividend or (B) in the case of a dividend on any class or series that is not convertible into Common Stock, at a rate per share of Series D Preferred Stock determined by (1) dividing the amount of the dividend payable on each share of such class or series of capital stock by the original issuance price of such class or series of capital stock (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to such class or series) and (2) multiplying such fraction by an amount equal to the Series D Original Issue Price; provided that, if the Corporation declares, pays or sets aside, on the same date, a dividend on shares of more than one class or series of capital stock of the Corporation, the dividend payable to the holders of Series D Preferred Stock pursuant to this Section 1.3 shall be calculated based upon the dividend on the class or series of capital stock that would result in the highest Series D Preferred Stock dividend.

1.4 The "**Series D Original Issue Price**" shall mean $8.1375 per share, subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Series D Preferred Stock.

2. Liquidation, Dissolution or Winding Up.

2.1 Payments to Holders of Series D Preferred Stock. In the event of any voluntary or involuntary liquidation, dissolution or winding up of the Corporation, the holders of shares of Series D Preferred Stock then outstanding shall be entitled to be paid out of the assets of the Corporation available for distribution to its stockholders before any payment shall be made to the holders of Common Stock, Series A Convertible Preferred Stock or any other class of capital stock of the Corporation ranking junior to the Series D Preferred Stock as to liquidation,

by reason of their ownership thereof, an amount per share equal to the greater of (i) the Series D Original Issue Price, plus any dividends accrued or declared but unpaid thereon, or (ii) such amount per share as would have been payable with respect to such share had all shares of Series D Preferred Stock been converted into Common Stock pursuant to Section 4 immediately prior to such liquidation, dissolution or winding up. If upon any such liquidation, dissolution or winding up of the Corporation, the assets of the Corporation available for distribution to its stockholders shall be insufficient to pay the holders of shares of Series D Preferred Stock the full amount to which they shall be entitled under this Subsection 2.1, the holders of shares of Series D Preferred Stock shall share ratably in any distribution of the assets available for distribution in proportion to the respective amounts which would otherwise be payable in respect of the shares held by them upon such distribution if all amounts payable on or with respect to such shares were paid in full.

2.2 Payments to Holders of Common Stock. In the event of any voluntary or involuntary liquidation, dissolution or winding up of the Corporation, after the payment of all preferential amounts required to be paid to the holders of shares of Series D Preferred Stock and subject to any other distribution that may be required with respect to any other series of Preferred Stock, the remaining assets of the Corporation available for distribution to its stockholders shall be distributed among the holders of shares of Common Stock and any class or series of capital stock that participates with the Common Stock in such distributions.

3. Voting. On any matter presented to the stockholders of the Corporation for their action or consideration at any meeting of stockholders of the Corporation, each holder of outstanding shares of Series D Preferred Stock shall be entitled to cast a number of votes equal to the number of whole shares of Common Stock into which the shares of Series D Preferred Stock held by such holder are convertible as of the record date for determining stockholders entitled to vote on such matter. Except as provided by law or by the other provisions of the Certificate of Incorporation, holders of Series D Preferred Stock shall vote together with the holders of Common Stock as a single class.

4. Optional Conversion.

The holders of the Series D Preferred Stock shall have conversion rights as follows (the "**Conversion Rights**"):

4.1 Right to Convert.

4.1.1 Conversion Ratio. Each share of Series D Preferred Stock shall be convertible, at the option of the holder thereof, at any time and from time to time, and without the payment of additional consideration by the holder thereof, into such number of fully paid and nonassessable shares of Common Stock as is determined by dividing the Series D Original Issue Price by the Series D Conversion Price (as defined below) in effect at the time of conversion. The "**Series D Conversion Price**" shall initially be equal to $1.6275. Such initial Series D Conversion Price, and the rate at which shares of Series D Preferred Stock may be converted into shares of Common Stock, shall be subject to adjustment as provided below. Notwithstanding the foregoing, the Corporation shall not effect any conversion of such holder's Series D Preferred Stock and such holder shall not be entitled to convert its shares of Series D Preferred Stock for a

number of shares of Common Stock in excess of that number of shares of Common Stock which, upon giving effect to such conversion, would cause (a) the aggregate number of shares of Common Stock beneficially owned by a holder of Series D Preferred Stock and its affiliates and any other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Exchange Act to exceed 19.99% of the total number of issued and outstanding shares of Common Stock of the Corporation (including for such purpose the shares of Common Stock issuable upon conversion of the Series D Preferred Stock) following such conversion, or (b) the combined voting power of the securities of the Corporation beneficially owned by a holder of Series D Preferred Stock and its affiliates and any other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Exchange Act to exceed 19.99% of the combined voting power of all of the securities of the Corporation then outstanding following such conversion, unless, in either case, the Corporation obtains the requisite stockholder approval under NASDAQ Marketplace Rule 5635(b) unless the Corporation obtains the requisite stockholder approval under NASDAQ Marketplace Rule 5635(b), in which case, this limitation under this Section 4.1.1 shall no longer apply to the holder. For purposes of this Section 4.1.1, the aggregate number of shares of Common Stock or voting securities beneficially owned by the holder and its affiliates and any other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Exchange Act shall include the shares of Common Stock issuable upon the conversion of the Series D Preferred Stock with respect to which such determination is being made, but shall exclude the number of shares of Common Stock which would be issuable upon exercise or conversion of the unexercised, non-converted or non-cancelled portion of any other securities of the Corporation that do not have voting power (including without limitation any securities of the Corporation which would entitle the holder thereof to acquire at any time Common Stock, including without limitation any debt, preferred stock, right, option, warrant or other instrument that is at any time convertible into or exercisable or exchangeable for, or otherwise entitles the holder thereof to receive, Common Stock), subject to a limitation on conversion or exercise analogous to the limitation contained herein beneficially owned by the holder or any of its affiliates and other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Exchange Act.

4.1.2 Termination of Conversion Rights. In the event of a notice of redemption of any shares of Series D Preferred Stock pursuant to Section 5 or 6, the Conversion Rights of the shares designated for redemption shall terminate at the close of business on the last full day preceding the date fixed for redemption, unless the redemption price is not fully paid on such redemption date, in which case the Conversion Rights for such shares shall continue until such price is paid in full. In the event of a liquidation, dissolution or winding up of the Corporation, the Conversion Rights shall terminate at the close of business on the last full day preceding the date fixed for the payment of any such amounts distributable on such event to the holders of Series D Preferred Stock.

4.2 Fractional Shares. No fractional shares of Common Stock shall be issued upon conversion of the Series D Preferred Stock. In lieu of any fractional shares to which the holder would otherwise be entitled, the Corporation shall pay cash equal to such fraction multiplied by the Market Price of a share of Common Stock. Whether or not fractional shares would be issuable upon such conversion shall be determined on the basis of the total number of

shares of Series D Preferred Stock the holder is at the time converting into Common Stock and the aggregate number of shares of Common Stock issuable upon such conversion. The "Market Price" of the Common Stock shall be determined as follows: if the Common Stock is listed on a national securities exchange or another nationally recognized trading system, the Market Price per share of Common Stock shall be deemed to be the greater of (a) the 20 consecutive trading day average closing price per share of the Corporation's common stock ending on the trading day immediately prior to the date of determination and (b) the closing price of the Corporation's common stock on the trading day immediately prior to the date of determination; and if the Common Stock is not listed on a national securities exchange or another nationally recognized trading system, the Market Price per share of Common Stock shall be deemed to be the amount most recently determined by the Board of Directors of the Corporation to represent the fair market value per share of the Common Stock (including without limitation a determination for purposes of granting Common Stock options or issuing Common Stock under any plan, agreement or arrangement with employees of the Company). Upon request of a holder of Series D Preferred Stock, the Board of Directors (or a representative thereof) shall, as promptly as reasonably practicable but in any event not later than 10 days after such request, notify the holder of the Market Price and furnish the holder with reasonable documentation of the Board's determination of such Market Price. Notwithstanding the foregoing, if the Board has not made such a determination within the three-month period prior to the date of determination, then the Board shall make, and shall provide or cause to be provided to the holder notice of, a determination of the Market Price within 15 days of a request by the holder that it do so.

4.3 Mechanics of Conversion.

4.3.1 Notice of Conversion. In order for a holder of Series D Preferred Stock to voluntarily convert shares of Series D Preferred Stock into shares of Common Stock, such holder shall surrender the certificate or certificates for such shares of Series D Preferred Stock (or, if such registered holder alleges that such certificate has been lost, stolen or destroyed, a lost certificate affidavit and agreement reasonably acceptable to the Corporation to indemnify the Corporation against any claim that may be made against the Corporation on account of the alleged loss, theft or destruction of such certificate), at the office of the transfer agent for the Series D Preferred Stock (or at the principal office of the Corporation if the Corporation serves as its own transfer agent), together with written notice that such holder elects to convert all or any number of the shares of the Series D Preferred Stock represented by such certificate or certificates and, if applicable, any event on which such conversion is contingent. Such notice shall state such holder's name or the names of the nominees in which such holder wishes the certificate or certificates for shares of Common Stock to be issued. If required by the Corporation, certificates surrendered for conversion shall be endorsed or accompanied by a written instrument or instruments of transfer, in form satisfactory to the Corporation, duly executed by the registered holder or his, her or its attorney duly authorized in writing. The close of business on the date of receipt by the transfer agent (or by the Corporation if the Corporation serves as its own transfer agent) of such certificates (or lost certificate affidavit and agreement) and notice shall be the time of conversion (the "**Conversion Time**"), and the shares of Common Stock issuable upon conversion of the shares represented by such certificate shall be deemed to be outstanding of record as of such date. The Corporation shall, as soon as practicable after the Conversion Time, (i) issue and deliver to such holder of Series D Preferred Stock, or to his, her or its nominees, a certificate or certificates for the number of full shares of Common Stock

issuable upon such conversion in accordance with the provisions hereof and a certificate for the number (if any) of the shares of Series D Preferred Stock represented by the surrendered certificate that were not converted into Common Stock, (ii) pay in cash such amount as provided in Subsection 4.2 in lieu of any fraction of a share of Common Stock otherwise issuable upon such conversion and (iii) pay all accrued or declared but unpaid dividends on the shares of Series D Preferred Stock converted.

4.3.2 Reservation of Shares. The Corporation shall at all times when the Series D Preferred Stock shall be outstanding, reserve and keep available out of its authorized but unissued capital stock, for the purpose of effecting the conversion of the Series D Preferred Stock, such number of its duly authorized shares of Common Stock as shall from time to time be sufficient to effect the conversion of all outstanding Series D Preferred Stock; and if at any time the number of authorized but unissued shares of Common Stock shall not be sufficient to effect the conversion of all then outstanding shares of the Series D Preferred Stock, the Corporation shall take such corporate action as may be necessary to increase its authorized but unissued shares of Common Stock to such number of shares as shall be sufficient for such purposes, including, without limitation, engaging in best efforts to obtain the requisite stockholder approval of any necessary amendment to the Certificate of Incorporation. Before taking any action which would cause an adjustment reducing the Series D Conversion Price below the then par value of the shares of Common Stock issuable upon conversion of the Series D Preferred Stock, the Corporation will take any corporate action which may, in the opinion of its counsel, be necessary in order that the Corporation may validly and legally issue fully paid and nonassessable shares of Common Stock at such adjusted Series D Conversion Price.

4.3.3 Effect of Conversion. All shares of Series D Preferred Stock which shall have been surrendered for conversion as herein provided shall no longer be deemed to be outstanding and all rights with respect to such shares shall immediately cease and terminate at the Conversion Time, except only the right of the holders thereof to receive shares of Common Stock in exchange therefor, to receive payment in lieu of any fraction of a share otherwise issuable upon such conversion as provided in Subsection 4.2 and to receive payment of any dividends accrued or declared but unpaid thereon. Any shares of Series D Preferred Stock so converted shall be retired and cancelled and may not be reissued as shares of such series, and the Corporation may thereafter take such appropriate action (without the need for stockholder action) as may be necessary to reduce the authorized number of shares of Series D Preferred Stock accordingly.

4.3.4 No Further Adjustment. Upon any such conversion, no adjustment to the Series D Conversion Price shall be made for any declared but unpaid dividends on the Series D Preferred Stock surrendered for conversion or on the Common Stock delivered upon conversion.

4.3.5 Taxes. The Corporation shall pay any and all issue and other similar taxes that may be payable in respect of any issuance or delivery of shares of Common Stock upon conversion of shares of Series D Preferred Stock pursuant to this Section 4. The Corporation shall not, however, be required to pay any tax which may be payable in respect of any transfer involved in the issuance and delivery of shares of Common Stock in a name other than that in which the shares of Series D Preferred Stock so converted were registered, and no

such issuance or delivery shall be made unless and until the person or entity requesting such issuance has paid to the Corporation the amount of any such tax or has established, to the satisfaction of the Corporation, that such tax has been paid.

4.4 Adjustments to Series D Conversion Price for Diluting Issues.

4.4.1 Special Definitions. For purposes of this Article Fourth, the following definitions shall apply:

(a) "**Option**" shall mean rights, options or warrants to subscribe for, purchase or otherwise acquire Common Stock or Convertible Securities.

(b) "**Series D Original Issue Date**" shall mean the date on which the first share of Series D Preferred Stock was issued.

(c) "**Convertible Securities**" shall mean any evidences of indebtedness, shares or other securities directly or indirectly convertible into or exchangeable for Common Stock, but excluding Options.

(d) "**Additional Shares of Common Stock**" shall mean all shares of Common Stock issued (or, pursuant to Subsection 4.4.3 below, deemed to be issued) by the Corporation after the Series D Original Issue Date, other than (1) the following shares of Common Stock and (2) shares of Common Stock deemed issued pursuant to the following Options and Convertible Securities (clauses (1) and (2), collectively, "**Exempted Securities**"):

(i) shares of Common Stock, Options or Convertible Securities issued as a dividend or distribution on Series D Preferred Stock;

(ii) shares of Common Stock, Options or Convertible Securities issued by reason of a dividend, stock split, split-up or other distribution on shares of Common Stock that is covered by Subsection 4.5, 4.6, 4.7 or 4.8;

(iii) shares of Common Stock or Options issued to employees or directors of, or consultants or advisors to, the Corporation or any of its subsidiaries pursuant to a plan, agreement or arrangement approved by the Board of Directors of the Corporation;

(iv) shares of Common Stock or Convertible Securities actually issued upon the exercise of Options or shares of Common Stock actually issued upon the conversion or exchange of Convertible Securities, in each case provided such issuance is pursuant to the terms of such Option or Convertible Security;

(v) shares of Common Stock, Options or Convertible Securities issued as payments of interest on notes or other indebtedness of the Company;

(vi) shares of Common Stock, Options or Convertible Securities issued to banks, equipment lessors or other financial institutions, or to real property lessors, pursuant to a debt financing, equipment leasing or real property leasing transaction approved by the Board of Directors of the Corporation;

(vii) shares of Common Stock, Options or Convertible Securities issued to suppliers or third party service providers in connection with the provision of goods or services, including placement agents, pursuant to transactions approved by the Board of Directors of the Corporation;

(viii) shares of Common Stock, Options or Convertible Securities issued pursuant to the acquisition of another corporation by the Corporation by merger, purchase of substantially all of the assets or other reorganization or to a joint venture agreement, provided, that such issuances are approved by the Board of Directors of the Corporation; or

(ix) shares of Common Stock, Options or Convertible Securities issued in connection with sponsored research, collaboration, technology license, development, marketing or other similar agreements or strategic partnerships approved by the Board of Directors of the Corporation.

4.4.2 No Adjustment of Series D Conversion Price. No adjustment in the Series D Conversion Price shall be made as the result of the issuance or deemed issuance of Additional Shares of Common Stock if the Corporation receives written notice from the Requisite Holders agreeing that no such adjustment shall be made as the result of the issuance or deemed issuance of such Additional Shares of Common Stock. The term "Requisite Holders" shall mean the holders of at least a majority of the then outstanding shares of Series D Preferred Stock.

4.4.3 Deemed Issue of Additional Shares of Common Stock.

(a) If the Corporation at any time or from time to time after the Series D Original Issue Date shall issue any Options or Convertible Securities (excluding Options or Convertible Securities which are themselves Exempted Securities) or shall fix a record date for the determination of holders of any class of securities entitled to receive any such

Options or Convertible Securities, then the maximum number of shares of Common Stock (as set forth in the instrument relating thereto, assuming the satisfaction of any conditions to exercisability, convertibility or exchangeability but without regard to any provision contained therein for a subsequent adjustment of such number) issuable upon the exercise of such Options or, in the case of Convertible Securities and Options therefor, the conversion or exchange of such Convertible Securities, shall be deemed to be Additional Shares of Common Stock issued as of the time of such issue or, in case such a record date shall have been fixed, as of the close of business on such record date.

(b) If the terms of any Option or Convertible Security, the issuance of which resulted in an adjustment to the Series D Conversion Price pursuant to the terms of Subsection 4.4.4, are revised as a result of an amendment to such terms or any other adjustment pursuant to the provisions of such Option or Convertible Security (but excluding automatic adjustments to such terms pursuant to anti-dilution or similar provisions of such Option or Convertible Security) to provide for either (1) any increase or decrease in the number of shares of Common Stock issuable upon the exercise, conversion and/or exchange of any such Option or Convertible Security or (2) any increase or decrease in the consideration payable to the Corporation upon such exercise, conversion and/or exchange, then, effective upon such increase or decrease becoming effective, the Series D Conversion Price computed upon the original issue of such Option or Convertible Security (or upon the occurrence of a record date with respect thereto) shall be readjusted to such Series D Conversion Price as would have obtained had such revised terms been in effect upon the original date of issuance of such Option or Convertible Security. Notwithstanding the foregoing, no readjustment pursuant to this clause (b) shall have the effect of increasing the Series D Conversion Price to an amount which exceeds the lower of (i) the Series D Conversion Price in effect immediately prior to the original adjustment made as a result of the issuance of such Option or Convertible Security, or (ii) the Series D Conversion Price that would have resulted from any issuances of Additional Shares of Common Stock (other than deemed issuances of Additional Shares of Common Stock as a result of the issuance of such Option or Convertible Security) between the original adjustment date and such readjustment date.

(c) If the terms of any Option or Convertible Security (excluding Options or Convertible Securities which are themselves Exempted Securities), the issuance of which did not result in an adjustment to the Series D Conversion Price pursuant to the terms of Subsection 4.4.4 (either because the consideration per share (determined pursuant to Subsection 4.4.5) of the Additional Shares of Common Stock subject thereto was equal to or greater than the Series D Conversion Price then in effect, or because such Option or Convertible Security was issued before the Series D Original Issue Date), are revised after the Series D Original Issue Date as a result of an amendment to such terms or any other adjustment pursuant to the provisions of such Option or Convertible Security (but excluding automatic adjustments to such terms pursuant to anti-dilution or similar provisions of such Option or Convertible Security) to provide for either (1) any increase in the number of shares of Common Stock issuable upon the exercise, conversion or exchange of any such Option or Convertible Security or (2) any decrease in the consideration payable to the Corporation upon such exercise, conversion or exchange, then such Option or Convertible Security, as so amended or adjusted, and the Additional Shares of Common Stock subject thereto (determined in the manner provided in Subsection 4.4.3(a)) shall be deemed to have been issued effective upon such increase or decrease becoming effective.

(d) Upon the expiration or termination of any unexercised Option or unconverted or unexchanged Convertible Security (or portion thereof) which resulted (either upon its original issuance or upon a revision of its terms) in an adjustment to the Series D Conversion Price pursuant to the terms of Subsection 4.4.4, the Series D Conversion Price shall be readjusted to such Series D Conversion Price as would have obtained had such Option or Convertible Security (or portion thereof) never been issued.

(e) If the number of shares of Common Stock issuable upon the exercise, conversion and/or exchange of any Option or Convertible Security, or the consideration payable to the Corporation upon such exercise, conversion and/or exchange, is calculable at the time such Option or Convertible Security is issued or amended but is subject to adjustment based upon subsequent events, any adjustment to the Series D Conversion Price provided for in this Subsection 4.4.3 shall be effected at the time of such issuance or amendment based on such number of shares or amount of consideration without regard to any provisions for subsequent adjustments (and any subsequent adjustments shall be treated as provided in clauses (b) and (c) of this Subsection 4.4.3). If the number of shares of Common Stock issuable upon the exercise, conversion and/or exchange of any Option or Convertible Security, or the consideration payable to the Corporation upon such exercise, conversion and/or exchange, cannot be calculated at all at the time such Option or Convertible Security is issued or amended, any adjustment to the Series D Conversion Price that would result under the terms of this Subsection 4.4.3 at the time of such issuance or amendment shall instead be effected at the time such number of shares and/or amount of consideration is first calculable (even if subject to subsequent adjustments), assuming for purposes of calculating such adjustment to the Series D Conversion Price that such issuance or amendment took place at the time such calculation can first be made.

4.4.4 Adjustment of Series D Conversion Price Upon Issuance of Additional Shares of Common Stock. In the event the Corporation shall at any time after the Series D Original Issue Date issue Additional Shares of Common Stock (including Additional Shares of Common Stock deemed to be issued pursuant to Subsection 4.4.3), without consideration or for a consideration per share less than $1.46 (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Common Stock), then the Series D Conversion Price shall be reduced, concurrently with such issue, to a price (calculated to the nearest one-hundredth of a cent) determined in accordance with the formula below; provided, however that in no event shall the Series D Conversion Price hereunder be reduced under this Section 4.4.4 to a price that is less than $1.46 (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Common Stock):

$$CP_2 = CP_1 * (A + B) \div (A + C).$$

For purposes of the foregoing formula, the following definitions shall apply:

(a) "CP_2" shall mean the Series D Conversion Price in effect immediately after such issue of Additional Shares of Common Stock

(b) "CP_1" shall mean the Series D Conversion Price in effect immediately prior to such issue of Additional Shares of Common Stock;

(c) "A" shall mean the number of shares of Common Stock outstanding immediately prior to such issue of Additional Shares of Common Stock (treating for this purpose as outstanding all shares of Common Stock issuable upon exercise of Options outstanding immediately prior to such issue or upon conversion or exchange of Convertible Securities (including the Series D Preferred Stock) outstanding (assuming exercise of any outstanding Options therefor) immediately prior to such issue);

(d) "B" shall mean the number of shares of Common Stock that would have been issued if such Additional Shares of Common Stock had been issued at a price per share equal to CP_1 (determined by dividing the aggregate consideration received by the Corporation in respect of such issue by CP_1); and

(e) "C" shall mean the number of such Additional Shares of Common Stock issued in such transaction.

4.4.5 Determination of Consideration. For purposes of this Subsection 4.4, the consideration received by the Corporation for the issue of any Additional Shares of Common Stock shall be computed as follows:

(a) Cash and Property: Such consideration shall:

(i) insofar as it consists of cash, be computed at the aggregate amount of cash received by the Corporation, excluding amounts paid or payable for accrued interest;

(ii) insofar as it consists of property other than cash, be computed at the fair market value thereof at the time of such issue, as determined in good faith by the Board of Directors of the Corporation; and

(iii) in the event Additional Shares of Common Stock are issued together with other shares or securities or other assets of the Corporation for consideration which covers both, be the proportion of such consideration so received, computed as provided in clauses (i) and (ii) above, as determined in good faith by the Board of Directors of the Corporation.

(b) Options and Convertible Securities. The consideration per share received by the Corporation for Additional Shares of Common Stock deemed to have been issued pursuant to Subsection 4.4.3, relating to Options and Convertible Securities, shall be determined by dividing

(i) the total amount, if any, received or receivable by the Corporation as consideration for the issue of such Options or Convertible Securities, plus the minimum aggregate amount of additional consideration (as set forth in the instruments relating thereto, without regard to any provision contained therein for a subsequent adjustment of such consideration) payable to the Corporation upon the exercise of such Options or the conversion or exchange of such Convertible Securities, or in the case of Options for Convertible Securities, the exercise of such Options for Convertible Securities and the conversion or exchange of such Convertible Securities, by

(ii) the maximum number of shares of Common Stock (as set forth in the instruments relating thereto, without regard to any provision contained therein for a subsequent adjustment of such number) issuable upon the exercise of such Options or the conversion or exchange of such Convertible Securities, or in the case of Options for Convertible Securities, the exercise of such Options for Convertible Securities and the conversion or exchange of such Convertible Securities.

4.4.6 Multiple Closing Dates. In the event the Corporation shall issue on more than one date Additional Shares of Common Stock that are a part of one transaction or a series of related transactions and that would result in an adjustment to the Series D Conversion Price pursuant to the terms of Subsection 4.4.4, and such issuance dates occur within a period of no more than 90 days from the first such issuance to the final such issuance, then, upon the final such issuance, the Series D Conversion Price shall be readjusted to give effect to all such issuances as if they occurred on the date of the first such issuance (and without giving effect to any additional adjustments as a result of any such subsequent issuances within such period).

4.5 Adjustment for Stock Splits and Combinations. If the Corporation shall at any time or from time to time after the Series D Original Issue Date effect a subdivision of the outstanding Common Stock, the Series D Conversion Price in effect immediately before that subdivision shall be proportionately decreased so that the number of shares of Common Stock issuable on conversion of each share of such series shall be increased in proportion to such increase in the aggregate number of shares of Common Stock outstanding. If the Corporation shall at any time or from time to time after the Series D Original Issue Date combine the outstanding shares of Common Stock, the Series D Conversion Price in effect immediately before the combination shall be proportionately increased so that the number of shares of

Common Stock issuable on conversion of each share of such series shall be decreased in proportion to such decrease in the aggregate number of shares of Common Stock outstanding. Any adjustment under this subsection shall become effective at the close of business on the date the subdivision or combination becomes effective.

4.6 Adjustment for Certain Dividends and Distributions. In the event the Corporation at any time or from time to time after the Series D Original Issue Date shall make or issue, or fix a record date for the determination of holders of Common Stock entitled to receive, a dividend or other distribution payable on the Common Stock in additional shares of Common Stock, then and in each such event the Series D Conversion Price in effect immediately before such event shall be decreased as of the time of such issuance or, in the event such a record date shall have been fixed, as of the close of business on such record date, by multiplying the Series D Conversion Price then in effect by a fraction:

(1) the numerator of which shall be the total number of shares of Common Stock issued and outstanding immediately prior to the time of such issuance or the close of business on such record date, and

(2) the denominator of which shall be the total number of shares of Common Stock issued and outstanding immediately prior to the time of such issuance or the close of business on such record date plus the number of shares of Common Stock issuable in payment of such dividend or distribution.

Notwithstanding the foregoing, (a) if such record date shall have been fixed and such dividend is not fully paid or if such distribution is not fully made on the date fixed therefor, the Series D Conversion Price shall be recomputed accordingly as of the close of business on such record date and thereafter the Series D Conversion Price shall be adjusted pursuant to this subsection as of the time of actual payment of such dividends or distributions; and (b) no such adjustment shall be made if the holders of Series D Preferred Stock simultaneously receive a dividend or other distribution of shares of Common Stock in a number equal to the number of shares of Common Stock as they would have received if all outstanding shares of Series D Preferred Stock had been converted into Common Stock on the date of such event.

4.7 Adjustments for Other Dividends and Distributions. In the event the Corporation at any time or from time to time after the Series D Original Issue Date shall make or issue, or fix a record date for the determination of holders of Common Stock entitled to receive, a dividend or other distribution payable in securities of the Corporation (other than a distribution of shares of Common Stock in respect of outstanding shares of Common Stock) or in other property and the provisions of Section 1 do not apply to such dividend or distribution, then and in each such event the holders of Series D Preferred Stock shall receive, simultaneously with the distribution to the holders of Common Stock, a dividend or other distribution of such securities or other property in an amount equal to the amount of such securities or other property as they would have received if all outstanding shares of Series D Preferred Stock had been converted into Common Stock on the date of such event.

4.8 Adjustment for Merger or Reorganization, etc. If there shall occur any reorganization, recapitalization, reclassification, consolidation or merger involving the Corporation in which the Common Stock (but not the Series D Preferred Stock) is converted into or exchanged for securities, cash or other property (other than a transaction covered by Subsections 4.4, 4.6 or 4.7), then, following any such reorganization, recapitalization, reclassification, consolidation or merger, each share of Series D Preferred Stock shall thereafter be convertible in lieu of the Common Stock into which it was convertible prior to such event into the kind and amount of securities, cash or other property which a holder of the number of shares of Common Stock of the Corporation issuable upon conversion of one share of Series D Preferred Stock immediately prior to such reorganization, recapitalization, reclassification, consolidation or merger would have been entitled to receive pursuant to such transaction; and, in such case, appropriate adjustment (as determined in good faith by the Board of Directors of the Corporation) shall be made in the application of the provisions in this Section 4 with respect to the rights and interests thereafter of the holders of the Series D Preferred Stock, to the end that the provisions set forth in this Section 4 (including provisions with respect to changes in and other adjustments of the Series D Conversion Price) shall thereafter be applicable, as nearly as reasonably may be, in relation to any securities or other property thereafter deliverable upon the conversion of the Series D Preferred Stock.

4.9 Certificate as to Adjustments. Upon the occurrence of each adjustment or readjustment of the Series D Conversion Price pursuant to this Section 4, the Corporation at its expense shall, as promptly as reasonably practicable but in any event not later than 10 days thereafter, compute such adjustment or readjustment in accordance with the terms hereof and furnish to each holder of Series D Preferred Stock a certificate setting forth such adjustment or readjustment (including the kind and amount of securities, cash or other property into which the Series D Preferred Stock is convertible) and showing in detail the facts upon which such adjustment or readjustment is based. The Corporation shall, as promptly as reasonably practicable after the written request at any time of any holder of Series D Preferred Stock (but in any event not later than 10 days thereafter), furnish or cause to be furnished to such holder a certificate setting forth (i) the Series D Conversion Price then in effect, and (ii) the number of shares of Common Stock and the amount, if any, of other securities, cash or property which then would be received upon the conversion of Series D Preferred Stock.

4.10 Notice of Record Date. In the event:

(a) the Corporation shall take a record of the holders of its Common Stock (or other capital stock or securities at the time issuable upon conversion of the Series D Preferred Stock) for the purpose of entitling or enabling them to receive any dividend or other distribution, or to receive any right to subscribe for or purchase any shares of capital stock of any class or any other securities, or to receive any other security; or

(b) of any capital reorganization of the Corporation, any reclassification of the Common Stock of the Corporation, or any consolidation or merger of the Corporation; or

(c) of the voluntary or involuntary dissolution, liquidation or winding-up of the Corporation,

then, and in each such case, the Corporation will send or cause to be sent to the holders of the Series D Preferred Stock a notice specifying, as the case may be, (i) the record date for such dividend, distribution or right, and the amount and character of such dividend, distribution or right, or (ii) the effective date on which such reorganization, reclassification, consolidation, merger, transfer, dissolution, liquidation or winding-up is proposed to take place, and the time, if any is to be fixed, as of which the holders of record of Common Stock (or such other capital stock or securities at the time issuable upon the conversion of the Series D Preferred Stock) shall be entitled to exchange their shares of Common Stock (or such other capital stock or securities) for securities or other property deliverable upon such reorganization, reclassification, consolidation, merger, transfer, dissolution, liquidation or winding-up, and the amount per share and character of such exchange applicable to the Series D Preferred Stock and the Common Stock. Such notice shall be sent at least 10 days prior to the record date or effective date for the event specified in such notice.

5. Redemption by Corporation.

5.1 Redemption. Shares of Series D Preferred Stock may be redeemed by the Corporation out of funds lawfully available therefor at a price equal to the Series D Original Issue Price per share, plus all accrued or declared but unpaid dividends thereon (the "**Redemption Price**"), at any time after November 4, 2013, if the closing sales price of the Common Stock for 20 or more trading days in a period of 30 consecutive trading days is equal to or greater than 200% of the Series D Conversion Price, provided that the Corporation provides written notice of such redemption to each holder of Series D Preferred Stock within 30 days of the end of such 30 consecutive trading day period (the "**Redemption Notice**"). The Corporation shall send the Redemption Notice to each holder of record of Series D Preferred Stock not less than 30 days prior to the date fixed by the Corporation for such redemption (the "**Redemption Date**"). The Redemption Notice shall state:

(a) the Redemption Date and the Redemption Price;

(b) the date upon which the holder's right to convert such shares terminates (as determined in accordance with Subsection 4.1); and

(c) that the holder is to surrender to the Corporation, in the manner and at the place designated, his, her or its certificate or certificates representing the shares of Series D Preferred Stock to be redeemed.

5.2 Surrender of Certificates; Payment. On or before the Redemption Date, each holder of shares of Series D Preferred Stock, unless such holder has exercised his, her or its right to convert such shares as provided in Section 4, shall surrender the certificate or certificates representing such shares (or, if such registered holder alleges that such certificate has been lost, stolen or destroyed, a lost certificate affidavit and agreement reasonably acceptable to the Corporation to indemnify the Corporation against any claim that may be made against the Corporation on account of the alleged loss, theft or destruction of such certificate) to the Corporation, in the manner and at the place designated in the Redemption Notice, and thereupon the Redemption Price for such shares shall be payable to the order of the person whose name appears on such certificate or certificates as the owner thereof.

5.3 Rights Subsequent to Redemption. If the Redemption Notice shall have been duly given, and if on the Redemption Date the Redemption Price payable upon redemption of the shares of Series D Preferred Stock is paid or tendered for payment or deposited with an independent payment agent so as to be available therefor in a timely manner, then notwithstanding that the certificates evidencing any of the shares of Series D Preferred Stock so called for redemption shall not have been surrendered, dividends with respect to such shares of Series D Preferred Stock shall cease to accrue after such Redemption Date and all rights with respect to such shares shall forthwith after the Redemption Date terminate, except only the right of the holders to receive the Redemption Price without interest upon surrender of their certificate or certificates therefor.

6. Fundamental Change Redemption.

6.1 Fundamental Change. Upon the occurrence of a Fundamental Change, each holder of shares of Series D Preferred Stock may, at its sole option, require the Corporation to purchase all or a portion of its shares of Series D Preferred Stock (the "**Fundamental Change Redemption**") at a price equal to Redemption Price. A "Fundamental Change" shall mean any of the following events:

(a) any "person" or "group" (each term as defined in the Exchange Act) that is not an affiliate of any holder of shares of Series D Preferred Stock becoming the "beneficial owner" (as defined in the Exchange Act) of voting securities of the Corporation, representing 66 2/3% or more of the outstanding voting securities of the Corporation (treating all securities convertible or exchangeable into or exercisable for shares of Common Stock as having been fully converted, exchanged and exercised, without regard to any exercise, conversion or exchange limitations therein) other than in connection with a transaction described in clause (d) below;

(b) the recapitalization or reclassification of the Common Stock of the Corporation;

(c) a sale of all or substantially all of the assets of the Corporation's assets to a person that is not an affiliate of any holder of shares of Series D Preferred Stock; or

(d) a merger, consolidation, business combination or similar transaction the result of which a "person" or "group" (each as defined in the Exchange Act) that is not an affiliate of any holder of shares of Series D Preferred Stock owns voting securities representing 66 2/3% or more of the outstanding voting securities of the surviving entity upon completion of such transaction.

6.2 Exercise of Fundamental Change Redemption Option. The Company shall send a written notice (the "**Fundamental Change Notice**") to each holder of shares of Series D Preferred Stock of (i) the occurrence of a Fundamental Change described in Subsection 6.1(a) above, within 10 days of the Corporation's becoming aware of the occurrence of such Fundamental Change, and (ii) a Fundamental Change described in Subsection 6.1(b)-(d) above, in accordance with Section 4.10. The Fundamental Change Notice shall describe the

Fundamental Change and state that each holder of shares of Series D Preferred Stock has the right to require a Fundamental Change Redemption. In order to require a Fundamental Change Redemption, a holder of Series D Preferred Stock must deliver written notice to the Corporation requesting the Fundamental Change Redemption within five days after the date of the Fundamental Change Notice and stating the number of shares of Series D Preferred Stock to be redeemed. Unless prohibited by Delaware law governing distributions to stockholders, the Corporation shall redeem the shares of Series D Preferred Stock requested to be redeemed at a price equal to the Redemption Price and on a date to be fixed by the Corporation which shall not be more than 30 days from the date of the last timely delivered Fundamental Change Redemption request. If, on the date of the Fundamental Change Redemption, Delaware law governing distributions to stockholders prevents the Corporation from redeeming all shares of Series D Preferred Stock to be redeemed, the Corporation shall ratably redeem the maximum number of shares that it may redeem consistent with such law, and shall redeem the remaining shares as soon as it may lawfully do so under such law.

6.3 Redemption Notice. Following receipt of a timely request for a Fundamental Change Redemption by a holder of Series D Preferred Stock, the Corporation shall send written notice of the mandatory redemption to the holder stating:

(a) the date fixed for the Fundamental Redemption (the "**Fundamental Redemption Date**") and the Redemption Price;

(b) the date upon which the holder's right to convert such shares terminates (as determined in accordance with Subsection 4.1); and

(c) that the holder is to surrender to the Corporation, in the manner and at the place designated, his, her or its certificate or certificates representing the shares of Series D Preferred Stock to be redeemed.

6.4 Surrender of Certificates; Payment. On or before the Fundamental Redemption Date, each holder of shares of Series D Preferred Stock to be redeemed on such Redemption Date, unless such holder has exercised his, her or its right to convert such shares as provided in Section 4, shall surrender the certificate or certificates representing such shares (or, if such registered holder alleges that such certificate has been lost, stolen or destroyed, a lost certificate affidavit and agreement reasonably acceptable to the Corporation to indemnify the Corporation against any claim that may be made against the Corporation on account of the alleged loss, theft or destruction of such certificate) to the Corporation, in the manner and at the place designated in the notice from the Corporation, and thereupon the Redemption Price for such shares shall be payable to the order of the person whose name appears on such certificate or certificates as the owner thereof. In the event less than all of the shares of Series D Preferred Stock represented by a certificate are redeemed, a new certificate representing the unredeemed shares of Series D Preferred Stock shall promptly be issued to such holder.

6.5 Rights Subsequent to Redemption. If on the Fundamental Redemption Date the Redemption Price payable upon redemption of the shares of the Series D Preferred Stock to be redeemed on such Redemption Date is paid or tendered for payment or deposited with an independent payment agent so as to be available therefor in a timely manner, then

notwithstanding that the certificates evidencing any of the shares of Series D Preferred Stock so called for redemption shall not have been surrendered, dividends with respect to such shares of Series D Preferred Stock shall cease to accrue after such Redemption Date and all rights with respect to such shares shall forthwith after the Fundamental Redemption Date terminate, except only the right to the holders to receive the Redemption Price without interest upon surrender of their certificate or certificates therefor.

6.6 Fundamental Change and Dividends. Upon the occurrence of a Fundamental Change as described in Subsection 6.1(c)-(d), the Company's obligation to pay Series D Preferred Dividends shall terminate.

7. Redeemed or Otherwise Acquired Shares. Any shares of Series D Preferred Stock that are redeemed or otherwise acquired by the Corporation or any of its subsidiaries shall be automatically and immediately cancelled and retired and shall not be reissued, sold or transferred. Neither the Corporation nor any of its subsidiaries may exercise any voting or other rights granted to the holders of Series D Preferred Stock following redemption.

8. Waiver. Any of the rights, powers, preferences and other terms of the Series D Preferred Stock set forth herein may be waived on behalf of all holders of Series D Preferred Stock by the affirmative written consent or vote of the Requisite Holders.

9. Notices. Any notice required or permitted to be given to a holder of shares of Series D Preferred Stock shall be mailed, postage prepaid, to the post office address last shown on the records of the Corporation, or given by electronic communication in compliance with the provisions of the General Corporation Law, and shall be deemed sent upon such mailing or electronic transmission.

IN WITNESS WHEREOF, this Certificate of Designations has been executed by a duly authorized officer of this corporation on this 4th day of November, 2011.

By: /s/ Sudhir Agrawal
Chief Executive Officer

CERTIFICATE OF AMENDMENT
TO THE
RESTATED CERTIFICATE OF INCORPORATION
OF
IDERA PHARMACEUTICALS, INC.

Idera Pharmaceuticals, Inc. (hereinafter called the "Corporation"), organized and existing under and by virtue of the General Corporation Law of the State of Delaware, does hereby certify as follows:

By action of the Board of Directors of the Corporation at a meeting held on March 27, 2012, the Board of Directors of the Corporation duly adopted a resolution, pursuant to Section 242 of the General Corporation Law of the State of Delaware, setting forth an amendment to the Restated Certificate of Incorporation of the Corporation, as amended to date (the "Certificate of Incorporation"), and declaring said amendment to be advisable. The stockholders of the Corporation duly approved said proposed amendment in accordance with Section 242 of the General Corporation Law of the State of Delaware at a meeting of stockholders held on June 12, 2012. The resolution setting forth the amendment is as follows:

RESOLVED: That the first paragraph of Article FOURTH of the Certificate of Incorporation be and hereby is amended and restated in its entirety so that the same shall read as follows:

"FOURTH. The total number of shares of all classes of stock which the Corporation shall have authority to issue is (i) One Hundred Forty Million (140,000,000) shares of Common Stock, $.001 par value per share ("Common Stock"), and (ii) Five Million (5,000,000) shares of Preferred Stock, $.01 par value per share ("Preferred Stock"), which may be issued from time to time in one or more series as set forth in Part B of this Article FOURTH."

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to be signed by its duly authorized officer this 13th day of June, 2012.

IDERA PHARMACEUTICALS, INC.

By: /s/ Sudhir Agrawal
Chief Executive Officer

CERTIFICATE OF DESIGNATIONS, PREFERENCES AND RIGHTS

OF

SERIES E PREFERRED STOCK

OF

IDERA PHARMACEUTICALS, INC.

(Pursuant to Section 151 of
the Delaware General Corporation Law)

Idera Pharmaceuticals, Inc. (the "**Corporation**"), a corporation organized and existing under the laws of the State of Delaware, hereby certifies that, pursuant to authority conferred on its Board of Directors (the "**Board**") by the Restated Certificate of Incorporation of the Corporation, as amended (the "**Certificate of Incorporation**"), the following resolution was adopted by the Board at a meeting duly called and held on November 9, 2012, which resolution remains in full force and effect on the date hereof:

RESOLVED, that there is hereby created and established a series of the Corporation's authorized Preferred Stock (the "**Preferred Stock**") having a par value of $0.01 per share, which series shall be designated as "Series E Convertible Preferred Stock" (the "**Series E Preferred Stock**") and shall consist of 424,242 shares. The shares of Series E Preferred Stock shall have the voting powers, designations, preferences and other special rights, and qualifications, limitations and restrictions thereof set forth below:

1. Dividends.

1.1 Each holder of Series E Preferred Stock shall be entitled to receive with respect to each share of Series E Preferred Stock then outstanding and held by such holder of Series E Preferred Stock, dividends, commencing from the date of issuance of such share of Series E Preferred Stock, at the Initial Dividend Rate (as defined below) per annum (on the basis of a 360 day year) of the Series E Original Issue Price (as defined below) (the "**Series E Preferred Dividends**"); provided, however, that subject to and effective upon the filing with the Delaware Secretary of State of the amendment to the Certificate of Designations, Preferences and Rights of Series D Preferred Stock (the "**Series D Certificate of Designations**," with the amendment thereto being referred to as the "**Amendment to Series D Certificate of Designations**") as described in Section 5.11(B) of that certain Convertible Preferred Stock and Warrant Purchase Agreement, dated November 9, 2012, between the Corporation and the purchasers of the Series E Preferred Stock therein (the "**Series E Purchase Agreement**"), the dividend rate provided for in this Section 1.1 shall be increased from the Initial Dividend Rate to the rate of eight percent (8%) per annum (on the basis of a 360 day year) of the Series E Original Issue Price. The Series E Preferred Dividends shall be cumulative, whether or not earned or declared, shall be paid quarterly in arrears on the last day of March, June, September and December (a "**Quarterly Dividend Payment Date**") in each year that Series E Preferred Stock is outstanding, with the first Quarterly Dividend Payment Date being March 31, 2013, and shall be prorated for periods shorter than one

quarter. Notwithstanding the foregoing, if, as of any Quarterly Dividend Payment Date at which the dividend rate is the Initial Dividend Rate, there are no shares of the Corporation's Series D Convertible Preferred Stock outstanding, then the dividend payable on such Quarterly Dividend Payment Date shall be calculated and paid at a rate of eight percent (8%) per annum (on the basis of a 360 day year) of the Series E Original Issue Price. In the event that the Amendment to Series D Certificate of Designations is filed with the Delaware Secretary of State and the dividend rate with respect to the Series E Preferred Dividends is increased pursuant to this Section 1.1, the Series E Preferred Dividends paid on the first Quarterly Dividend Payment Date after such filing and increase shall be paid at the increased rate. In the event that the Amendment to Series D Certificate of Designations is submitted to the stockholders of the Corporation as contemplated by Section 5.11 of the Series E Purchase Agreement and the Amendment to Series D Certificate of Designations is not approved, then the holders of the Series E Preferred Stock shall no longer be entitled to any Series E Preferred Dividends under this Section 1.1 and the Corporation shall have no further obligation to pay the Series E Preferred Dividends under this Section 1.1; provided, however, the Corporation shall not submit the Amendment to the Series D Certificate of Designations to the stockholders if there are no shares of Series D Preferred Stock then outstanding. The rights of a holder of Series E Preferred Stock to Series E Preferred Dividends shall rank senior to the rights of the Corporation's Series A Convertible Preferred Stock and Series D Convertible Preferred Stock as to dividends. The Series E Preferred Dividends shall be paid to each holder of Series E Preferred Stock in cash out of legally available funds. The term "**Initial Dividend Rate**" shall mean four and six tenths percent (4.6%) or such other percentage approved by the Corporation and by the holders of at least a majority of then outstanding shares of Series E Preferred Stock, with such approval given in writing or by vote at a meeting, consenting or voting (as the case may be) as a separate class.

1.2 Notwithstanding the foregoing, if any Series E Preferred Dividend is not paid by the Corporation within five trading days following a Quarterly Dividend Payment Date, such Series E Preferred Dividend shall continue to accrue and the Corporation shall be obligated to pay the holders a late fee with respect to such Series E Preferred Dividend, which shall be paid by the Corporation in cash, at the rate of sixteen percent (16%) per annum (or such lesser rate permitted by applicable law) (the "**Dividend Late Fee**"), and shall accrue daily from the applicable Quarterly Dividend Payment Date through and including the date the Corporation pays such Series E Preferred Dividend plus the Dividend Late Fee in full (which amount shall be paid as liquidated damages and not as a penalty); provided however, that no Dividend Late Fee shall accrue or be owed with respect to any Series E Preferred Dividend that the Corporation is not permitted to pay under Delaware law.

1.3 The Corporation shall not declare, pay or set aside any dividends on shares of any other class or series of capital stock of the Corporation (other than dividends on shares of the Corporation's Common Stock, par value $0.001 per share (the "**Common Stock**") payable in shares of Common Stock, dividends on the Series A Convertible Preferred Stock in accordance with Section 2(a) of the Certificate of Designations, Preferences and Rights of Series A Convertible Preferred Stock (the "**Series A Certificate of Designations**"), dividends on the Series D Convertible Preferred Stock in accordance with Section 1.1 of the Series D Certificate of

Designations and such dividends on other series or classes of the capital stock of the Corporation as are approved for this exclusion by the holders of at least a majority of the then outstanding shares of Series E Preferred Stock, given in writing or by vote at a meeting, consenting or voting (as the case may be) as a separate class, unless the holders of the Series E Preferred Stock then outstanding shall first receive, or simultaneously receive, a dividend on each outstanding share of Series E Preferred Stock in an amount at least equal to the sum of (i) the amount of the aggregate dividends then accrued on such share of Series E Preferred Stock and not previously paid and (ii) (A) in the case of a dividend on Common Stock or any class or series that is convertible into Common Stock, that dividend per share of Series E Preferred Stock as would equal the product of (1) the dividend payable on each share of such class or series determined, if applicable, as if all shares of such class or series had been converted into Common Stock and (2) the number of shares of Common Stock issuable upon conversion of a share of Series E Preferred Stock, in each case calculated on the record date for determination of holders entitled to receive such dividend or (B) in the case of a dividend on any class or series that is not convertible into Common Stock, at a rate per share of Series E Preferred Stock determined by (1) dividing the amount of the dividend payable on each share of such class or series of capital stock by the original issuance price of such class or series of capital stock (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to such class or series) and (2) multiplying such fraction by an amount equal to the Series E Original Issue Price; provided that, if the Corporation declares, pays or sets aside, on the same date, a dividend on shares of more than one class or series of capital stock of the Corporation, the dividend payable to the holders of Series E Preferred Stock pursuant to this Section 1.3 shall be calculated based upon the dividend on the class or series of capital stock that would result in the highest Series E Preferred Stock dividend.

1.4 The "**Series E Original Issue Price**" shall mean $14.00 per share, subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Series E Preferred Stock.

2. Liquidation, Dissolution or Winding Up; Sale of the Corporation.

2.1 Payments to Holders of Series E Preferred Stock Upon Liquidation.

2.1.1 In the event of any voluntary or involuntary liquidation, dissolution or winding up of the Corporation, the holders of shares of Series E Preferred Stock then outstanding shall be entitled to be paid out of the assets of the Corporation available for distribution to its stockholders before any payment shall be made to the holders of Common Stock, Series A Convertible Preferred Stock, Series D Convertible Preferred Stock or any other class of capital stock of the Corporation ranking junior to the Series E Preferred Stock as to liquidation, by reason of their ownership thereof, an amount per share equal to the greater of (i) the Series E Original Issue Price, plus any dividends accrued or declared but unpaid thereon, and (ii) such amount per share as would have been payable with respect to such share had all shares of Series E Preferred Stock been converted into Common Stock pursuant to Subsection 4 immediately prior to such liquidation, dissolution or winding up disregarding for these purposes the limitations on conversion due to beneficial ownership set forth in Subsection 4.1.2.

2.1.2 If upon any such liquidation, dissolution or winding up of the Corporation, the assets of the Corporation available for distribution to its stockholders shall be insufficient to pay the holders of shares of Series E Preferred Stock the full amount to which they shall be entitled under this Subsection 2.1, the holders of shares of Series E Preferred Stock shall share ratably in any distribution of the assets available for distribution in proportion to the respective amounts which would otherwise be payable in respect of the shares held by them upon such distribution if all amounts payable on or with respect to such shares were paid in full.

2.2 Payments to Holders of Common Stock Upon Liquidation. In the event of any voluntary or involuntary liquidation, dissolution or winding up of the Corporation, after the payment of all preferential amounts required to be paid to the holders of shares of Series E Preferred Stock and subject to any other distribution that may be required with respect to any other series of Preferred Stock, the remaining assets of the Corporation available for distribution to its stockholders shall be distributed among the holders of shares of Common Stock and any class or series of capital stock that participates with the Common Stock in such distributions.

2.3 Sale of the Corporation.

2.3.1 In the event of a Sale of the Corporation (as defined below) after payment shall be made to the holders of Series A Convertible Preferred Stock, Series D Convertible Preferred Stock and any other class of capital stock of the Corporation ranking senior to the Series E Preferred Stock upon a Sale of the Corporation, the remaining assets of the Corporation available for distribution to its stockholders shall be distributed among the holders of the shares of Series E Preferred Stock and Common Stock pro rata based on the number of shares held by each such holder, treating for this purpose all such securities as if they had been converted to Common Stock pursuant to the terms of the Certificate of Incorporation immediately prior to such Sale of the Corporation disregarding for these purposes the limitations on conversion due to beneficial ownership set forth in Subsection 4.1.2.

2.3.2 The term "**Sale of the Corporation**" shall mean each of the following events: (a) a merger or consolidation in which (i) the Corporation is a constituent party or (ii) a subsidiary of the Corporation is a constituent party and the Corporation issues shares of its capital stock pursuant to such merger or consolidation (except in the case of clause (i) and (ii), any such merger or consolidation involving the Corporation or a subsidiary in which the shares of capital stock of the Corporation outstanding immediately prior to such merger or consolidation continue to represent, or are converted into or exchanged for shares of capital stock that represent, immediately following such merger or consolidation, at least a majority, by voting power, of the capital stock of (y) the surviving or resulting corporation or (z) if the surviving or resulting corporation is a wholly owned subsidiary of another corporation immediately following such merger or consolidation, the parent corporation of such surviving or resulting corporation; or (b) the sale, lease, transfer, exclusive license or other disposition, in a single transaction or series of related transactions, by the Corporation or any subsidiary of the Corporation of all or substantially all the assets of the Corporation and its subsidiaries taken as a whole, or the sale or disposition (whether by merger or otherwise) of one or more subsidiaries of the Corporation if substantially all of the assets of the

Corporation and its subsidiaries taken as a whole are held by such subsidiary or subsidiaries, except where such sale, lease, transfer, exclusive license or other disposition is to a wholly owned subsidiary of the Corporation. For the purposes of clarity, a Sale of the Corporation shall not be deemed to be a liquidation, dissolution or winding up of the Corporation for the purposes of this Section 2.

3. Voting.

3.1 Unless and until the stockholders of the Corporation approve the Nasdaq Proposal (as defined by and in accordance with Section 5.11(B) of the Series E Purchase Agreement), the holders of the Series E Preferred Stock shall have no voting rights with respect to any matter presented to the stockholders of the Corporation for their action or consideration at any meeting of stockholders of the Corporation or otherwise, except as otherwise required by applicable law or regulation. Subject to and effective upon the date that the stockholders of the Corporation approve the Nasdaq Proposal, on any matter presented to the stockholders of the Corporation for their action or consideration at any meeting of stockholders of the Corporation, each holder of outstanding shares of Series E Preferred Stock shall be entitled to cast a number of votes equal to the lesser of (a) the number of whole shares of Common Stock into which the shares of Series E Preferred Stock held by such holder are convertible as of the record date for determining stockholders entitled to vote on such matter and (b) the product of the Voting Adjustment Percentage (as defined below) multiplied by the number of whole shares of Common Stock into which the shares of Series E Preferred Stock held by such holder are convertible as of the record date for determining stockholders entitled to vote on such matter. Except as provided by law or by the other provisions of the Certificate of Incorporation, holders of Series E Preferred Stock shall vote together, as a single class, with the holders of Common Stock, Series D Convertible Preferred Stock and any other series or class of the stock of the Corporation that votes together with the holders of Common Stock. The "**Voting Adjustment Percentage**" is determined in accordance with the formula below:

$$X = \left(\frac{\left(35\%\left((A - B) \div 65\% \right) \right) - B}{C} \right)$$

For purposes of the foregoing formula, the following definitions shall apply:

(a) "A" shall mean the number of shares of Common Stock then issued and outstanding plus the number of shares of Common Stock then issuable upon conversion of the Series D Preferred Stock then issued and outstanding and any other series of Preferred Stock (other than the Series E Preferred Stock) then issued and outstanding, and entitled to vote on any matter presented to the stockholders of the Corporation for their action or consideration at any meeting of stockholders of the Corporation;

(b) “B” shall mean the number of shares of Common Stock then issued and outstanding plus the number of shares of Common Stock then issuable upon conversion of the Series D Preferred Stock then issued and outstanding and any other series of Preferred Stock (other than the Series E Preferred Stock) then issued and outstanding, and entitled to vote on any matter presented to the stockholders of the Corporation for their action or consideration at any meeting of stockholders of the Corporation, in each case held by any holders of Series E Preferred Stock or an affiliate of any holders of Series E Preferred Stock;

(c) “C” shall mean the number of shares of Common Stock then issuable upon conversion of the Series E Preferred Stock then issued and outstanding; and

(d) “X” shall mean the Voting Adjustment Percentage.

3.2 Series E Preferred Stock Protective Provisions. At any time when at least 84,849 shares of Series E Preferred Stock (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Series E Preferred Stock) are outstanding, the Corporation shall not, either directly or indirectly by amendment, merger, consolidation or otherwise, do any of the following without (in addition to any other vote required by law or the Certificate of Incorporation) the written consent or affirmative vote of the holders of at least 51% of the then outstanding shares of Series E Preferred Stock, given in writing or by vote at a meeting, consenting or voting (as the case may be) as a separate class, and any such act or transaction entered into without such consent or vote shall be null and void ab initio, and of no force or effect:

3.2.1 amend, alter or repeal any provision of the Certificate of Incorporation or bylaws of the Corporation in a manner that adversely and uniquely affects the powers, preferences or rights of the Series E Preferred Stock;

3.2.2 purchase or redeem (or permit any subsidiary to purchase or redeem) or pay or declare any dividend or make any distribution on, any shares of capital stock of the Corporation other than (i) redemptions of or dividends or distributions on the Series A Preferred Stock and Series D Preferred Stock, (ii) dividends or other distributions payable on the Common Stock solely in the form of additional shares of Common Stock, (iii) repurchases of stock from former employees, officers, directors, consultants or other persons who performed services for the Corporation or any subsidiary in connection with the cessation of such employment or service at the lower of the original purchase price or the then-current fair market value thereof pursuant to agreements between such persons and the Corporation or (iv) redemptions under Subsection 5 below; or

3.2.3 recapitalize or reclassify any of the Common Stock.

4. Optional Conversion.

The holders of the Series E Preferred Stock shall have conversion rights as follows (the "**Conversion Rights**"):

4.1 Right to Convert.

4.1.1 Termination of Conversion Rights. In the event of a notice of redemption of any shares of Series E Preferred Stock pursuant to Subsection 5, the Conversion Rights of the shares designated for redemption shall terminate at the close of business on the last full day preceding the date fixed for redemption, unless the redemption price is not fully paid on such redemption date, in which case the Conversion Rights for such shares shall continue until such price is paid in full. In the event of a liquidation, dissolution or winding up of the Corporation or a Sale of the Corporation, the Conversion Rights shall terminate at the close of business on the last full day preceding the date fixed for the payment of any such amounts distributable on such event to the holders of Series E Preferred Stock.

4.1.2 Conversion Ratio. Each share of Series E Preferred Stock shall be convertible, at the option of the holder thereof, at any time and from time to time, and without the payment of additional consideration by the holder thereof, into such number of fully paid and nonassessable shares of Common Stock as is determined by dividing the Series E Original Issue Price by the Series E Conversion Price (as defined below) in effect at the time of conversion. The "**Series E Conversion Price**" shall initially be equal to $0.70. Such initial Series E Conversion Price, and the rate at which shares of Series E Preferred Stock may be converted into shares of Common Stock, shall be subject to adjustment as provided below. Notwithstanding the foregoing, the Corporation shall not effect any conversion of such holder's Series E Preferred Stock and such holder shall not be entitled to convert its shares of Series E Preferred Stock for a number of shares of Common Stock in excess of that number of shares of Common Stock which, upon giving effect to such conversion, would cause (a) the aggregate number of shares of Common Stock beneficially owned by a holder of Series E Preferred Stock and its affiliates and any other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Securities Exchange Act of 1934, as amended (the "**Exchange Act**") to exceed 19.99% of the total number of issued and outstanding shares of Common Stock of the Corporation (including for such purpose the shares of Common Stock issuable upon conversion of the Series E Preferred Stock) following such conversion, or (b) the combined voting power of the securities of the Corporation beneficially owned by a holder of Series E Preferred Stock and its affiliates and any other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Exchange Act to exceed 19.99% of the combined voting power of all of the securities of the Corporation then outstanding following such conversion, unless, in either case, the stockholders of the Corporation approve the Nasdaq Proposal, in which case, the 19.99% limitation under clause (a) and clause (b) of this Section 4.1.2 shall be increased, with respect to any holder of Series E Preferred Stock, to 35% for purposes of both clause (a) and clause (b) of this Section 4.1.2. For purposes of this Section 4.1.2, the aggregate number of shares of Common Stock or voting securities beneficially owned by the holder and its affiliates and any other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the

Exchange Act shall include the shares of Common Stock issuable upon the conversion of the Series E Preferred Stock with respect to which such determination is being made, but shall exclude the number of shares of Common Stock which would be issuable upon exercise or conversion of the unexercised, non-converted or non-cancelled portion of any other securities of the Corporation that do not have voting power (including without limitation any securities of the Corporation which would entitle the holder thereof to acquire at any time Common Stock, including without limitation any debt, preferred stock, right, option, warrant or other instrument that is at any time convertible into or exercisable or exchangeable for, or otherwise entitles the holder thereof to receive, Common Stock), subject to a limitation on conversion or exercise analogous to the limitation contained herein beneficially owned by the holder or any of its affiliates and other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Exchange Act.

4.2 Fractional Shares. No fractional shares of Common Stock shall be issued upon conversion of the Series E Preferred Stock. In lieu of any fractional shares to which the holder would otherwise be entitled, the Corporation shall pay cash equal to such fraction multiplied by the Market Price of a share of Common Stock. Whether or not fractional shares would be issuable upon such conversion shall be determined on the basis of the total number of shares of Series E Preferred Stock the holder is at the time converting into Common Stock and the aggregate number of shares of Common Stock issuable upon such conversion. The "**Market Price**" of the Common Stock shall be determined as follows: if the Common Stock is listed on a national securities exchange or another nationally recognized trading system, the Market Price per share of Common Stock shall be deemed to be the greater of (a) the 20 consecutive trading day average closing price per share of the Common Stock ending on the trading day immediately prior to the date of determination and (b) the closing price of the Common Stock on the trading day immediately prior to the date of determination; and if the Common Stock is not listed on a national securities exchange or another nationally recognized trading system, the Market Price per share of Common Stock shall be deemed to be the amount most recently determined by the Board to represent the fair market value per share of the Common Stock (including without limitation a determination for purposes of granting Common Stock options or issuing Common Stock under any plan, agreement or arrangement with employees of the Corporation). Upon request of a holder of Series E Preferred Stock, the Board (or a representative thereof) shall, as promptly as reasonably practicable but in any event not later than 10 days after such request, notify the holder of the Market Price and furnish the holder with reasonable documentation of the Board's determination of such Market Price. Notwithstanding the foregoing, if the Board has not made such a determination within the three-month period prior to the date of determination, then the Board shall make, and shall provide or cause to be provided to the holder notice of, a determination of the Market Price within 15 days of a request by the holder that it do so.

4.3 Mechanics of Conversion.

4.3.1 Notice of Conversion. In order for a holder of Series E Preferred Stock to voluntarily convert shares of Series E Preferred Stock into shares of Common Stock, such holder shall surrender the certificate or certificates for such shares of Series E Preferred Stock (or, if such registered holder alleges that such certificate has been lost, stolen or destroyed, a lost certificate affidavit and agreement reasonably acceptable to the Corporation to indemnify the Corporation against any claim that may be made against the Corporation on account of the alleged loss, theft or destruction of such certificate), at the office of the transfer agent for the Series E Preferred Stock (or at the principal office of the Corporation if the Corporation serves as its own transfer agent), together with written notice that such holder elects to convert all or any number of the shares of the Series E Preferred Stock represented by such certificate or certificates and, if applicable, any event on which such conversion is contingent. Such notice shall state such holder's name or the names of the nominees in which such holder wishes the certificate or certificates for shares of Common Stock to be issued. If required by the Corporation, certificates surrendered for conversion shall be endorsed or accompanied by a written instrument or instruments of transfer, in form satisfactory to the Corporation, duly executed by the registered holder or his, her or its attorney duly authorized in writing. The close of business on the date of receipt by the transfer agent (or by the Corporation if the Corporation serves as its own transfer agent) of such certificates (or lost certificate affidavit and agreement) and notice shall be the time of conversion (the "**Conversion Time**"), and the shares of Common Stock issuable upon conversion of the shares represented by such certificate shall be deemed to be outstanding of record as of such date. The Corporation shall, as soon as practicable after the Conversion Time, (i) issue and deliver to such holder of Series E Preferred Stock, or to his, her or its nominees, a certificate or certificates for the number of full shares of Common Stock issuable upon such conversion in accordance with the provisions hereof and a certificate for the number (if any) of the shares of Series E Preferred Stock represented by the surrendered certificate that were not converted into Common Stock, (ii) pay in cash such amount as provided in Subsection 4.2 in lieu of any fraction of a share of Common Stock otherwise issuable upon such conversion and (iii) subject to applicable law, pay all accrued or declared but unpaid dividends on the shares of Series E Preferred Stock converted.

4.3.2 Reservation of Shares. The Corporation shall at all times when the Series E Preferred Stock shall be outstanding, reserve and keep available out of its authorized but unissued capital stock, for the purpose of effecting the conversion of the Series E Preferred Stock, such number of its duly authorized shares of Common Stock as shall from time to time be sufficient to effect the conversion of all outstanding Series E Preferred Stock; and if at any time the number of authorized but unissued shares of Common Stock shall not be sufficient to effect the conversion of all then outstanding shares of the Series E Preferred Stock, the Corporation shall take such corporate action as may be necessary to increase its authorized but unissued shares of Common Stock to such number of shares as shall be sufficient for such purposes, including, without limitation, engaging in best efforts to obtain the requisite stockholder approval of any necessary amendment to the Certificate of Incorporation. Before taking any action which would cause an adjustment reducing the Series E Conversion Price below the then par value of the shares of Common Stock issuable upon conversion of the Series E Preferred Stock, the Corporation will take any corporate action which may, in the opinion of its counsel, be necessary in order that the Corporation may validly and legally issue fully paid and nonassessable shares of Common Stock at such adjusted Series E Conversion Price.

4.3.3 Effect of Conversion. All shares of Series E Preferred Stock which shall have been surrendered for conversion as herein provided shall no longer be deemed to be outstanding and all rights with respect to such shares shall immediately cease and terminate at the Conversion Time, except only the right of the holders thereof to receive shares of Common Stock in exchange therefor, to receive payment in lieu of any fraction of a share otherwise issuable upon such conversion as provided in Subsection 4.2 and to receive payment of any dividends accrued or declared but unpaid thereon. Any shares of Series E Preferred Stock so converted shall be retired and cancelled and may not be reissued as shares of such series, and the Corporation may thereafter take such appropriate action (without the need for stockholder action) as may be necessary to reduce the authorized number of shares of Series E Preferred Stock accordingly.

4.3.4 No Further Adjustment. Upon any such conversion, no adjustment to the Series E Conversion Price shall be made for any declared but unpaid dividends on the Series E Preferred Stock surrendered for conversion or on the Common Stock delivered upon conversion.

4.3.5 Taxes. The Corporation shall pay any and all issue and other similar taxes that may be payable in respect of any issuance or delivery of shares of Common Stock upon conversion of shares of Series E Preferred Stock pursuant to this Section 4. The Corporation shall not, however, be required to pay any tax which may be payable in respect of any transfer involved in the issuance and delivery of shares of Common Stock in a name other than that in which the shares of Series E Preferred Stock so converted were registered, and no such issuance or delivery shall be made unless and until the person or entity requesting such issuance has paid to the Corporation the amount of any such tax or has established, to the satisfaction of the Corporation, that such tax has been paid.

4.4 Adjustment for Stock Splits and Combinations. If the Corporation shall at any time or from time to time after the Series E Original Issue Date effect a subdivision of the outstanding Common Stock, the Series E Conversion Price in effect immediately before that subdivision shall be proportionately decreased so that the number of shares of Common Stock issuable on conversion of each share of such series shall be increased in proportion to such increase in the aggregate number of shares of Common Stock outstanding. If the Corporation shall at any time or from time to time after the Series E Original Issue Date combine the outstanding shares of Common Stock, the Series E Conversion Price in effect immediately before the combination shall be proportionately increased so that the number of shares of Common Stock issuable on conversion of each share of such series shall be decreased in proportion to such decrease in the aggregate number of shares of Common Stock outstanding. Any adjustment under this subsection shall become effective at the close of business on the date the subdivision or combination becomes effective.

4.5 Adjustment for Certain Dividends and Distributions. In the event the Corporation at any time or from time to time after the Series E Original Issue Date shall make or issue, or fix a record date for the determination of holders of Common Stock entitled to receive, a dividend or other distribution payable on the Common Stock in additional shares of Common Stock, then and in each such

event the Series E Conversion Price in effect immediately before such event shall be decreased as of the time of such issuance or, in the event such a record date shall have been fixed, as of the close of business on such record date, by multiplying the Series E Conversion Price then in effect by a fraction:

(1) the numerator of which shall be the total number of shares of Common Stock issued and outstanding immediately prior to the time of such issuance or the close of business on such record date, and

(2) the denominator of which shall be the total number of shares of Common Stock issued and outstanding immediately prior to the time of such issuance or the close of business on such record date plus the number of shares of Common Stock issuable in payment of such dividend or distribution.

Notwithstanding the foregoing, (a) if such record date shall have been fixed and such dividend is not fully paid or if such distribution is not fully made on the date fixed therefor, the Series E Conversion Price shall be recomputed accordingly as of the close of business on such record date and thereafter the Series E Conversion Price shall be adjusted pursuant to this subsection as of the time of actual payment of such dividends or distributions; and (b) no such adjustment shall be made if the holders of Series E Preferred Stock simultaneously receive a dividend or other distribution of shares of Common Stock in a number equal to the number of shares of Common Stock as they would have received if all outstanding shares of Series E Preferred Stock had been converted into Common Stock on the date of such event.

4.6 Adjustments for Other Dividends and Distributions. In the event the Corporation at any time or from time to time after the Series E Original Issue Date shall make or issue, or fix a record date for the determination of holders of Common Stock entitled to receive, a dividend or other distribution payable in securities of the Corporation (other than a distribution of shares of Common Stock in respect of outstanding shares of Common Stock) or in other property and the provisions of Subsection 1 do not apply to such dividend or distribution, then and in each such event the holders of Series E Preferred Stock shall receive, simultaneously with the distribution to the holders of Common Stock, a dividend or other distribution of such securities or other property in an amount equal to the amount of such securities or other property as they would have received if all outstanding shares of Series E Preferred Stock had been converted into Common Stock on the date of such event.

4.7 Adjustment for Merger or Reorganization, etc. Subject to the provisions of Subsection 2.3, if there shall occur any reorganization, recapitalization, reclassification, consolidation or merger involving the Corporation in which the Common Stock (but not the Series E Preferred Stock) is converted into or exchanged for securities, cash or other property (other than a transaction covered by Subsections 4.5 or 4.6), then, following any such reorganization, recapitalization, reclassification, consolidation or merger, each share of Series E Preferred Stock shall thereafter be convertible in lieu of the Common Stock into which it was convertible prior to

such event into the kind and amount of securities, cash or other property which a holder of the number of shares of Common Stock of the Corporation issuable upon conversion of one share of Series E Preferred Stock immediately prior to such reorganization, recapitalization, reclassification, consolidation or merger would have been entitled to receive pursuant to such transaction; and, in such case, appropriate adjustment (as determined in good faith by the Board) shall be made in the application of the provisions in this Section 4 with respect to the rights and interests thereafter of the holders of the Series E Preferred Stock, to the end that the provisions set forth in this Section 4 (including provisions with respect to changes in and other adjustments of the Series E Conversion Price) shall thereafter be applicable, as nearly as reasonably may be, in relation to any securities or other property thereafter deliverable upon the conversion of the Series E Preferred Stock.

4.8 Certificate as to Adjustments. Upon the occurrence of each adjustment or readjustment of the Series E Conversion Price pursuant to this Section 4, the Corporation at its expense shall, as promptly as reasonably practicable but in any event not later than 10 days thereafter, compute such adjustment or readjustment in accordance with the terms hereof and furnish to each holder of Series E Preferred Stock a certificate setting forth such adjustment or readjustment (including the kind and amount of securities, cash or other property into which the Series E Preferred Stock is convertible) and showing in detail the facts upon which such adjustment or readjustment is based. The Corporation shall, as promptly as reasonably practicable after the written request at any time of any holder of Series E Preferred Stock (but in any event not later than 10 days thereafter), furnish or cause to be furnished to such holder a certificate setting forth (i) the Series E Conversion Price then in effect, and (ii) the number of shares of Common Stock and the amount, if any, of other securities, cash or property which then would be received upon the conversion of Series E Preferred Stock.

4.9 Notice of Record Date. In the event:

(a) the Corporation shall take a record of the holders of its Common Stock (or other capital stock or securities at the time issuable upon conversion of the Series E Preferred Stock) for the purpose of entitling or enabling them to receive any dividend or other distribution, or to receive any right to subscribe for or purchase any shares of capital stock of any class or any other securities, or to receive any other security; or

(b) of any capital reorganization of the Corporation, any reclassification of the Common Stock of the Corporation, or any consolidation or merger of the Corporation; or

(c) of the voluntary or involuntary dissolution, liquidation or winding-up of the Corporation,

then, and in each such case, the Corporation will send or cause to be sent to the holders of the Series E Preferred Stock a notice specifying, as the case may be, (i) the record date for such dividend, distribution or right, and the amount and character of such dividend, distribution or right, or (ii) the effective date on which such reorganization, reclassification, consolidation, merger, transfer, dissolution, liquidation or winding-up is proposed to take place, and the time, if any is to be fixed, as of which the holders of record of Common Stock (or such other capital stock or securities at the time issuable upon the conversion of the Series E Preferred Stock) shall be entitled to exchange their shares of Common Stock (or such other capital stock or securities) for securities or other property deliverable upon such reorganization, reclassification, consolidation, merger, transfer, dissolution, liquidation or winding-up, and the amount per share and character of such exchange applicable to the Series E Preferred Stock and the Common Stock. Such notice shall be sent at least 10 days prior to the record date or effective date for the event specified in such notice.

5. Redemption by Corporation.

5.1 Redemption. Shares of Series E Preferred Stock may be redeemed by the Corporation out of funds lawfully available therefor at a price equal to the Series E Original Issue Price per share, plus all accrued or declared but unpaid dividends thereon (the "**5.1 Redemption Price**"), at any time after the later of (i) November 9, 2014 and (ii) the date that no shares of Series D Preferred Stock remain outstanding, if the closing sales price of the Common Stock for 20 or more trading days in a period of 30 consecutive trading days is equal to or greater than 400% of the Series E Conversion Price; provided, that the Corporation provides written notice of such redemption to each holder of Series E Preferred Stock within 30 days of the end of such 30 consecutive trading day period (the "**5.1 Redemption Notice**"). The Corporation shall send the 5.1 Redemption Notice to each holder of record of Series E Preferred Stock not less than 30 days prior to the date fixed by the Corporation for such redemption (the "**5.1 Redemption Date**"). The 5.1 Redemption Notice shall state:

(a) the 5.1 Redemption Date and the 5.1 Redemption Price;

(b) the date upon which the holder's right to convert such shares terminates (as determined in accordance with Subsection 4.1); and

(c) that the holder is to surrender to the Corporation, in the manner and at the place designated, his, her or its certificate or certificates representing the shares of Series E Preferred Stock to be redeemed pursuant to this Section 5.1.

Notwithstanding anything to the contrary set forth in this Section 5, the Corporation may not exercise its right of redemption pursuant to this Section 5.1 with respect to any shares of Series E Preferred Stock which the holder thereof may not convert into Common Stock pursuant to Subsection 4.1 as a result of the beneficial ownership limitations set forth therein (each such share, a "**Nonredeemable Series E Share**" and collectively, the "**Nonredeemable Series E Shares**").

5.2 Alternative Redemption. In the event that the Corporation exercises its redemption rights under Subsection 5.1 but is unable to redeem all of the shares of Series E Preferred Stock in accordance with the last sentence of Subsection 5.1, then the Corporation may redeem all or a portion of the Nonredeemable Series E Shares at a price per Nonredeemable Series E Share equal to the greater of (a) the 20 consecutive trading day average closing price per share of the Common Stock ending on the trading day immediately prior to the 5.1 Redemption Date plus any dividends accrued or declared but unpaid thereon and (b) the Series E Conversion Price plus any dividends accrued or declared but unpaid thereon (the "**5.2 Redemption Price**" and, together with the 5.1 Redemption Price, the "**Redemption Prices**"); provided, that the Corporation provides written notice of such redemption to each holder of Series E Preferred Stock within 30 days following the 5.1 Redemption Date (the "**5.2 Redemption Notice**" and, together with the 5.1 Redemption Notice, the "**Redemption Notices**"). The Corporation shall send the 5.2 Redemption Notice to each holder of record of Series E Preferred Stock not less than 30 days prior to the date fixed by the Corporation for such redemption (the "**5.2 Redemption Date**" and, together with the 5.1 Redemption Date, the "**Redemption Dates**").

The 5.2 Redemption Notice shall state:

(a) the 5.2 Redemption Date and the 5.2 Redemption Price;

(b) the number of Nonredeemable Series E Shares (as determined in accordance with Subsection 4.1); and

(c) that the holder is to surrender to the Corporation, in the manner and at the place designated, his, her or its certificate or certificates representing the Nonredeemable Series E Shares of Series E Preferred Stock to be redeemed pursuant to this Section 5.2.

5.3 Surrender of Certificates; Payment. On or before a Redemption Date, each holder of shares of Series E Preferred Stock to be redeemed on such Redemption Date, unless such holder has exercised his, her or its right to convert such shares as provided in Subsection 4, shall surrender the certificate or certificates representing such shares (or, if such registered holder alleges that such certificate has been lost, stolen or destroyed, a lost certificate affidavit and agreement reasonably acceptable to the Corporation to indemnify the Corporation against any claim that may be made against the Corporation on account of the alleged loss, theft or destruction of such certificate) to the Corporation, in the manner and at the place designated in the notice from the Corporation, and thereupon the applicable Redemption Price for such shares shall be payable to the order of the person whose name appears on such certificate or certificates as the owner thereof. In the event less than all of the shares of Series E Preferred Stock represented by a certificate are redeemed, a new certificate representing the unredeemed shares of Series E Preferred Stock shall promptly be issued to such holder.

5.4 Rights Subsequent to Redemption. If a Redemption Notice shall have been duly given, and if on the applicable Redemption Date the applicable Redemption Price payable upon redemption of the shares of Series E Preferred Stock to be redeemed on such Redemption Date is paid or tendered for payment or deposited with an independent payment agent so as to be available therefor in a timely manner, then notwithstanding that the certificates evidencing any of the shares of Series E Preferred Stock so called for redemption on such Redemption Date shall not have been surrendered, dividends with respect to such shares of Series E Preferred Stock shall cease to accrue after such Redemption Date and all rights with respect to such shares shall forthwith after such Redemption Date terminate, except only the right of the holders to receive the applicable Redemption Price without interest upon surrender of their certificate or certificates therefor.

5.5 Redemption Approval. Notwithstanding anything to the contrary set forth in this Section 5, no redemptions may be effected by the Corporation pursuant to Subsection 5.1 or Subsection 5.2 unless and until such redemption has been approved by a majority in number of the directors of the Corporation that are not affiliated with any holder of the Series E Preferred Stock or the Warrants (as defined in the Series E Purchase Agreement) and were not elected as a director of the Corporation as a result of being nominated or submitted for consideration by any holder of the Series E Preferred Stock or Warrants or any affiliate thereof.

6. Redeemed or Otherwise Acquired Shares. Any shares of Series E Preferred Stock that are redeemed or otherwise acquired (including pursuant to Subsection 5.4) by the Corporation or any of its subsidiaries shall be automatically and immediately cancelled and retired and shall not be reissued, sold or transferred. Neither the Corporation nor any of its subsidiaries may exercise any voting or other rights granted to the holders of Series E Preferred Stock following redemption.

7. Waiver. Any of the rights, powers, preferences and other terms of the Series E Preferred Stock set forth herein may be waived on behalf of all holders of Series E Preferred Stock by the affirmative written consent or vote of the holders of at least a majority of the then outstanding Series E Preferred Stock.

8. Notices. Any notice required or permitted to be given to a holder of shares of Series E Preferred Stock shall be mailed, postage prepaid, to the post office address last shown on the records of the Corporation, or given by electronic communication in compliance with the provisions of the General Corporation Law, and shall be deemed sent upon such mailing or electronic transmission.

IN WITNESS WHEREOF, this Certificate of Designations has been executed by a duly authorized officer of this corporation on this 9th day of November, 2012.

By: /s/ Sudhir Agrawal
Chief Executive Officer

IDERA PHARMACEUTICALS, INC.

CERTIFICATE OF ELIMINATION
OF NUMBER OF SHARES OF PREFERRED STOCK DESIGNATED AS SERIES C
JUNIOR PARTICIPATING PREFERRED STOCK PREFERRED STOCK

Idera Pharmaceuticals, Inc. (hereinafter called the "Corporation"), pursuant to the authority conferred upon the Board of Directors of the Corporation (the "Board") by the Corporation's Restated Certificate of Incorporation, as amended (the "Certificate of Incorporation"), and in accordance with the provisions of Section 151(g) of the General Corporation Law of the State of Delaware (the "Delaware Law"), certifies that the Board duly adopted the following resolution:

"RESOLVED: That no shares of the Corporation's Series C Junior Participating Preferred Stock (the "Series C Preferred Stock") are outstanding and no shares of Series C Preferred Stock will be issued subject to the Certificate of Designation, Preferences and Rights of Series C Preferred Stock, dated December 10, 2001, as amended, with respect to such series (the "Series C Certificate of Designation"); and that the Proper Officers be and hereby are authorized and directed in the name and on behalf of the Corporation to execute and file a certificate with the Secretary of State of the State of Delaware pursuant to Section 151(g) of the Delaware Law setting forth the text of this resolution, upon the filing and effectiveness of which all matters as set forth in the Series C Certificate of Designation shall be deemed to have been eliminated from the Restated Certificate and the 200,000 shares of Preferred Stock previously designated as Series C Preferred Stock shall resume their status as undesignated shares of Preferred Stock available for future issuance in accordance with the Restated Certificate."

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to be signed by its duly authorized officer this 17th day of June, 2013.

IDERA PHARMACEUTICALS, INC.

By: /s/ Sudhir Agrawal
Sudhir Agrawal, D. Phil.
Chairman of the Board of Directors,
President and Chief Executive Officer

IDERA PHARMACEUTICALS, INC.
CERTIFICATE OF AMENDMENT OF
CERTIFICATE OF DESIGNATIONS, PREFERENCES AND RIGHTS OF
SERIES D PREFERRED STOCK

Pursuant to Section 242 of the
General Corporation Law of the State of Delaware

Idera Pharmaceuticals, Inc., a Delaware corporation (the "Corporation"), in accordance with Section 103 of the General Corporation Law of the State of Delaware (the "General Corporation Law"), hereby certifies as follows:

A Certificate of Designations, Preferences and Rights of Series D Preferred Stock (the "Certificate of Designations") was filed with the Secretary of State of the State of Delaware on November 4, 2011 pursuant to Section 151 of the General Corporation Law. By action of the Board of Directors of the Corporation, the Board of Directors of the Corporation duly adopted resolutions, pursuant to Section 242 of the General Corporation Law, setting forth amendments to the Certificate of Designations and declaring said amendment to be advisable. The stockholders of the Corporation duly approved said proposed amendments in accordance with Section 242 of the General Corporation Law at a meeting of stockholders held on July 26, 2013. The resolutions setting forth the proposed amendment are as follows:

RESOLVED, that Section 1.1 of the Certificate of Designations be deleted in its entirety and that the following paragraph be inserted in lieu thereof:

"1.1 Series D Preferred Dividends.

1.1.1 Each holder of Series D Preferred Stock shall be entitled to receive, with respect to each share of Series D Preferred Stock then outstanding and held by such holder of Series D Preferred Stock, dividends, commencing from the date of issuance of such share of Series D Preferred Stock, at the rate of seven percent (7%) per annum (on the basis of a 360 day year) of the Series D Original Issue Price (as defined below) (the "**Series D Preferred Dividends**"). The Series D Preferred Dividends shall be cumulative, whether or not earned or declared, shall be paid quarterly in arrears on the last day of December, March, June and September (a "**Quarterly Dividend Payment Date**") in each year that Series D Preferred Stock is outstanding, with the first Quarterly Dividend Payment Date being December 31, 2011, and shall be prorated for periods shorter than one quarter. The rights of a holder of Series D Preferred Stock as Series D Preferred Dividends shall rank senior to the rights of the Corporation's Series A Convertible Preferred Stock as to dividends.

1.1.2 The Series D Preferred Dividends shall be paid to each holder of Series D Preferred Stock in cash out of legally available funds or, at the Corporation's election, through the issuance of such number of shares of the Corporation's Common

Stock, par value $0.001 per share (the "**Common Stock**") (rounded down to the nearest whole share with any fractional shares being issued in cash in an amount equal to the Market Price (as defined in Section 4.2 below) of such fractional share of Common Stock) determined by dividing the amount of the total accrued but unpaid dividends then outstanding on such holder's shares of Series D Preferred Stock by the Market Price then in effect (which for this purpose may not be less than $1.46 per share, subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Common Stock); provided, however, that (i) the Corporation may not pay such dividends in shares of Common Stock on or prior to October 1, 2013, (ii) the Corporation may not issue shares of Common Stock in excess of that number of shares of Common Stock which, upon giving effect to such issuance, would cause (a) the aggregate number of shares of Common Stock beneficially owned by a holder of Series D Preferred Stock and its affiliates and any other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Securities Exchange Act of 1934, as amended (the "**Exchange Act**"), to exceed 19.99% of the total number of issued and outstanding shares of Common Stock of the Corporation following such issuance, or (b) the combined voting power of the securities of the Corporation beneficially owned by a holder of Series D Preferred Stock and its affiliates and any other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Exchange Act to exceed 19.99% of the combined voting power of all of the securities of the Corporation then outstanding following such issuance, unless and until, in either case of clause (a) and clause (b) of this Section 1.1.2, the stockholders of the Corporation approve the Nasdaq Proposal (as defined by and in accordance with Section 5.11(B) of that certain Convertible Preferred Stock and Warrant Purchase Agreement, dated November 9, 2012, between the Corporation and the Purchasers named therein), in which case, the 19.99% limitation under clause (a) and (b) of this Section 1.1.2 shall be increased, with respect to any holder of Series D Preferred Stock, to 35% for purposes of both clause (a) and clause (b) of this Section 1.1.2, and (iii) if clause (ii) shall in fact limit the issuance of any shares of Common Stock in payment of a given dividend, then the Corporation's election to pay such dividend in shares of Common Stock shall be ineffective to the extent of such limitation and such dividend shall instead thereupon be paid, at the Corporation's election, (x) in cash by the Corporation out of legally available funds or (y) through the issuance of a number of shares of the Corporation's Series F Convertible Preferred Stock, par value $0.01 per share (the "**Series F Preferred Stock**") equal to one-twentieth (1/20th) of the number of shares of Common Stock that the Corporation could have issued pursuant to this Section 1.1.2 with respect to such Series D Preferred Dividends but for the limitations set forth in clause (a) and clause (b) of this Section 1.1.2.

1.1.3 Any election by the Corporation to pay Series D Preferred Dividends in cash or in shares of Common Stock or Series F Preferred Stock shall be made uniformly with respect to all outstanding shares of Series D Preferred Stock for a given dividend period.

1.1.4 For purposes of this Section 1.1 the aggregate number of shares of Common Stock or voting securities beneficially owned by a holder of Series D Preferred

Stock and its affiliates and any other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Exchange Act, shall include the shares of Common Stock to be issued as part of such dividend payment, but shall exclude the number of shares of Common Stock which would be issuable upon exercise or conversion of the unexercised, non-converted or non-cancelled portion of any other securities of the Corporation that do not have voting power (including without limitation any securities of the Corporation which would entitle the holder thereof to acquire at any time Common Stock, including without limitation any debt, preferred stock, right, option, warrant or other instrument that is at any time convertible into or exercisable or exchangeable for, or otherwise entitles the holder thereof to receive, Common Stock), subject to a limitation on conversion or exercise analogous to the limitation contained herein beneficially owned by the holder or any of its affiliates and other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Exchange Act."

* * *

RESOLVED, that Section 1.3 of the Certificate of Designations be deleted in its entirety and that the following paragraph be inserted in lieu thereof:

"1.3 The Corporation shall not declare, pay or set aside any dividends on shares of any other class or series of capital stock of the Corporation (other than dividends on shares of Common Stock payable in shares of Common Stock, dividends on the Series A Convertible Preferred Stock in accordance with Section 2(a) of the Certificate of Designations for the Series A Convertible Preferred Stock and dividends on the Series E Preferred Stock in accordance with Section 1.1 of the Certificate of Designations for the Series E Convertible Preferred Stock unless the holders of the Series D Preferred Stock then outstanding shall first receive, or simultaneously receive, a dividend on each outstanding share of Series D Preferred Stock in an amount at least equal to the sum of (i) the amount of the aggregate dividends then accrued on such share of Series D Preferred Stock and not previously paid and (ii) (A) in the case of a dividend on Common Stock or any class or series that is convertible into Common Stock, that dividend per share of Series D Preferred Stock as would equal the product of (1) the dividend payable on each share of such class or series determined, if applicable, as if all shares of such class or series had been converted into Common Stock and (2) the number of shares of Common Stock issuable upon conversion of a share of Series D Preferred Stock, in each case calculated on the record date for determination of holders entitled to receive such dividend or (B) in the case of a dividend on any class or series that is not convertible into Common Stock, at a rate per share of Series D Preferred Stock determined by (1) dividing the amount of the dividend payable on each share of such class or series of capital stock by the original issuance price of such class or series of capital stock (subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to such class or series) and (2) multiplying such fraction by an amount equal to the Series D Original Issue Price; provided that, if the Corporation declares, pays or sets aside, on the same date, a dividend on shares of more than one class or series of capital stock of the Corporation, the dividend payable to the holders of Series D Preferred Stock pursuant to this Section 1.3 shall be calculated based upon the dividend on the class or series of capital stock that would result in the highest Series D Preferred Stock dividend."

* * *

RESOLVED, that Section 2.1 of the Certificate of Designations be deleted in its entirety and that the following paragraph be inserted in lieu thereof:

"2.1 Payments to Holders of Series D Preferred Stock. In the event of any voluntary or involuntary liquidation, dissolution or winding up of the Corporation, the holders of shares of Series D Preferred Stock then outstanding shall be entitled to be paid out of the assets of the Corporation available for distribution to its stockholders before any payment shall be made to the holders of Common Stock, Series A Convertible Preferred Stock or any other class of capital stock of the Corporation ranking junior to the Series D Preferred Stock as to liquidation, by reason of their ownership thereof, an amount per share equal to such amount as would have been payable with respect to such share had all shares of Series D Preferred Stock been converted into Common Stock pursuant to Section 4 immediately prior to such liquidation, dissolution or winding up, disregarding for these purposes the limitations on conversion due to beneficial ownership set forth in Subsection 4.1.1. If upon any such liquidation, dissolution or winding up of the Corporation, the assets of the Corporation available for distribution to its stockholders shall be insufficient to pay the holders of shares of Series D Preferred Stock the full amount to which they shall be entitled under this Subsection 2.1, the holders of shares of Series D Preferred Stock shall share ratably in any distribution of the assets available for distribution in proportion to the respective amounts which would otherwise be payable in respect of the shares held by them upon such distribution if all amounts payable on or with respect to such shares were paid in full."

* * *

RESOLVED, that Section 4.1.1 of the Certificate of Designations be deleted in its entirety and that the following paragraph be inserted in lieu thereof:

"4.1.1 Conversion Ratio. Each share of Series D Preferred Stock shall be convertible, at the option of the holder thereof, at any time and from time to time, and without the payment of additional consideration by the holder thereof, into such number of fully paid and nonassessable shares of Common Stock as is determined by dividing the Series D Original Issue Price by the Series D Conversion Price (as defined below) in effect at the time of conversion. The "Series D Conversion Price" shall initially be equal to $1.6275. Such initial Series D Conversion Price, and the rate at which shares of Series D Preferred Stock may be converted into shares of Common Stock, shall be subject to adjustment as provided below. Notwithstanding the foregoing, the Corporation shall not effect any conversion of such holder's Series D Preferred Stock and such holder shall not be entitled to convert its shares of Series D Preferred Stock for a number of shares of Common Stock in excess of that number of shares of Common Stock which, upon giving effect to such conversion, would cause (a) the aggregate number of shares of Common Stock beneficially owned by a holder of Series D Preferred Stock and its affiliates and

any other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Exchange Act to exceed 19.99% of the total number of issued and outstanding shares of Common Stock of the Corporation (including for such purpose the shares of Common Stock issuable upon conversion of the Series D Preferred Stock) following such conversion, or (b) the combined voting power of the securities of the Corporation beneficially owned by a holder of Series D Preferred Stock and its affiliates and any other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Exchange Act to exceed 19.99% of the combined voting power of all of the securities of the Corporation then outstanding following such conversion, unless, in either case, the stockholders of the Corporation approve the Nasdaq Proposal, in which case, the 19.99% limitation under clause (a) and clause (b) of this Section 4.1.1 shall be increased, with respect to any holder of Series D Preferred Stock, to 35% for purposes of both clause (a) and clause (b) of this Section 4.1.1. For purposes of this Section 4.1.1, the aggregate number of shares of Common Stock or voting securities beneficially owned by the holder and its affiliates and any other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Exchange Act shall include the shares of Common Stock issuable upon the conversion of the Series D Preferred Stock with respect to which such determination is being made, but shall exclude the number of shares of Common Stock which would be issuable upon exercise or conversion of the unexercised, non-converted or non-cancelled portion of any other securities of the Corporation that do not have voting power (including without limitation any securities of the Corporation which would entitle the holder thereof to acquire at any time Common Stock, including without limitation any debt, preferred stock, right, option, warrant or other instrument that is at any time convertible into or exercisable or exchangeable for, or otherwise entitles the holder thereof to receive, Common Stock), subject to a limitation on conversion or exercise analogous to the limitation contained herein beneficially owned by the holder or any of its affiliates and other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Exchange Act."

* * *

RESOLVED, that Section 4.1.2 of the Certificate of Designations be deleted in its entirety and that the following paragraph be inserted in lieu thereof:

"4.1.2 Termination of Conversion Rights. In the event of a notice of redemption of any shares of Series D Preferred Stock pursuant to Section 5, the Conversion Rights of the shares designated for redemption shall terminate at the close of business on the last full day preceding the date fixed for redemption, unless the redemption price is not fully paid on such redemption date, in which case the Conversion Rights for such shares shall continue until such price is paid in full. In the event of a liquidation, dissolution or winding up of the Corporation or a Sale of the Corporation (as defined in Section 6.2 below), the Conversion Rights shall terminate at the close of business on the last full day preceding the date fixed for the payment of any such amounts distributable on such event to the holders of Series D Preferred Stock."

* * *

RESOLVED, that Section 6 of the Certificate of Designations be deleted in its entirety and that the following paragraph be inserted in lieu thereof:

"6. Sale of the Corporation.

6.1 In the event of a Sale of the Corporation (as defined below) after payment shall be made to the holders of Series A Convertible Preferred Stock and any other class of capital stock of the Corporation ranking senior to the Series D Preferred Stock upon a Sale of the Corporation, the remaining assets of the Corporation available for distribution to its stockholders shall be distributed among the holders of the shares of Series D Preferred Stock, Series E Preferred Stock and Common Stock pro rata based on the number of shares held by each such holder, treating for this purpose all such securities as if they had been converted to Common Stock pursuant to the terms of the Certificate of Incorporation immediately prior to such Sale of the Corporation disregarding for these purposes the limitations on conversion due to beneficial ownership set forth in Subsection 4.1.1.

6.2 The term "**Sale of the Corporation**" shall mean each of the following events: (a) a merger or consolidation in which (i) the Corporation is a constituent party or (ii) a subsidiary of the Corporation is a constituent party and the Corporation issues shares of its capital stock pursuant to such merger or consolidation (except in the case of clause (i) and (ii), any such merger or consolidation involving the Corporation or a subsidiary in which the shares of capital stock of the Corporation outstanding immediately prior to such merger or consolidation continue to represent, or are converted into or exchanged for shares of capital stock that represent, immediately following such merger or consolidation, at least a majority, by voting power, of the capital stock of (y) the surviving or resulting corporation or (z) if the surviving or resulting corporation is a wholly owned subsidiary of another corporation immediately following such merger or consolidation, the parent corporation of such surviving or resulting corporation; or (b) the sale, lease, transfer, exclusive license or other disposition, in a single transaction or series of related transactions, by the Corporation or any subsidiary of the Corporation of all or substantially all the assets of the Corporation and its subsidiaries taken as a whole, or the sale or disposition (whether by merger or otherwise) of one or more subsidiaries of the Corporation if substantially all of the assets of the Corporation and its subsidiaries taken as a whole are held by such subsidiary or subsidiaries, except where such sale, lease, transfer, exclusive license or other disposition is to a wholly owned subsidiary of the Corporation. For the purposes of clarity, a Sale of the Corporation shall not be deemed to be a liquidation, dissolution or winding up of the Corporation for the purposes of this Section 6."

* * *

IN WITNESS WHEREOF, this Certificate of Amendment has been executed by a duly authorized officer of the Corporation on this 26th day of July, 2013.

IDERA PHARMACEUTICALS, INC.

By: /s/ Sudhir Agrawal
Name: Sudhir Agrawal
Title: Chief Executive Officer

IDERA PHARMACEUTICALS, INC.
CERTIFICATE OF AMENDMENT OF
CERTIFICATE OF DESIGNATIONS, PREFERENCES AND RIGHTS OF
SERIES E PREFERRED STOCK

Pursuant to Section 242 of the
General Corporation Law of the State of Delaware

Idera Pharmaceuticals, Inc., a Delaware corporation (the "Corporation"), in accordance with Section 103 of the General Corporation Law of the State of Delaware (the "General Corporation Law"), hereby certifies as follows:

A Certificate of Designations, Preferences and Rights of Series E Preferred Stock (the "Certificate of Designations") was filed with the Secretary of State of the State of Delaware on November 9, 2012 pursuant to Section 151 of the General Corporation Law. By action of the Board of Directors of the Corporation, the Board of Directors of the Corporation duly adopted resolutions, pursuant to Section 242 of the General Corporation Law, setting forth amendments to the Certificate of Designations and declaring said amendment to be advisable. The stockholders of the Corporation duly approved said proposed amendments in accordance with Section 242 of the General Corporation Law at a meeting of stockholders held on July 26, 2013. The resolutions setting forth the proposed amendment are as follows:

RESOLVED, that Section 1.1 of the Certificate of Designations be deleted in its entirety and the following new paragraph be inserted in lieu thereof:

"1.1 Series E Preferred Dividends.

1.1.1 Each holder of Series E Preferred Stock shall be entitled to receive with respect to each share of Series E Preferred Stock then outstanding and held by such holder of Series E Preferred Stock, dividends, commencing from the date of issuance of such share of Series E Preferred Stock, at the Initial Dividend Rate (as defined below) per annum (on the basis of a 360 day year) of the Series E Original Issue Price (as defined below) (the "**Series E Preferred Dividends**"); provided, however, that subject to and effective upon the filing with the Delaware Secretary of State of the amendment to the Certificate of Designations, Preferences and Rights of Series D Preferred Stock (the "**Series D Certificate of Designations**," with the amendment thereto being referred to as the "**Amendment to Series D Certificate of Designations**") as described in Section 5.11(B) of that certain Convertible Preferred Stock and Warrant Purchase Agreement, dated November 9, 2012, between the Corporation and the purchasers of the Series E Preferred Stock therein (the "**Series E Purchase Agreement**"), the dividend rate provided for in this Section 1.1 shall be increased from the Initial Dividend Rate to the rate of eight percent (8%) per annum (on the basis of a 360 day year) of the Series E Original Issue Price. The Series E Preferred Dividends shall be cumulative, whether or not earned or declared, shall be paid quarterly in arrears on the last day of March, June, September and December (a "**Quarterly Dividend Payment Date**") in each year that Series E Preferred Stock is outstanding, with the first Quarterly Dividend Payment Date being March 31, 2013, and shall

be prorated for periods shorter than one quarter. Notwithstanding the foregoing, if, as of any Quarterly Dividend Payment Date at which the dividend rate is the Initial Dividend Rate, there are no shares of the Corporation's Series D Convertible Preferred Stock outstanding, then the dividend payable on such Quarterly Dividend Payment Date shall be calculated and paid at a rate of eight percent (8%) per annum (on the basis of a 360 day year) of the Series E Original Issue Price. In the event that the Amendment to Series D Certificate of Designations is filed with the Delaware Secretary of State and the dividend rate with respect to the Series E Preferred Dividends is increased pursuant to this Section 1.1.1, the Series E Preferred Dividends paid on the first Quarterly Dividend Payment Date after such filing and increase shall be paid at the increased rate. In the event that the Amendment to Series D Certificate of Designations is submitted to the stockholders of the Corporation as contemplated by Section 5.11 of the Series E Purchase Agreement and the Amendment to Series D Certificate of Designations is not approved, then the holders of the Series E Preferred Stock shall no longer be entitled to any Series E Preferred Dividends under this Section 1.1.1 and the Corporation shall have no further obligation to pay the Series E Preferred Dividends under this Section 1.1.1; provided, however, the Corporation shall not submit the Amendment to the Series D Certificate of Designations to the stockholders if there are no shares of Series D Preferred Stock then outstanding. The rights of a holder of Series E Preferred Stock to Series E Preferred Dividends shall rank senior to the rights of the Corporation's Series A Convertible Preferred Stock and Series D Convertible Preferred Stock as to dividends. The term "**Initial Dividend Rate**" shall mean four and six tenths percent (4.6%) or such other percentage approved by the Corporation and by the holders of at least a majority of then outstanding shares of Series E Preferred Stock, with such approval given in writing or by vote at a meeting, consenting or voting (as the case may be) as a separate class.

1.1.2 The Series E Preferred Dividends shall be paid to each holder of Series E Preferred Stock in cash out of legally available funds or, at the Corporation's election, through the issuance of such number of shares of Common Stock (as defined in Section 1.3 below) (rounded down to the nearest whole share with any fractional shares being issued in cash in an amount equal to the Market Price (as defined in Section 4.2 below) of such fractional share of Common Stock) determined by dividing the amount of the total accrued but unpaid dividends then outstanding on such holder's shares of Series E Preferred Stock by the Market Price then in effect (which for this purpose may not be less than $0.70 per share, subject to appropriate adjustment in the event of any stock dividend, stock split, combination or other similar recapitalization with respect to the Common Stock); provided, however, that (i) the Corporation may not pay such dividends in shares of Common Stock on or prior to October 1, 2013, (ii) the Corporation may not issue shares of Common Stock in excess of that number of shares of Common Stock which, upon giving effect to such issuance, would cause (a) the aggregate number of shares of Common Stock beneficially owned by a holder of Series E Preferred Stock and its affiliates and any other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Exchange Act (as defined in Section 4.1.2), to exceed 19.99% of the total number of issued and outstanding shares of Common Stock of the Corporation following such issuance, or (b) the combined voting power of the securities of the Corporation beneficially owned by a holder of Series E Preferred Stock and its affiliates and any other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Exchange Act to exceed 19.99% of the combined voting power of all of the securities of the Corporation then outstanding

following such issuance, unless and until, in either case of clause (a) and clause (b) of this Section 1.1.2, the stockholders of the Corporation approve the Nasdaq Proposal (as defined in Section 3.1 below), in which case, the 19.99% limitation under clause (a) and (b) of this Section 1.1.2 shall be increased, with respect to any holder of Series E Preferred Stock, to 35% for purposes of both clause (a) and clause (b) of this Section 1.1.2, and (iii) if clause (ii) shall in fact limit the issuance of any shares of Common Stock in payment of a given dividend, then the Corporation's election to pay such dividend in shares of Common Stock shall be ineffective to the extent of such limitation and such dividend shall instead thereupon be paid, at the Corporation's election, (x) in cash by the Corporation out of legally available funds or (y) through the issuance of a number of shares of the Corporation's Series F Convertible Preferred Stock, par value $0.01 per share (the "**Series F Preferred Stock**") equal to one-twentieth (1/20th) of the number of shares of Common Stock that the Corporation could have issued pursuant to this Section 1.1.2 with respect to such Series E Preferred Dividends but for the limitations set forth in clause (a) and clause (b) of this Section 1.1.2.

1.1.3 Any election by the Corporation to pay Series E Preferred Dividends in cash or shares of Common Stock and/or Series F Preferred Stock shall be made uniformly with respect to all outstanding shares of Series E Preferred Stock for a given dividend period.

1.1.4 For purposes of this Section 1.1, the aggregate number of shares of Common Stock or voting securities beneficially owned by a holder of Series E Preferred Stock and its affiliates and any other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Exchange Act, shall include the shares of Common Stock to be issued as part of such dividend payment, but shall exclude the number of shares of Common Stock which would be issuable upon exercise or conversion of the unexercised, non-converted or non-cancelled portion of any other securities of the Corporation that do not have voting power (including without limitation any securities of the Corporation which would entitle the holder thereof to acquire at any time Common Stock, including without limitation any debt, preferred stock, right, option, warrant or other instrument that is at any time convertible into or exercisable or exchangeable for, or otherwise entitles the holder thereof to receive, Common Stock), subject to a limitation on conversion or exercise analogous to the limitation contained herein beneficially owned by the holder or any of its affiliates and other persons whose beneficial ownership of Common Stock would be aggregated with the holder's for purposes of Section 13(d) of the Exchange Act."

* * *

RESOLVED, that Section 2.1.1 of the Certificate of Designations be deleted in its entirety and that the following paragraph be inserted in lieu thereof:

"2.1.1 In the event of any voluntary or involuntary liquidation, dissolution or winding up of the Corporation, the holders of shares of Series E Preferred Stock then outstanding shall be entitled to be paid out of the assets of the Corporation available for distribution to its stockholders before any payment shall be made to the holders of Common Stock, Series A Convertible Preferred Stock, Series D Convertible Preferred Stock or any other class of capital stock of the Corporation ranking junior to the Series E Preferred Stock as to liquidation, by reason of their ownership thereof, an amount per share equal to such amount as would have been

payable with respect to such share had all shares of Series E Preferred Stock been converted into Common Stock pursuant to Subsection 4 immediately prior to such liquidation, dissolution or winding up disregarding for these purposes the limitations on conversion due to beneficial ownership set forth in Subsection 4.1.2."

* * *

RESOLVED, that Section 2.3.1 of the Certificate of Designations be deleted in its entirety and that the following paragraph be inserted in lieu thereof:

"2.3.1 In the event of a Sale of the Corporation (as defined below) after payment shall be made to the holders of Series A Convertible Preferred Stock and any other class of capital stock of the Corporation ranking senior to the Series E Preferred Stock upon a Sale of the Corporation, the remaining assets of the Corporation available for distribution to its stockholders shall be distributed among the holders of the shares of Series E Preferred Stock, Series D Preferred Stock and Common Stock pro rata based on the number of shares held by each such holder, treating for this purpose all such securities as if they had been converted to Common Stock pursuant to the terms of the Certificate of Incorporation immediately prior to such Sale of the Corporation disregarding for these purposes the limitations on conversion due to beneficial ownership set forth in Subsection 4.1.2."

* * *

IN WITNESS WHEREOF, this Certificate of Amendment has been executed by a duly authorized officer of the Corporation on this 26th day of July, 2013.

IDERA PHARMACEUTICALS, INC.

By: /s/ Sudhir Agrawal
Name: Sudhir Agrawal
Title: Chief Executive Officer

CERTIFICATE OF AMENDMENT
TO THE
RESTATED CERTIFICATE OF INCORPORATION
OF
IDERA PHARMACEUTICALS, INC.

Idera Pharmaceuticals, Inc. (hereinafter called the "Corporation"), organized and existing under and by virtue of the General Corporation Law of the State of Delaware, does hereby certify as follows:

By action of the Board of Directors of the Corporation at a meeting held on May 22, 2013, the Board of Directors of the Corporation duly adopted a resolution, pursuant to Section 242 of the General Corporation Law of the State of Delaware, setting forth an amendment to the Restated Certificate of Incorporation of the Corporation, as amended to date (the "Certificate of Incorporation"), and declaring said amendment to be advisable. The stockholders of the Corporation duly approved said proposed amendment in accordance with Section 242 of the General Corporation Law of the State of Delaware at a meeting of stockholders held on July 26, 2013. The resolution setting forth the amendment is as follows:

RESOLVED: That the first paragraph of Article FOURTH of the Certificate of Incorporation be and hereby is amended and restated in its entirety so that the same shall read as follows:

"FOURTH. The total number of shares of all classes of stock which the Corporation shall have authority to issue is (i) Two Hundred Eighty Million (280,000,000) shares of Common Stock, $.001 par value per share ("Common Stock"), and (ii) Five Million (5,000,000) shares of Preferred Stock, $.01 par value per share ("Preferred Stock"), which may be issued from time to time in one or more series as set forth in Part B of this Article FOURTH."

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to be signed by its duly authorized officer this 26th day of July, 2013.

IDERA PHARMACEUTICALS, INC.

By: /s/ Sudhir Agrawal
Sudhir Agrawal, D. Phil.
President and Chief Executive Officer

IDERA PHARMACEUTICALS, INC.

CERTIFICATE OF ELIMINATION
OF NUMBER OF SHARES OF PREFERRED STOCK DESIGNATED AS SERIES D
CONVERTIBLE PREFERRED STOCK

Idera Pharmaceuticals, Inc. (hereinafter called the "Corporation"), pursuant to the authority conferred upon the Board of Directors of the Corporation (the "Board") by the Corporation's Restated Certificate of Incorporation, as amended, and in accordance with the provisions of Section 151(g) of the General Corporation Law of the State of Delaware, certifies that the Board duly adopted the following resolution:

"RESOLVED: That no shares of the Corporation's Series D Convertible Preferred Stock (the "Series D Preferred Stock") are outstanding and no shares of Series D Preferred Stock will be issued subject to the Corporation's Certificate of Designation, Preferences and Rights of Series D Preferred Stock, dated November 4, 2011, as amended, with respect to such series (the "Series D Certificate of Designation"); and that the Proper Officers be and hereby are authorized and directed in the name and on behalf of the Corporation to execute and file a certificate with the Secretary of State of the State of Delaware pursuant to Section 151(g) of the General Corporation Law of the State of Delaware setting forth the text of this resolution, upon the filing and effectiveness of which all matters as set forth in the Series D Certificate of Designation shall be deemed to have been eliminated from the Corporation's Restated Certificate of Incorporation, as amended (the "Restated Certificate") and the 1,124,260 shares of Preferred Stock previously designated as Series D Preferred Stock shall resume their status as undesignated shares of Preferred Stock available for future issuance in accordance with the Restated Certificate."

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to be signed by its duly authorized officer this 28th day of March, 2014.

IDERA PHARMACEUTICALS, INC.

By: /s/ Sudhir Agrawal
Sudhir Agrawal, D. Phil.
President and Chief Executive Officer

IDERA PHARMACEUTICALS, INC.

CERTIFICATE OF ELIMINATION
OF NUMBER OF SHARES OF PREFERRED STOCK DESIGNATED AS SERIES E CONVERTIBLE PREFERRED STOCK

Idera Pharmaceuticals, Inc. (hereinafter called the "Corporation"), pursuant to the authority conferred upon the Board of Directors of the Corporation (the "Board") by the Corporation's Restated Certificate of Incorporation, as amended, and in accordance with the provisions of Section 151(g) of the General Corporation Law of the State of Delaware, certifies that the Board duly adopted the following resolution:

"RESOLVED: That no shares of the Corporation's Series E Convertible Preferred Stock (the "Series E Preferred Stock") are outstanding and no shares of Series E Preferred Stock will be issued subject to the Corporation's Certificate of Designation, Preferences and Rights of Series E Preferred Stock, dated November 9, 2012, as amended, with respect to such series (the "Series E Certificate of Designation"); and that the Proper Officers be and hereby are authorized and directed in the name and on behalf of the Corporation to execute and file a certificate with the Secretary of State of the State of Delaware pursuant to Section 151(g) of the General Corporation Law of the State of Delaware setting forth the text of this resolution, upon the filing and effectiveness of which all matters as set forth in the Series E Certificate of Designation shall be deemed to have been eliminated from the Corporation's Restated Certificate of Incorporation, as amended (the "Restated Certificate") and the 424,242 shares of Preferred Stock previously designated as Series E Preferred Stock shall resume their status as undesignated shares of Preferred Stock available for future issuance in accordance with the Restated Certificate."

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Elimination to be signed by its duly authorized officer this 12th day of March, 2015.

IDERA PHARMACEUTICALS, INC.

By: /s/ Louis J. Arcudi, III
Louis J. Arcudi, III
Senior Vice President of Operations, Chief Financial Officer and Treasurer

CERTIFICATE OF AMENDMENT
TO THE
RESTATED CERTIFICATE OF INCORPORATION
OF
IDERA PHARMACEUTICALS, INC.

(Pursuant to Section 242 of the
General Corporation Law of the State of Delaware)

Idera Pharmaceuticals, Inc. (hereinafter called the "Corporation"), a corporation organized and existing under and by virtue of the General Corporation Law of the State of Delaware, does hereby certify as follows:

FIRST: A resolution was duly adopted by the Board of Directors of the Corporation pursuant to Section 242 of the General Corporation Law of the State of Delaware setting forth a proposed amendment to the Restated Certificate of Incorporation of the Corporation, as amended, and declaring said amendment to be advisable. The stockholders of the Corporation duly approved said proposed amendment in accordance with Section 242 of the General Corporation Law of the State of Delaware. The resolution setting forth the amendment is as follows:

RESOLVED: That the first paragraph of Article FOURTH of the Restated Certificate of Incorporation of the Corporation, as amended, be and hereby is deleted in its entirety and the following is inserted in lieu thereof:

"FOURTH. Effective upon the effective time of this Certificate of Amendment to the Restated Certificate of Incorporation pursuant to the General Corporation Law of the State of Delaware (the "Effective Time"), a one-for-eight reverse stock split of the Corporation's common stock, $.001 par value per share (the "Common Stock"), shall become effective, pursuant to which each eight shares of Common Stock issued or outstanding (including treasury shares) immediately prior to the Effective Time shall be reclassified and combined into one validly issued, fully paid and nonassessable share of Common Stock automatically and without any action by the Corporation or the holder thereof upon the Effective Time and shall represent one share of Common Stock from and after the Effective Time (such reclassification and combination of shares, the "Reverse Stock Split"). The par value of the Common Stock following the Reverse Stock Split shall remain at $.001 per share. No fractional shares of Common Stock shall be issued as a result of the Reverse Stock Split and, in lieu thereof, upon surrender after the Effective Time of a certificate which formerly represented shares of Common Stock that were issued and outstanding immediately prior to the Effective Time, any person who would otherwise be entitled to a fractional share of Common Stock as a result of the Reverse Stock Split, following the Effective Time, shall be entitled to receive a cash payment (without interest) equal to the fraction of a share of Common Stock to which such holder would otherwise be entitled multiplied by the closing price per share of the Common Stock on the Nasdaq Capital Market

on the first trading day that commences after the Reverse Stock Split is effective on the Nasdaq Capital Market.

Each stock certificate that, immediately prior to the Effective Time, represented shares of Common Stock that were issued and outstanding immediately prior to the Effective Time shall, from and after the Effective Time, automatically and without the necessity of presenting the same for exchange, represent that number of whole shares of Common Stock after the Effective Time into which the shares formerly represented by such certificate have been reclassified (as well as the right to receive cash in lieu of fractional shares of Common Stock as set forth above); provided, however, that each person of record holding a certificate that represented shares of Common Stock that were issued and outstanding immediately prior to the Effective Time shall receive, upon surrender of such certificate, if any, a written confirmation from the Corporation's transfer agent indicating the number of whole shares of Common Stock after the Effective Time into which the shares of Common Stock formerly represented by such certificate shall have been reclassified as well as any cash in lieu of fractional shares to which such holder may be entitled as set forth above.

The total number of shares of all classes of stock which the Corporation shall have authority to issue is (i) Seventy Million (70,000,000) shares of Common Stock, $.001 par value per share, and (ii) Five Million (5,000,000) shares of Preferred Stock, $.01 par value per share ("Preferred Stock"), which may be issued from time to time in one or more series as set forth in Part B of this Article FOURTH."

SECOND: This Certificate of Amendment shall be effective at 5:00 p.m., Eastern time, on July 27, 2018.

IN WITNESS WHEREOF, the Corporation has caused this Certificate of Amendment to be signed by its duly authorized officer this 27th day of July, 2018.

IDERA PHARMACEUTICALS, INC.

By: /s/ Vincent J. Milano
Vincent J. Milano
President and Chief Executive Officer

Confidential Materials omitted and filed separately with the
Securities and Exchange Commission. Double asterisks denote omissions.

CLINICAL TRIAL COLLABORATION AND SUPPLY AGREEMENT

This **CLINICAL TRIAL COLLABORATION AND SUPPLY AGREEMENT** (the "***Agreement***") is made and entered into effective as of the date signed by the last Party to sign below (the "***Effective Date***") by and between Idera Pharmaceuticals Inc., having a place of business at **505 Eagleview Boulevard, Suite 212, Exton, PA 19341** (the "***Recipient***") and **Bristol-Myers Squibb Company**, having a place of business at 345 Park Avenue, New York, NY 10154 ("***BMS***"). The Recipient and BMS are sometimes individually referred to in this Agreement as a "***Party***" and collectively as the "***Parties***."

PRELIMINARY STATEMENTS

A. The Recipient desires to conduct, and BMS desires to supply the BMS Study Drug (as defined below) for the conduct of, a Combined Therapy Clinical Trial (as defined below) in accordance with the Protocol (as defined below) therefor and in accordance with the terms of this Agreement.

B. The Parties desire to agree on various terms and conditions to govern the Parties' obligations in connection with the performance of the Combined Therapy Clinical Trial.

NOW, THEREFORE, in consideration of the foregoing premises and the mutual promises and covenants contained herein, the Parties agree as follows:

ARTICLE 1

DEFINITIONS

The terms in this Agreement with initial letters capitalized, whether used in the singular or the plural, shall have the meaning set forth below or, if not listed below, the meaning designated in places throughout this Agreement.

"***Adverse Event***," ("AE") "***Serious Adverse Event***" ("SAE") and "***Serious Adverse Drug Reaction***" ("SADR") shall have the meanings provided to such terms in the International Conference on Harmonization ("ICH") guideline for industry on Clinical Safety Data Management (E2A, Definitions and Standards for Expedited Reporting).

"***Affiliate***" means, with respect to a particular Party, an entity that, directly or indirectly, through one or more intermediaries, controls, is controlled by, or is under common control with such Party. As used in this definition, the term "controls" (with correlative meanings for the terms "controlled by" or "under common control with") means (a) that an entity owns, directly or indirectly, more than fifty percent (50%) of the voting stock of another entity, or (b) that an entity, person or group otherwise has the actual ability to control and direct the management of the entity, whether by contract or otherwise.

"***Agreement***" shall have the meaning set forth in the preamble to this Agreement, and includes the Appendices attached hereto, the Supply and Quality Documentation and any and all amendments of any of the foregoing hereafter signed by the Parties with reference to this Agreement and made part hereof.

"***Applicable Law***" means all applicable laws, rules and regulations (whether federal, state or local) that may be in effect from time to time, including current Good Clinical Practices (GCP), Good Laboratory Practices (GLP) and Good Manufacturing Practices (GMP).

"***Arbitration Matter***" means any disputed matter that relates to or arises out of the validity, interpretation or construction of, or the compliance with or breach of, this Agreement; *provided that* such disputed matter has been considered, but not resolved, by the Executive Officers as set forth in Section 13.3. For clarity, no Publication Dispute, or any matter requiring mutual agreement of both Parties shall be an Arbitration Matter.

"***BMS Class Drug***" means (i) the BMS Study Drug and (ii) any other antibodies that are designed to selectively bind to cytotoxic T-lymphocyte-associated antigen ("CTLA-4").

"***BMS Indemnitees***" shall have the meaning set forth in Section 11.2.

"***BMS Independent Patent Rights***" means any Patent Rights Controlled by BMS (or its Affiliates) (a) as of the Effective Date or (b) during the Term the subject matter of which was conceived or first reduced to practice through activities other than those performed pursuant to this Agreement, in each case of (a) or (b) that Cover the use (whether alone or in combination with other agents), manufacture, formulation or composition of matter of the BMS Study Drug.

"***BMS Regulatory Documentation***" means any Regulatory Documentation pertaining to the BMS Study Drug that exists as of the Effective Date or that is created during the Term through efforts outside this Agreement.

"***BMS Study Data***" shall have the meaning set forth in Section 8.1.

"***BMS Study Drug***" means BMS's proprietary monoclonal antibody product known as Yervoy® (ipilimumab).

"***BMS Study Invention***" means any Invention that pertains solely to (a) the composition of matter of any BMS Class Drug (and not any Recipient Class Drug), (b) method of manufacture or formulation of any BMS Class Drug (and not any Recipient Class Drug) as a Single Agent Compound, and/or (c) a method of use of any BMS Class Drug (and not any Recipient Class Drug) as a monotherapy or as used with other agents, antibodies or compounds (other than an Invention pertaining, whether generically or specifically, to the composition of matter, method of manufacture or formulation, or a method of use of both a BMS Class Drug and a Recipient Class Drug).

"***BMS Study Patent Rights***" means any Patent Rights that Cover any BMS Study Invention (and not a Recipient Study Invention or Combined Therapy Invention), excluding BMS Independent Patent Rights and BMS Technology. For avoidance of doubt, any Patent Rights that cover both (a) a BMS Study Invention and (b) any other type of Invention is included within the Combined Therapy Patent Rights.

"***BMS Technology***" means all Technology Controlled by BMS (or its Affiliates) as of the Effective Date or during the Term created through efforts outside of this Agreement related to the BMS Study Drug or the Combined Therapy and necessary for the conduct of the Combined Therapy Clinical Trial. For clarity, BMS Technology does not include (a) Inventions, (b) Study Data, or (c) Combined Therapy Clinical Trial Regulatory Documentation.

"***Breaching Party***" shall have the meaning set forth in Section 12.2(a).

"***Business Day***" means a day other than Saturday, Sunday or any day on which commercial banks located in New York, NY are authorized or obligated by Applicable Law to close.

"***Clinical Hold***" means that (a) the FDA has issued an order to a Party pursuant to 21 CFR §312.42 to delay a proposed clinical investigation or to suspend an ongoing clinical investigation of the Combined

Therapy or such Party's Single Agent Compound in the United States or (b) a Regulatory Authority other than the FDA has issued an equivalent order to that set forth in (a) in any other country or group of countries.

"***Combined Therapy***" means a therapy using the Recipient Study Drug and the BMS Study Drug together concomitantly or sequentially, whether with or without another agent.

"***Combined Therapy Clinical Trial***" means the human clinical trial using the Recipient Study Drug and the BMS Study Drug, which will be conducted under the Recipient's protocol (said, protocol, as it may be amended from time to time in accordance with this Agreement, the "***Protocol***") and is incorporated herein by reference. The draft Protocol as of the Effective Date is attached as Appendix A hereto.

"***Combined Therapy IND***" shall have the meaning set forth in Section 2.1(b).

"***Combined Therapy Invention***" means any Invention that is not a Recipient Study Invention or a BMS Study Invention.

"***Combined Therapy Patent Right(s)***" means any Patent Rights that Cover any Combined Therapy Invention or Combined Therapy Study Data, excluding BMS Independent Patent Rights and Recipient Independent Patent Rights.

"***Combined Therapy Clinical Trial Regulatory Documentation***" means any Regulatory Documentation to be submitted for the conduct of the Combined Therapy Clinical Trial, but excluding (a) any Recipient Regulatory Documentation and (b) any BMS Regulatory Documentation.

"***Combined Therapy Study Data***" shall have the meaning set forth in Section 8.2.

"***Commercially Reasonable Efforts***" means, with respect to a Party, the level of effort and resources normally devoted by such Party to conduct a clinical trial for a biopharmaceutical product or compound that is owned by it or to which it has rights, which is of similar market potential, profit potential or strategic value and at a similar stage in its development or product life based on conditions then prevailing.

"***Confidential Information***" shall have the meaning set forth in Section 9.1(a).

"***Control***" or "***Controlled***" means, with respect to particular information or intellectual property, that the applicable Party owns or has a license to such information or intellectual property and has the ability to grant a right, license or sublicense to the other Party as provided for herein without violating the terms of any agreement or other arrangement with any Third Party.

"***Cover***" means, with respect to a Patent Right, that, but for rights granted to a Person under such Patent Right, the practice by such Person of an invention described in such Patent Right would infringe a claim included in such Patent Right, or in the case of a Patent Right that is a patent application, would infringe a claim in such patent application if it were to issue as a patent. "***Covered***" or "***Covering***" shall have correlative meanings.

"***CRO***" means any Third Party contract research organization used to conduct the Combined Therapy Clinical Trial, including laboratories and Third Parties used to maintain the safety database from the Combined Therapy Clinical Trial, but, for clarity, excluding clinical trial sites and any Third Parties who are individuals.

"***Cure Period***" shall have the meaning set forth in Section 12.2(a).

"***[**]***" means [**].

"***[**]***" means [**].

"***Date of First Receipt***" means, with respect to a Party, the date on which any employee of such Party, its Affiliates or its Third Party subcontractors first becomes aware of safety-related information.

"***Designated Clinical Contact***" shall have the meaning set forth in Section 2.3.

"***Designated Supply Contact***" shall have the meaning set forth in Section 4.7.

"***Dispute***" shall have the meaning set forth in Section 13.3(b).

"***Effective Date***" shall have the meaning set forth in the preamble to this Agreement.

"***Executive Officers***" means the Chief Executive Officer of the Recipient and the Head of Oncology Development of BMS (or their respective designees).

"***FDA***" means the United States Food and Drug Administration, or any successor agency having the same or similar authority.

"***Filing Party***" shall have the meaning set forth in Section article 6(c).

"***Global Safety Database***" means the database containing Adverse Events, Serious Adverse Events, Serious Adverse Drug Reactions and pregnancy reports for the Combined Therapy, and shall be the authoritative data source for regulatory reporting and responding to regulatory queries with respect to the Combined Therapy Clinical Trial.

"***Good Clinical Practices***" or "***GCP***" means, as to the United States and the European Union, applicable good clinical practices as in effect in the United States and the European Union, respectively, during the Term and, with respect to any other jurisdiction, clinical practices equivalent to good clinical practices as then in effect in the United States or the European Union.

"***Good Laboratory Practices***" or "***GLP***" means, as to the United States and the European Union, applicable good laboratory practices as in effect in the United States and the European Union, respectively, during the Term and, with respect to any other jurisdiction, laboratory practices equivalent to good laboratory practices as then in effect in the United States or the European Union.

"***Good Manufacturing Practices***" or "***GMP***" means, as to the United States and the European Union, applicable good manufacturing practices as in effect in the United States and the European Union, respectively, during the Term and, with respect to any other jurisdiction, manufacturing practices equivalent to good manufacturing practices as then in effect in the United States or the European Union.

"***ICF***" shall have the meaning set forth in Section 5.1(f).

"***IND***" means (a) an Investigational New Drug Application as defined in the United States Food, Drug and Cosmetic Act, as amended, and regulations promulgated thereunder, or any successor application or procedure required to initiate clinical testing of a drug in humans in the United States, (b) a counterpart of such an Investigational New Drug Application that is required in any other country before beginning clinical testing of a drug in humans in such country, including, for clarity, a "***Clinical Trial Application***" in the European Union, and (c) all supplements and amendments to any of the foregoing.

"***Indemnify***" shall have the meaning set forth in Section 11.1.

"***Infringe***" and "***Infringement***" means any alleged or threatened (in writing) infringement, or misappropriation by a Third Party, of any Patent Rights.

"***Invention***" means any invention or Technology, whether or not patentable, that is made, conceived, or first actually reduced to practice following the Effective Date by, for or on behalf of a Party, or by, for or on behalf of the Parties together (including by a Third Party in the performance of the Combined Therapy Clinical Trial), (a) in relation to the Combined Therapy Clinical Trial to be conducted under this Agreement or (b) by the use of unpublished Study Data, but excluding in each case any Study Data.

"***IRB***" means an Investigational Review Board or Ethics Committee (or similar body in a given country).

"***Licensee***" shall have the meaning set forth in Section 13.10(b).

"***Losses***" shall have the meaning set forth in Section 11.1.

"***Manufacture"*** or "***Manufacturing***" means manufacturing, processing, formulating, packaging, labeling, holding (including storage), and quality control testing of a Single Agent Compound or the Combined Therapy, in each case so as to be suitable for use in the Combined Therapy Clinical Trial under Applicable Law.

"***Material Safety Issue***" means a Party's good faith belief that there is an unacceptable risk for harm in humans based upon: (a) pre-clinical safety data, including data from animal toxicology studies, or (b) the observation of Serious Adverse Events in humans after the Recipient Study Drug or the BMS Study Drug, either as a Single Agent Compound or in combination with another pharmaceutical agent (including as the Combined Therapy), has been administered to or taken by humans, such as during the Combined Therapy Clinical Trial.

"***NDA***" means (a) any new drug application or biologics license application filed with the FDA, or any successor application or procedure required to introduce a drug or biologic into commerce in the United States, (b) a counterpart of such a new drug application or biologics license application that is required in any other country before beginning the commercialization of a drug or a biologic in humans in such country, and (c) all supplements and amendments to any of the foregoing.

"***Non-Breaching Party***" shall have the meaning set forth in Section 12.2(a).

"***Officials***" shall have the meaning set forth in Section 10.9.

"***Operational Matters***" shall have the meaning set forth in Section 5.1.

"***Party***" or "***Parties***" shall have the meaning set forth in the preamble to this Agreement.

"***Patent Rights***" means any (a) United States or foreign patents, (b) United States or foreign patent applications, including all provisional applications, substitutions, continuations, continuations-in-part, divisions, renewals, and all patents granted thereon, (c) United States or foreign patents-of-addition, reissues, reexaminations (including *ex parte* reexaminations, *inter partes* reviews, *inter partes* reexaminations, post grant reviews and supplemental examinations) and extensions or restorations by existing or future extension or restoration mechanisms, including supplementary protection certificates, patent term extensions, or the equivalents thereof, and (d) any other form of government-issued right substantially similar to any of the foregoing.

"***Payment***" shall have the meaning set forth in Section 10.9.

"***Person***" means any individual, sole proprietorship, partnership, limited partnership, limited liability partnership, corporation, limited liability company, business trust, joint stock company, trust,

unincorporated association, joint venture or other similar entity or organization, including a government or political subdivision, department or agency of a government.

"***Personal Data***" means any information relating to an identified or identifiable natural person.

"***POTV***" shall have the meaning set forth in Section 9.7(a).

"***Protocol***" shall have the meaning set forth in the definition of Combined Therapy Clinical Trial.

"***Publication Dispute***" shall have the meaning set forth in Section 9.6(b).

"***Quarter***" means a calendar quarter.

"***Recipient Class Drug***" means the Recipient Study Drug and any other TLR-9 Agonist.

"***Recipient Indemnitees***" shall have the meaning set forth in Section 11.1.

"***Recipient Independent Patent Rights***" means any Patent Rights Controlled by the Recipient or a Recipient Affiliate (a) as of the Effective Date or (b) during the Term the subject matter of which was conceived or first reduced to practice through activities other than those performed pursuant to this Agreement, in each case (a) and (b) that Cover the use (either alone or in combination with other agents), manufacture, formulation or composition of matter of the Recipient Study Drug.

"***Recipient Regulatory Documentation***" means any Regulatory Documentation pertaining to the Recipient Study Drug that exists as of the Effective Date or that is created during the Term through efforts outside this Agreement.

"***Recipient Study Data***" shall have the meaning set forth in Section 8.2.

"***Recipient Study Drug***" means the Recipient's TLR-9 Agonist (Toll-Like Receptor Agonist), IMO-2125.

"***Recipient Study Invention***" means any Invention that pertains solely to (a) the composition of matter of any Recipient Class Drug (and not any BMS Class Drug), (b) method of manufacture or formulation of any Recipient Class Drug (and not any BMS Class Drug) as a Single Agent Compound, or (c) a method of use of the Recipient Class Drug (and not any BMS Class Drug) as a monotherapy or as used in combination with other agents, antibodies or compounds (other than Invention pertaining, whether generically or specifically, to the composition of matter, method of manufacture, formulation or a method of use of both a BMS Class Drug and a Recipient Class Drug.

"***Recipient Study Patent Rights***" means any Patent Rights that Cover any Recipient Study Invention (and not a BMS Study Invention or a Combined Therapy Invention), excluding Recipient Independent Patent Rights and Recipient Technology. For avoidance of doubt, any Patent Rights that cover both (a) a Recipient Study Invention and (b) any other type of Invention is included within the Combined Therapy Patent Rights.

"***Recipient Technology***" means all Technology Controlled by the Recipient or a Recipient Affiliate as of the Effective Date or during the Term created through efforts outside of this Agreement related to the Recipient Study Drug or the Combined Therapy. For clarity, Recipient Technology does not include (a) Inventions, (b) Study Data, or (c) Combined Therapy Clinical Trial Regulatory Documentation.

"***Regulatory Authority***" means the FDA or any other governmental authority outside the United States (whether supranational, national, federal, provincial and/or local) that is the counterpart to the FDA, including the European Medicines Agency for the European Union.

"***Regulatory Documentation***" means, with respect to a Party's Single Agent Compound, all submissions to Regulatory Authorities in connection with the development of such Single Agent Compound, as applicable, including all INDs and amendments thereto, NDAs and amendments thereto, drug master files, correspondence with regulatory agencies, periodic safety update reports, adverse event files, complaint files, inspection reports and manufacturing records, in each case together with all supporting documents (including documents that include clinical data).

"***Results***" shall have the meaning set forth in Section 9.6(b).

"***Right of Cross-Reference***" means, with regard to a Party, allowing the applicable Regulatory Authority in a country to have access to relevant information (by cross-reference, incorporation by reference or otherwise) contained in Regulatory Documentation (and any data contained therein) filed with such Regulatory Authority with respect to a Party's Single Agent Compound (and, in the case of BMS, the Right to Cross-Reference the Combined Therapy IND and any Regulatory Documentation and data contained therein), only to the extent necessary for the conduct of the Combined Therapy Clinical Trial in such country or as otherwise expressly permitted or required under this Agreement to enable a Party to exercise its rights or perform its obligations hereunder, and, except as to information contained in the Combined Therapy IND pertaining to the Combined Therapy, without the disclosure of such information to such Party.

"***Safety Issue***" means any information suggesting an emerging safety concern or possible change in the risk-benefit balance for the BMS Study Drug, including information on a possible causal relationship between an Adverse Event and a drug, the relationship being unknown or incompletely documented previously.

"***Safety Signal***" means information arising from one or multiple sources, including observations and experiments, which suggests a new potentially causal association, or a new aspect of a known association between an intervention and an event or set of related events, either adverse or beneficial, that is judged to be of sufficient likelihood to justify verificatory action.

"***Samples***" means biological specimens collected from Combined Therapy Clinical Trial study subjects (including fresh and/or archived tumor samples, serum, peripheral blood mononuclear cells, plasma, and whole blood for RNA and DNA sample isolation).

"***Shortage***" shall have meaning set forth in Section 4.5.

"***Single Agent Compound***" or "***Compound***" means, with respect to (a) the Recipient, the Recipient Study Drug, as monotherapy, and (b) BMS, the BMS Study Drug, as monotherapy.

"***Sponsor***" means an applicant or holder of clinical studies applications/notifications.

"***Study Data***" shall have the meaning set forth in Section 8.1.

"***Sunshine Laws***" shall have the meaning set forth in Section 9.7(c).

"***Supply and Quality Documentation***" shall have the meaning set forth in Section 4.3.

"***Technology***" means information, inventions, discoveries, trade secrets, knowledge, technology, methods, processes, practices, formulae, instructions, skills, techniques, procedures, experiences, ideas, technical assistance, designs, drawings, assembly procedures, computer programs, specifications, data and results not generally known to the public (including biological, chemical, pharmacological, toxicological, pharmaceutical, physical and analytical, pre-clinical, clinical, safety, manufacturing and quality control data and know-how, including study designs and protocols), in all cases, whether or not patentable, in written,

electronic or any other form now known or hereafter developed and materials, including Regulatory Documentation.

"***Term***" shall have the meaning set forth in Section 12.1.

"***Territory***" means all countries.

"***Third Party***" means any Person or entity other than the Recipient and BMS and their respective Affiliates.

"***Third Party Claim***" shall have the meaning set forth in Section 11.1.

"***Third Party License Payments***" means any payments (e.g., upfront payments, milestones, royalties) due to any Third Party under license agreements or other written agreements granting rights to intellectual property owned or controlled by such Third Party to the extent that such rights are necessary for (a) the making, using or importing of a Party's Single Agent Compound for the conduct of the Combined Therapy Clinical Trial, or (b) the conduct of the Combined Therapy Clinical Trial.

"***TP Study Costs***" shall have the meaning set forth in Section 7.2.

ARTICLE 2

SCOPE

2.1 Scope.

(a) The Recipient will conduct the Combined Therapy Clinical Trial in accordance with the agreed upon Protocol and the terms of this Agreement. The Recipient shall be solely responsible for the content of the Protocol; *provided that*: (i) the Recipient will notify BMS of any proposed material amendments to the draft Protocol attached as Appendix A to this Agreement (or to the final Protocol initially approved by an IRB) and the Recipient will consider any comments provided by BMS regarding the proposed amendments and (ii) any changes to the draft Protocol attached as Appendix A (or to the final Protocol initially approved by an IRB) that pertain to the administration of the BMS Study Drug must be reviewed and expressly approved by BMS in writing or the change may not be implemented. BMS shall have [**] from the date on which the Recipient provides the applicable Protocol amendment to BMS to approve or provide any comments to the Recipient concerning the proposed amendment.

(b) The Combined Therapy Clinical Trial shall be conducted under the Recipient's IND, and shall be conducted only in the Territory. The Recipient shall be the sole holder of all legal interests in its IND; *provided, however, that* the Recipient may not grant any Third Party any Right of Cross-Reference with respect to any portion of its IND pertaining to BMS's Single Agent Compound for use as monotherapy or for use in combination with any molecules, agents, antibodies or compounds other than the Recipient Study Drug.

(c) BMS will make available its current package insert for the BMS Study Drug in the Territory available to the Recipient and will provide any updates thereto at the same time as the same are made publicly available.

(d) If the Recipient and BMS agree that the Recipient will require access to the investigator's brochure for the BMS Study Drug in order for the site to conduct the Combined Therapy Clinical Trial, then (i) BMS will provide the current version of its Investigator Brochure to the Recipient

promptly and (ii) will thereafter, until the conclusion of the Combined Therapy Clinical Trial, provide to the Recipient, upon reasonable request, the latest investigator's brochure for the BMS Study Drug or any amendments thereto in accordance with BMS's customary practices for same. The Recipient shall, and shall require that any clinical trial sites for the Combined Therapy Clinical Trial shall, use any such data provided pursuant to this Section 2.1(d) solely (A) to evaluate the safety and efficacy of the BMS Study Drug and the Combined Therapy for use in Combined Therapy Clinical Trial, (B) to meet any regulatory requirements pertaining to the conduct of the Combined Therapy Clinical Trial and (C) to enable the Recipient to draft and update as necessary the investigator's brochure for the Combined Therapy Clinical Trial. The Recipient will ensure that clinical trial sites for the Combined Therapy Clinical Trial are obligated to protect such information and disclosures as set forth in Article 9. The Recipient's right to use the investigator's brochure provided by BMS shall terminate upon the expiration or termination of the Combined Therapy Clinical Trial and shall not be used for purposes of conducting any other clinical studies.

(e) If requested in writing by the Recipient and agreed to by BMS (such consent not to be unreasonably withheld), BMS shall provide a Right of Cross-Reference as needed to its existing Regulatory Documentation for BMS's Single Agent Compound for those countries in the Territory where the Combined Therapy Clinical Trial will be conducted solely as necessary to allow the Combined Therapy Clinical Trial to be conducted under the Combined Therapy IND in an applicable country; *provided that* such Right of Cross-Reference shall terminate upon the expiration or termination of this Agreement and shall not be used for purposes of conducting any other clinical studies, except that, in the case of termination for a Material Safety Issue pursuant to Section 12.4, such Right of Cross-Reference shall remain in effect solely (i) to the extent necessary to permit the Recipient to comply with any outstanding obligations required by a Regulatory Authority and/or Applicable Law or (ii) as necessary to permit the Recipient to continue to dose subjects enrolled in the Combined Therapy Clinical Trial through completion of the Protocol if required by the applicable Regulatory Authority(ies) and/or Applicable Laws.

(f) If PDL-1 biomarker testing is incorporated into the Protocol, the Recipient agrees to use the commercially available [**] to perform such testing.

(g) The Recipient shall refer to the applicable BMS Study identification number (CA209-8MN) in all Combined Therapy Clinical Trial reports, reports of Serious Adverse Events, BMS Study Drug requests, and all other material submissions or communications to BMS relating to the Protocol.

2.2 Adverse Event Reporting.

(a) This Section 2.2 shall govern safety reporting arising from the Combined Therapy Clinical Trial. The Recipient will manage all drug safety reporting activities for the Combined Therapy Clinical Trial.

(b) The Recipient will forward to BMS at the contact information below via fax or secure e-mail in a CIOMS form all fatal or life threatening SAE reports within [**] of Date of First Receipt, all other SAE reports, reports of exposure during pregnancy (maternal and paternal) and reports of suspected transmission of an infectious agent via the BMS Study Drug or Combined Therapy within [**] of Date of First Receipt, in each case for the BMS Study Drug and the Combined Therapy administered in the Combined Therapy Clinical Trial.

BMS – Adverse Event Reporting Contact	
E-mail	[**]
Fax	[**]

Idera – Pharmacovigilance Contact - [**], Senior Director, Pharmacovigilance	
Email	[**]
Telephone	[**]

(c) Each Party shall collect, use and disclose Personal Data obtained in the course of performing the pharmacovigilance activities under this Section 2.2 solely for the purposes of complying with the regulatory obligations as described in this Agreement, or as otherwise required by Applicable Law or by a court order. Both Parties will use electronic, physical, and other safeguards appropriate to the nature of the information to prevent any use or disclosure of Personal Data other than as provided for by this Agreement and permitted under the ICF. Both Parties will also take reasonable precautions to protect such Personal Data from accidental, unauthorized, or unlawful alteration or destruction. Each Party will notify the other Party promptly of any accidental, unauthorized, or unlawful destruction, loss, alteration, or disclosure of, or access of such Personal Data.

(d) The Recipient will promptly make available to BMS upon request such records that the Recipient Controls as is necessary or useful to perform medical assessment of any Adverse Event associated with the use of the BMS Study Drug or Combined Therapy reported during the Combined Therapy Clinical Trial that is forwarded to BMS under this Agreement. The Recipient will designate a single point of contact within its organization (and will provide to BMS the email address of such point of contact prior to the start of the Combined Therapy Clinical Trial) for any pharmacovigilance-related follow-up questions that BMS would have.

(e) The Recipient shall perform case level reconciliation to confirm that BMS has received all reports required under this Agreement. The Recipient shall e-mail [**] to request a reconciliation report for the Combined Therapy Clinical Trial. The Recipient shall reconcile the cases identified as being transmitted to BMS on BMS's reconciliation report and those contained in the Combined Therapy Clinical Trial database. The Recipient shall send missing case-level events to [**] or by fax at [**]. The Recipient shall perform such reconciliation every [**], unless otherwise agreed by BMS in writing.

(f) As Sponsor, the Recipient will be responsible for submitting all applicable Individual Case Safety Report (ICSRs) and aggregate report submissions to Regulatory Authorities for the Combined Therapy Clinical Trial. The Recipient will provide BMS with the final version of any aggregate report relating to the Combined Therapy Clinical Trial at the time of submission. The Recipient will also submit appropriate safety letters or safety reports to study investigators, the reviewing IRB and authorized Regulatory Authorities in accordance with Applicable Law.

(g) In the event that BMS produces any Development Safety Update Report ("***DSUR***") in respect to the BMS Study Drug, BMS will provide to the Recipient upon request, and for the duration of the Combined Therapy Clinical Trial, copies of the executive summary and any line listings of Serious Adverse Drug Reactions extracted from the final DSUR for information purposes only and to assist the Recipient in generation of their own clinical trial aggregate report, where applicable. The Recipient agrees not to forward such BMS DSUR sections to any Third Party, except to its Affiliates, consultants, advisors and contractors under obligations of confidentiality for generation of such a clinical trial aggregate report.

(h) If the Recipient determines there is a significant Safety Issue or significant Safety Signals arising in a clinical trial that may be associated with the BMS Study Drug or Combined Therapy, the Recipient will disclose such information to BMS promptly after such determination.

(i) BMS will ensure that any urgent Safety Issues or Safety Signals relating to the BMS Study Drug will be communicated to the Recipient promptly after such determination.

2.3 Clinical Study Designated Contact. Each Party will designate an employee within its organization (the "***Designated Clinical Contact***") who will coordinate and/or facilitate:

(a) the review of Protocol amendments submitted by the Recipient for BMS approval and with whom comments thereon may be discussed;

(b) any BMS clinical and regulatory responsibilities and communications regarding the Combined Therapy Clinical Trial;

(c) internal BMS review of any document or regulatory communication and the provision of any BMS comments; and

(d) discussion of any other topics or issues relating to the Combined Therapy Clinical Trial requested by the Recipient or BMS.

2.4 Conduct. Each Party shall use Commercially Reasonable Efforts to (a) perform and fulfill its respective activities under the Combined Therapy Clinical Trial and this Agreement on a timely basis and in an effective manner consistent with prevailing standards, (b) supply the quantities of its Compound in accordance with Article 4 as needed to conduct the Combined Therapy Clinical Trial on a timely basis, and, in the case of the Recipient, package and deliver same to study sites on a timely basis, and (c) in the case of the Recipient, conduct and complete the Combined Therapy Clinical Trial on a timely basis in accordance with the Protocol and Third Party agreements relating thereto, and provide sufficient resources, funding and personnel to conduct and perform the Combined Therapy Clinical Trial on a timely basis in accordance with the Protocol for same and the terms of this Agreement. Each Party shall perform its duties for the Combined Therapy Clinical Trial in accordance with Applicable Law, including GCP, GLP and GMP as applicable.

ARTICLE 3

LICENSE GRANTS

3.1 Grant by BMS. Subject to the terms of this Agreement, BMS hereby grants, and shall cause its Affiliates to grant, to the Recipient a non-exclusive, non-transferable, royalty-free license (with the right to sublicense solely pursuant to the terms of and subject to the limitations of Section 3.2) under the BMS Independent Patent Rights and BMS Technology to use the BMS Study Drug solely within the Territory and solely to the extent necessary to discharge the Recipient's obligations under this Agreement with respect to the conduct of the Combined Therapy Clinical Trial in the Territory.

3.2 Sublicensing.

(a) The Recipient shall have the right to grant sublicenses under the licenses granted to it under Section 3.1, to Affiliates and to Third Parties, if required for an Affiliate or a Third Party to perform its duties with respect to the conduct of the Combined Therapy Clinical Trial, solely as necessary to assist the Recipient in carrying out its responsibilities with respect to the Combined Therapy Clinical Trial.

(b) With regard to any such sublicenses permitted and made under this Agreement, (i) the sublicensees, except Affiliates (so long as they remain Affiliates of the Recipient), shall be subject to written agreements that bind such sublicensees to obligations that are consistent with the Recipient's obligations under this Agreement including confidentiality and non-use provisions no less restrictive than those set forth in herein, and provisions regarding intellectual property that ensure that the Parties will have the rights provided under this Agreement to any intellectual property relating to their Single Agent

Compound and/or the Combined Therapy created by such sublicensee, (ii) the Recipient shall provide written notice to BMS of any such sublicense (and obtain approval for sublicenses to Third Parties other than clinical trial sites); and (c) the Recipient shall remain liable to the other Party for all actions of the Recipient's sublicensees.

3.3 No Implied Licenses. Unless and except as specifically set forth in this Agreement, neither Party shall acquire any license or other intellectual property interest, by implication or otherwise, in any intellectual property of the other Party, including Confidential Information disclosed to it under this Agreement or under any Patent Rights Controlled by the other Party or its Affiliates.

ARTICLE 4

MANUFACTURE AND SUPPLY

4.1 Recipient Study Drug Manufacture and Supply.

(a) The Recipient shall be responsible, at its sole costs and expense, for manufacturing, packaging and labeling (or having manufactured, packaged or labeled) GMP-grade quantities of the Recipient Study Drug, as well as obtaining any other drug (other than the BMS Study Drug provided by BMS pursuant to Section 4.2) required for the conduct of the Combined Therapy Clinical Trial, and shall package and label if and as required by the Protocol and/or applicable Regulatory Authorities all drugs (including the BMS Study Drug) used in the Combined Therapy Clinical Trial, on a timely basis and in accordance with applicable specifications as required for the conduct of the Combined Therapy Clinical Trial. The Recipient Study Drug shall be manufactured in accordance with Applicable Law (including GMP) and shall be of similar quality to the Recipient Study Drug used by the Recipient for its other clinical trials of the Recipient Study Drug.

(b) The Recipient shall provide BMS with prompt notice of any Manufacturing and supply issues with respect to the Recipient Study Drug or BMS Study Drug that may adversely impact the conduct or timelines of the Combined Therapy Clinical Trial.

4.2 BMS Study Drug.

(a) Manufacture and Supply. BMS shall Manufacture or have Manufactured the BMS Study Drug in reasonable quantities needed, and at the points in time as agreed to by the Parties, for the Combined Therapy Clinical Trial, and shall supply such BMS Study Drug as commercially labeled to the Recipient or its designee for use solely in the Combined Therapy Clinical Trial. The Recipient will at its sole expense, package and label the BMS Study Drug for use in the Combined Therapy Clinical Trial to the extent necessary. The cost of Manufacture and supply (including shipping, taxes and duty, if applicable) of the BMS Study Drug for the Combined Therapy Clinical Trial shall be borne solely by BMS, and BMS shall bear the risk of loss for such quantities of BMS Study Drug until delivery of such quantities of BMS Study Drug to the Recipient or its Designated Supply Contact(s). BMS shall also be responsible for the payment of any Third Party License Payments that may be due based on the manufacture, supply and use of the BMS Study Drug used in the Combined Therapy Clinical Trial. The BMS Study Drug shall be manufactured in accordance with Applicable Law (including GMP) and shall be of similar quality to the BMS Study Drug used by BMS for its other clinical trials of the BMS Study Drug. BMS shall deliver certificates of analysis, and any other documents specified in the Supply and Quality Documentation, including such documentation as is necessary to allow the Recipient to compare the BMS Study Drug certificate of analysis to the BMS Study Drug specifications. Pursuant to the Supply and Quality Documentation, BMS shall be responsible for the regulatory compliance of the quality of the BMS Study Drug at the time the BMS Study Drug is delivered to the Recipient with the regulatory filings in the countries

in the Territory where the Combined Therapy Clinical Trial will be performed. Subject to Section 4.4, the Parties shall cooperate in accordance with Applicable Law to minimize indirect taxes (such as value added tax, sales tax, consumption tax and other similar taxes) relating to the BMS Study Drug in connection with this Agreement.

(b) Use of BMS Study Drug Supplied by BMS to the Recipient. The Recipient shall use the quantities of BMS Study Drug supplied to it under this Agreement solely as necessary for, and in accordance with, this Agreement and the Protocol, and for no other purpose, including as a reagent or tool to facilitate its internal research efforts, for any commercial purpose, or for other clinical or non-clinical research unrelated to the Combined Therapy Clinical Trial. Except as may be required or expressly permitted by the Protocol or the Supply and Quality Documentation, the Recipient shall not perform, and shall not allow any Third Party to perform, any analytical testing of the quantities of BMS Study Drug supplied to it under this Agreement. If Study Drug supplied by BMS is lost, damaged, destroyed or becomes unable to comply with applicable specifications while under the control of the Recipient or any of its (sub)contractors, including common carriers and clinical study sites contracted by the Recipient, BMS shall not be obligated to replace same and if BMS does elect to do so, BMS may elect to charge the Recipient a reasonable replacement cost to replace same...

4.3 Supply and Quality Documentation. BMS shall supply the BMS Study Drug to the Recipient in accordance with such supply and quality addenda or agreement(s) as the Parties may agree (the "***Supply and Quality Documentation***"). The Supply and Quality Documentation will, among other things, (i) specify the vial sizes of BMS Study Drug to be supplied by BMS to the Recipient, (ii) confirm that the BMS Study Drug shall be supplied in commercially labeled vials, (iii) address the acceptable expiration dates of such supplied BMS Study Drug to align with the needs of the Combined Therapy Clinical Trial; and (iv) memorialize the Parties' agreement regarding appropriate BSE/TSE statements.. The Parties shall finalize and execute the Supply and Quality Documentation within [**] of the Effective Date, but in no event later than the date on which the first shipment of the BMS Study Drug is supplied for use in the Combined Therapy Clinical Trial. The Supply and Quality Documentation shall outline the additional roles and responsibilities relative to the quality of BMS Study Drug in support of the Combined Therapy Clinical Trial. It shall include the responsibility for quality elements as well as exchanged GMP documents and certifications required to release the BMS Study Drug for the Combined Therapy Clinical Trial. In addition, the Supply and Quality Documentation shall detail the documentation required for each shipment of BMS Study Drug supplied to the Recipient or its designee for use in the Combined Therapy Clinical Trial.

4.4 Supply Forecast. Estimated supply and delivery details will be outlined in the Supply and Quality Documentation and will be updated by the Parties by mutual agreement (which agreement can be effected by the Parties' Designated Supply contacts and without need for an amendment to this Agreement) based on the actual enrollment. The Recipient will promptly inform BMS of any change in its requirements, and BMS will endeavor to accommodate any change in the supply quantities requested by the Recipient so long as it does not unduly disrupt BMS's ongoing business activities.

4.5 Shortages. In the event of a supply or manufacturing issues, interruption or shortage of BMS Study Drug as determined by BMS pursuant to its internal processes and policies (a "***Shortage***"), such that BMS reasonably believes that it will not be able to fulfill its supply obligations under this Agreement or may adversely impact the conduct or timelines of the Combined Therapy Clinical Trial, BMS will provide written notice thereof as soon as reasonably practicable to the Recipient (including the quantity of BMS Study Drug that BMS reasonably estimates it will be able to supply) and, upon request, the Parties will promptly discuss such situation (including how the quantities of BMS Study Drug that BMS is able to supply under this Agreement will be allocated within the Combined Therapy Clinical Trial). Notwithstanding anything to the contrary contained herein, in the event of a Shortage of the BMS Study Drug, BMS will have sole discretion, subject to Applicable Law, to determine the quantity of BMS Study

Drug it will be able to supply as a result of such Shortage; provided, however, that BMS shall consider in good faith the needs of patients who are actively being treated with BMS Study Drug, including Combined Therapy Clinical Trial patients, in making such determination. BMS will not be deemed to be in breach of this Agreement for failure to supply any other quantities of BMS Study Drug hereunder as a result of a Shortage. Any such allocation of the BMS Study Drug in accordance with this Section 4.5 will the Recipient's exclusive remedy with respect to a Shortage.

4.6 Customs Valuation. The Recipient will provide BMS in writing with a list of each country in which it proposes to conduct the Combined Therapy Clinical Trial and for which it has executed or plans to execute any site agreement or CRO agreement. During the conduct of the Combined Therapy Clinical Trial, the Recipient will send in writing any changes to the list of participating countries to BMS one month prior to the end of each Quarter. If no changes are sent to BMS by the Recipient for a particular Quarter, the prior Quarter's participating country list will be used as the basis for customs valuation for that Quarter. BMS will provide the Recipient with country-specific customs valuations initially for the BMS Study Drug prior to initiation of the Combined Therapy Clinical Trial and at the end of each Quarter during the conduct of the Combined Therapy Clinical Trial. The Recipient will use the BMS provided values for the import/export process to the listed participating countries and not make any change to such valuations without BMS's prior written consent.

4.7 Designated Supply Contact. Each Party will designate an individual (the "***Designated Supply Contact***") that a Party may contact to assist with coordinating supplies and facilitating the resolution of any issues or concerns arising in connection with the supply of the BMS Study Drug for use in the Combined Therapy Clinical Trial.

ARTICLE 5

RESPONSIBILITIES

5.1 Specific Responsibilities of the Recipient. The Recipient shall, subject to the terms of the Protocol, applicable terms and conditions of this Agreement, and any other agreement between the Parties relating to the Combined Therapy Clinical Trial, manage and be responsible for the conduct of the Combined Therapy Clinical Trial, including timelines and contingency planning. In particular, and not in limitation of the foregoing, the Recipient shall perform (itself and/or through Third Parties, including clinical trial sites, CROs and investigators) and/or be responsible for the following (items (a) to (p) below, collectively the "***Operational Matters***") with respect to the Combined Therapy Clinical Trial:

(a) compiling, amending and filing all necessary Combined Therapy Clinical Trial Regulatory Documentation with Regulatory Authority(ies), maintaining and acting as the sponsor of record as provided in 21 CFR 312.50 (and applicable comparable ex-US laws) with responsibility, unless otherwise delegated in accordance with 21 CFR 312.52 (and applicable comparable ex-US laws), for the Combined Therapy Clinical Trial and making all required submissions to Regulatory Authorities related thereto on a timely basis;

(b) conducting clinical study start-up activities, communicating with and obtaining approval from IRBs for the Protocol and other relevant documents for the Combined Therapy Clinical Trial as applicable, as well as patient recruitment and retention activities;

(c) listing of the Combined Therapy Clinical Trial, if it is required to be listed on a public database on www.clinicaltrials.gov or other public registry in any country in which such Combined Therapy Clinical Trial is being conducted, all in accordance with Applicable Law and in accordance with its internal policies relating to clinical trial registration;

(d) whenever reasonably feasible, providing BMS with reasonable advance notice of meetings or other non-written communications with a Regulatory Authority and the opportunity (unless prohibited by a Regulatory Authority) to participate in each such meeting or other non-written communication, to the extent involving a safety, efficacy or toxicology issue relating to the Combined Therapy or the BMS Study Drug or any other matter that could have an adverse effect on the BMS Study Drug. In such case, whenever reasonably feasible consistent with Regulatory Authority demands, the Recipient will provide BMS with the opportunity to review, provide comments to the Recipient within [**] on, and, if inconsistent with the Protocol, approve all submissions and written correspondence with a Regulatory Authority that relates to the BMS Study Drug;

(e) provide BMS (i) a written summary of meetings or other non-written communications with a Regulatory Authority within [**] of such meeting or communication, except in instances in which BMS participated in such meetings or other non-written communications, and (ii) copies of any official correspondence to or from a Regulatory Authority within [**] of receipt or provision, in each case of (i) or (ii) to the extent involving a safety, efficacy or toxicology issue relating to the Combined Therapy or the BMS Study Drug or any other matter that could have an adverse effect on the BMS Study Drug, and copies of all material Combined Therapy Clinical Trial Regulatory Documentation and correspondence that relates to same within [**] of submission to Regulatory Authorities;

(f) subject to the terms of this Agreement, the selection and payment of, negotiation of the terms of, contracting with, managing and overseeing compliance of its agreement by and the receipt of contract deliverables from, any CRO or vendor selected by the Recipient to assist in the performance of the Combined Therapy Clinical Trial. The Recipient shall determine and approve contract deliverables and manage contract performance, including executing site contracts, drafting and obtaining IRB approval for site informed consent forms (each an "***ICF***"), obtaining signed ICFs, monitoring plans, etc. The Recipient will be responsible for ensuring that all such contracts and ICFs: (i) do not conflict with the terms of this Agreement, (ii) allow the Recipient to provide BMS with access to and use of Study Data, Samples, and other information and documents as required pursuant to this Agreement (and in no event less than the same use rights granted to the Recipient), (iii) do not adversely affect the BMS Technology or BMS Independent Patent Rights (or the enforcement or defense thereof), the [**], the Combined Therapy, or the BMS Study Drug as monotherapy, (iv) do not impose a new obligation, whether direct, indirect, or contingent, upon BMS that is not set forth in this Agreement, (v) do not confer a benefit upon the Recipient that is not also conferred upon BMS, (vi) retain each of the Parties' respective intellectual property rights in the Recipient Study Drug, BMS Study Drug and Combined Therapy consistent with this Agreement, and (vii) comply with Applicable Law;

(g) providing BMS (if requested by BMS) with copies of each final site template of the Combined Therapy Clinical Trial's ICF. The Recipient shall ensure that each ICF does not impose any financial obligation, liability, damages or other cost upon BMS with respect to any injury (including death) suffered by a Combined Therapy Clinical Trial subject whether or not resulting from the administration of the BMS Study Drug or direct a study subject to BMS to seek reimbursement for any costs or seek compensation for any injury incurred in connection with the Combined Therapy Clinical Trial;

(h) if requested by BMS, providing BMS within [**] with minutes from any and all external drug safety monitoring boards for the Combined Therapy Clinical Trial after receipt by the Recipient, to the extent relating to the BMS Study Drug or the Combined Therapy;

(i) informing and updating BMS on a [**] basis (with significant issues to be communicated promptly after the Recipient becomes aware of same) regarding all Operational Matters, so that if BMS has any significant concerns or material disagreements regarding same, the matter can be discussed with the Recipient. Without limiting the foregoing, the Recipient shall inform BMS [**] as to the overall Combined Therapy Clinical Trial progress, [**], and any other Combined Therapy Clinical

Trial-related matters requested by BMS to the extent involving a safety, efficacy or toxicology issue relating to the Combined Therapy or the BMS Study Drug or any other matter that could have an adverse effect on the BMS Study Drug;

(j) owning and being responsible for (or appointing a Third Party to be responsible for) the maintenance of the Global Safety Database and being responsible for safety reporting, collecting, evaluating and reporting Serious Adverse Events, other safety data and any further pharmacovigilance information from the Combined Therapy Clinical Trial;

(k) analyzing the Study Data and providing BMS with access to the Study Data as follows:

(i) top line data and a copy of all Clinical Study Reports (CSRs), including all Appendices and Addendums, in each case, reasonably promptly as and when received by the Recipient's clinical management;

(ii) if requested by BMS, sharing with BMS for review and comment drafts of interim and/or final clinical trial report (and/or statistical analysis in accordance with the Protocol) from the Combined Therapy Clinical Trial;

(iii) if requested by BMS, within [**] after database lock, access to those safety databases that will be used for any interim review by an external consultant (or drug safety monitoring board, if required);

(iv) if requested by BMS, within [**] after database lock, access to case report forms or patient profiles for all patients in the Combined Therapy Clinical Trial;

(v) if requested by BMS, within [**] of the creation of an electronic clean database for the Combined Therapy Clinical Trial, an electronic copy of the clean database (the form and format of the clean database to be reasonably acceptable to both Parties);

(vi) if requested by BMS, subject to any third party requirements, providing BMS with raw or derived datasets and any programs or SAS codes, including associated documentation, to be used for any statistical analysis plan for the Combined Therapy Clinical Trial; and

(vii) (A) safety analyses, (B) new and/or changing Safety Signals and Safety Issues, (C) new and/or changing toxicology and efficacy signals, and (D) any statistical analysis, immunogenicity analysis, or bioanalysis, in each case relating to the BMS Study Drug, the Recipient Study Drug and/or the Combined Therapy, as and when the same are received by the Recipient;

(l) obtaining supplies of any co-medications, to the extent any such co-medications are required for use in the Combined Therapy Clinical Trial, and providing to BMS any information related to the Combined Therapy Clinical Trial that is provided to the manufacturer of any co-medication within [**] after the provision of the information to the manufacturer;

(m) if requested by BMS, information regarding the pharmacokinetics, efficacy and safety of the Recipient Study Drug alone or in combination with the BMS Study Drug;

(n) performing either directly or through third parties collection of Samples required by the Protocol;

(o) handling and addressing inquiries from the Combined Therapy Clinical Trial subjects and investigators; and

(p) such other responsibilities as may be agreed to by the Parties.

5.2 BMS Operational Responsibilities. BMS shall be responsible for the following activities:

(a) Manufacturing and supplying GMP-grade quantities of the BMS Study Drug, as further described in Article 4 above, and, where and to the extent provided in the Supply and Quality Documentation, providing necessary GMP information and documentation that enables the Recipient Qualified Person (as such term will be defined in the Supply and Quality Documentation) to release BMS Study Drug for the Combined Therapy Clinical Trial;

(b) where and to the extent provided in the Supply and Quality Documentation, providing for the release by a Qualified Person or providing the necessary documentation in support of such quality release, of the BMS Study Drug if such release is required for the Combined Therapy Clinical Trial;

(c) to the extent necessary for the conduct of the Combined Therapy Clinical Trial, providing a Right of Cross-Reference to the relevant Regulatory Documentation for the BMS Study Drug as set forth in Section 2.1(b) and/or (e), if applicable, to the BMS investigator's brochure for the BMS Study Drug (and updates thereto) as provided in Section 2.1(d);

(d) informing Recipient as soon as reasonably practicable about any recall of any BMS Study Drug supplied to Recipient pursuant to this Agreement and, thereafter, replacing at its own expense any such supplied but recalled BMS Study Drug with other, non-recalled BMS Study Drug as soon as reasonably practicable;

(e) responding to questions or requests from Regulatory Authorities related to the BMS Study Drug in connection with the Combined Therapy Clinical Trial to the extent either required by Regulatory Authorities or because the Recipient does not have the requested information or answers; and

(f) such other responsibilities as may be agreed to by the Parties.

5.3 Other Clinical Trials. Nothing in this Agreement shall preclude either Party from conducting any other clinical trials as it may determine in its discretion, so long as it does not use or rely on the Confidential Information that is solely owned by the other Party in doing so.

5.4 Subsequent Studies. After completion of the Combined Therapy Clinical Trial, the Parties agree to discuss in good faith additional Combined Therapy Clinical Trials of the BMS Study Drug with the Recipient Study Drug. If the Parties jointly agree to conduct any such further clinical trials, such further clinical trials will, unless otherwise mutually agreed in writing, be conducted in accordance with a separate agreement.

ARTICLE 6

INTELLECTUAL PROPERTY

6.1 Inventions and related Patent Rights. All rights to Inventions shall be allocated as follows:

(a) Recipient Ownership. Subject to the terms of this Agreement, all Recipient Study Inventions and Recipient Study Patent Rights shall be owned solely by the Recipient, and the Recipient will have the full right to exploit such Recipient Study Inventions and Recipient Study Patent Rights without the consent of, or any obligation to account to, BMS. BMS shall assign and hereby assigns (and shall cause its Affiliates and contractors to assign) its right, title and interest in any Recipient Study Inventions and

Recipient Study Patent Rights to the Recipient. BMS shall execute such further documents and provide other assistance as may be reasonably requested by the Recipient to perfect the Recipient's rights in such Recipient Study Inventions and Recipient Study Patent Rights, all at the Recipient's expense. The Recipient shall have the sole right but not the obligation to prepare, file, prosecute (including any proceedings relating to reissues, reexaminations, protests, interferences, oppositions, post-grant reviews or similar proceedings and requests for patent extensions) and maintain any Recipient Study Patent Rights at its own expense.

(b) BMS Ownership. Subject to the terms of this Agreement, all BMS Study Inventions and BMS Study Patent Rights shall be owned solely by BMS, and BMS will have the full right to exploit such BMS Study Inventions and BMS Study Patent Rights without the consent of, or any obligation to account to, the Recipient. The Recipient shall assign and hereby assigns (and shall cause its Affiliates and contractors to assign) all its right, title and interest in any BMS Study Inventions and BMS Study Patent Rights to BMS. The Recipient shall execute such further documents and provide other assistance as may be reasonably requested by BMS to perfect BMS's rights in such BMS Study Inventions and BMS Study Patent Rights, all at BMS's expense. BMS shall have the sole right but not the obligation to prepare, file, prosecute (including any proceedings relating to reissues, reexaminations, protests, interferences, oppositions, post-grant reviews or similar proceedings and requests for patent extensions) and maintain any BMS Study Patent Rights at its own expense.

(c) Combined Therapy Inventions. All Combined Therapy Inventions and Combined Therapy Patent Rights shall be jointly owned by the Parties, and either Party shall have the right to freely exploit the Combined Therapy Inventions and Combined Therapy Patent Rights, both within and outside the scope of this Agreement, without accounting or any other obligation to the other Party (except as expressly set forth in this Section 6.1(c) and Section 6.3(d) with regard to the filing, prosecution, maintenance and enforcement of Combined Therapy Patent Rights) and each Party may use, exploit and grant licenses (with right to sublicense) to Third Parties under its interest in such Combined Therapy Inventions and Combined Therapy Patent Rights. The Recipient, using outside counsel acceptable to both Parties, shall be responsible, at its sole discretion, for preparing and prosecuting Patent applications and maintaining Patents within the Combined Therapy Patent Rights. The Recipient shall keep BMS advised as to material developments and steps to be taken with respect to prosecuting any such Patent Rights and shall furnish BMS with copies of applications for such Patent Rights, amendments thereto and other related correspondence to and from patent offices, and permit BMS a reasonable opportunity to review and offer comments prior to submitting such applications and correspondence to the applicable governmental authority (and will take BMS's comments into account in preparing same). BMS shall reasonably assist and cooperate in obtaining, prosecuting and maintaining the Combined Therapy Patent Rights. Notwithstanding the foregoing, the Recipient shall not take any position in a submission to a patent office concerning a Combined Therapy Invention that interprets the scope of a Patent Right of BMS without the prior written consent of BMS. The Recipient shall be reimbursed for any costs and expenses incurred in prosecuting Combined Therapy Patent Rights and the subsequent maintenance of Combined Therapy Patent Rights by BMS such that BMS shall be responsible for [**] percent ([**]%) of such costs. From time-to-time, the Recipient shall invoice BMS such amounts and BMS shall pay the Recipient such invoiced amounts within [**] after receipt of an invoice therefor. The Parties shall discuss in good faith the countries in which the Combined Therapy Patent Rights will be filed. In case one of the two Parties decides not to file or maintain a Combined Therapy Patent Right in a given country (and also elects not to reimburse the other Party for [**]) of the costs of prosecution and maintenance of such Combined Therapy Patent Right in such country), the other Party shall have the right to file, prosecute and maintain such Combined Therapy Patent Right in such country in its own name and at its own expense. In this case, the Party who decides not to file or maintain (and also decides not to reimburse the other Party for its share of the costs of) a Combined Therapy Patent Right for a given country shall promptly assign its rights to the Combined Therapy Patent Right in said country to the Party (the "***Filing Party***") who wishes to file or maintain said Combined Therapy Patent Right in such country and the Filing Party shall grant, and hereby grants, to the

other Party an irrevocable, perpetual, fully-paid, non-exclusive license, with the right to grant and authorize sublicenses, under such Combined Therapy Patent Rights to make, have made, use, sell, offer for sale, import and other exploit products and services in such country. The Party who does not wish to file or maintain a Combined Therapy Patent Right in any country shall assist in the timely provision of all documents required under national provisions to register said assignment of rights with the corresponding national authorities at the sole expenses of the Party who wishes to file or maintain such Combined Therapy Patent Right in that given country. If the Parties cannot agree with respect to the decision to file or maintain a Combined Therapy Patent Right within [**] subsequent to the initiation of the Parties' good faith efforts to resolve any disagreement, then either Party shall have the right to file or maintain any Combined Therapy Patent Right in the names of both Parties, provided that: (i) any such Combined Therapy Patent Right shall be jointly owned by the Parties and subject to the freedom to use and operate under such Combined Therapy Patent Right as set forth in the first sentence of this Section 6.1(c); (ii) such prosecuting Party obtains the prior consent of the non-prosecuting Party, which consent shall not be unreasonably withheld or delayed, and (iii) the non-prosecuting party reimburses the prosecuting party for its [**] share of the patent costs.

(d) Separation of Patent Rights. In order to more efficiently enable the prosecution and maintenance of the BMS Study Patent Rights, the Recipient Study Patent Rights and Combined Therapy Patent Rights relating to Inventions as described above, the Parties will use good faith efforts to separate BMS Study Patent Rights, the Recipient Study Patent Rights, Combined Therapy Patent Rights, BMS Independent Patent Rights and the Recipient Independent Patent Rights into separate patent filings to the extent possible and without adversely impacting such prosecution and maintenance or the scope of the protected subject matter.

6.2 Disclosure and Assignment of Inventions. Each Party shall disclose promptly to the other Party in writing and on a confidential basis all Inventions, prior to any public disclosure thereof or filing of Patent Rights therefor and allowing sufficient time for comment by the other Party. In addition, each Party shall, and does hereby, assign, and shall cause its Affiliates and contractors to so assign, to the other Party, without additional compensation, such right, title and interest in and to any Inventions as well as any Patent Rights and other intellectual property rights with respect thereto, as is necessary to fully effect, as applicable, the sole ownership provided for in Sections 6.1(a) and 6.1(b) and the joint ownership provided for in Section 6.1(c).

6.3 Infringement of Patent Rights by Third Parties.

(a) Notice. Each Party shall promptly notify the other Party in writing of any Infringement of Combined Therapy Patent Rights, of which its in-house patent counsel becomes aware.

(b) Infringement of Recipient Study Patent Rights. For all Infringements of Recipient Study Patent Rights anywhere in the world, the Recipient shall have the exclusive right to prosecute such Infringements as it may determine in its sole and absolute discretion, and the Recipient shall bear all related expenses and retain all related recoveries. BMS shall reasonably cooperate with the Recipient or its designee (to the extent BMS has relevant information arising out of this Agreement), at the Recipient's request and expense, in any such action.

(c) Infringement of BMS Study Patent Rights. For all Infringements of BMS Study Patent Rights anywhere in the world, BMS shall have the exclusive right to prosecute such Infringements as it may determine in its sole and absolute discretion, and BMS shall bear all related expenses and retain all related recoveries. The Recipient shall reasonably cooperate with BMS or its designee (to the extent that the Recipient has relevant information arising out of this Agreement), at BMS's request and expense, in any such action.

(d) Infringement of Combined Therapy Patent Rights.

(i) With respect to Infringements of Combined Therapy Patent Rights, the Parties shall mutually agree as to whether to bring an enforcement action to seek the removal or prevention of such Infringements and damages therefor and, if so, which Party shall bring such action, with any costs and expenses relating thereto to be allocated in accordance with Section 6.3(d)(ii).

(ii) Regardless of which Party brings an enforcement action pursuant to Section 6.3(d)(i) or whether the Parties reach agreement to initiate such an enforcement action, the other Party hereby agrees to cooperate reasonably in any such action, including, if required, by bringing a legal action, furnishing a power of attorney or joining as a plaintiff to such a legal action. If the Parties mutually agree to bring an enforcement action, BMS shall be responsible for [**] percent ([**]%), and the Recipient shall be responsible for [**] percent ([**]%), of the reasonable and verifiable costs and expenses incurred in connection with any such action. If either Party recovers monetary damages from any Third Party in an action agreed to by the Parties, such recovery shall be allocated first to the reimbursement of any actual, unreimbursed costs and expenses incurred by the Parties in such litigation (including, for this purpose, a reasonable allocation of expenses of internal counsel) pro rata in accordance with the aggregate amounts spent by both Parties, and any remaining amounts shall be split [**] percent ([**]%) to the Recipient and [**] percent ([**]%) to BMS, unless the Parties agree in writing to a different allocation. If the Parties do not agree to initiating such an enforcement action, (A) the Party initiating such enforcement action shall be responsible for the costs and expenses incurred in connection with such action and shall reimburse the other Party for the costs the other Party incurs for the assistance and cooperation requested by such Party and (B) the Party initiating such enforcement action shall retain all recoveries from such enforcement action. Neither Party shall enter into any settlement without the prior written consent of the other Party in connection with any proceeding under this Section 6.3(d).

6.4 Infringement of Third Party Rights.

(a) Notice. If the activities relating to the Combined Therapy Clinical Trial become the subject of a claim of infringement of a patent, copyright or other proprietary right by a Third Party anywhere in the world, the Party first having notice of the claim shall promptly notify the other Party and, without regard to which Party is charged with said infringement and the venue of such claim, the Parties shall promptly confer to discuss the claim.

(b) Defense. If both Parties are charged with infringement pursuant to a claim described in Section 6.4(a), each Party shall have the right to defend itself against such claim and the Parties shall discuss in good faith defending such claim jointly. If only one Party is charged with infringement, such Party will have the first right but not the obligation to defend such claim. If the charged Party does not commence actions to defend such claim within [**] after request by the other Party to do so, then the other Party shall have the right, but not the obligation, to defend any such claim to the extent such claim pertains to the other Party's Compound. In any event, the non-defending Party shall reasonably cooperate with the Party conducting the defense of the claim and shall have the right to participate with separate counsel at its own expense, and the defending Party shall consider comments and suggestions on strategy for defending the action by the non-defending Party in good faith. The Party defending the claim shall bear the cost and expenses of the defense of any such Third Party infringement claim and shall have sole rights to any recovery. If the Parties jointly defend the claim, the Recipient shall bear [**] percent ([**]%), and BMS shall bear [**] percent ([**]%) of any costs and expenses of the defense of any such Third Party infringement claim; *provided, however, that*, notwithstanding the foregoing, if the claim relates solely to one Party's Compound, such Party will bear [**] percent ([**]%) of the costs and expenses of the defense of such claim and shall have the sole right, but not the obligation, to defend, settle and otherwise handle the disposition of such claim. Neither Party shall enter into any settlement concerning activities under this Agreement or the Combined Therapy that affects the other Party's rights under this Agreement or imposes

any obligations on the other Party, including any admissions of wrongdoing on behalf of the other Party, without such other Party's prior written consent, not to be unreasonably withheld or delayed, except that a Party may settle any claim that solely relates to its Compound without the consent of the other Party as long as such other Party's rights under this Agreement are not adversely impacted (in which case, it will obtain such other Party's prior written consent, not to be unreasonably withheld or delayed).

6.5 Combined Therapy Clinical Trial Regulatory Documentation. Subject to the license and other rights granted by each Party to the other Party pursuant to this Agreement, the Recipient shall solely own all right, title and interest in and to the Combined Therapy Clinical Trial Regulatory Documentation; *provided*, *however*, *that* BMS shall retain sole and exclusive ownership of any BMS Regulatory Documentation that is submitted with or referenced in the Combined Therapy Clinical Trial Regulatory Documentation and that the Recipient shall retain sole and exclusive ownership of any Recipient Regulatory Documentation that is submitted with or referenced in the Combined Therapy Clinical Trial Regulatory Documentation. This Section 6.5 is without limitation of any other disclosure obligations under this Agreement.

6.6 No Other Use. Except as expressly provided in Section 6.1, the Recipient agrees not to apply for any Patent Rights based on or containing BMS Confidential Information, and to give no assistance to any Third Party for such application without BMS's prior written authorization, and BMS agrees not to apply for any Patent Rights based on or containing the Recipient's Confidential Information, and to give no assistance to any Third Party for such application without the Recipient's prior written authorization.

6.7 Joint Research Agreement. The Parties acknowledge and agree that this Agreement is a "joint research agreement" as defined in 35 USC § 100 (h).

ARTICLE 7

COSTS AND EXPENSES

7.1 Manufacturing and IP Costs. Expenses incurred as described in Article 4 (regarding Manufacturing and Supply) and Article 6 (regarding Intellectual Property) shall be borne or shared by the Parties as provided in such Articles.

7.2 TP Study Costs. For all expenses (other than those set forth in section 7.1) that are directly attributable or reasonably allocable to the conduct of the Combined Therapy Clinical Trial: (a) the Recipient will solely bear all out-of-pocket costs reasonably incurred by the Recipient (or by BMS pursuant to the following sentence) to Third Parties (including to CROs, laboratories, investigators, and clinical sites/IRBs) in connection with the performance of the Combined Therapy Clinical Trial ("***TP Study Costs***"), and (b) each Party shall be solely responsible for all of its own internal costs (including costs of individual independent contractors) incurred by such Party or any of its Affiliates. It is not expected that BMS will incur any TP Study Costs; however, in the event BMS should incur any TP Study Costs in connection with the conduct of the Combined Therapy Clinical Trial, the Recipient will reimburse BMS for same on a [**] basis within [**] following submission of an invoice therefor and appropriate supporting documentation,

provided that BMS has provided Recipient a reasonable opportunity to address the legitimacy of any TP Study Costs.

7.3 Third Party License Payments. If the conduct of the Combined Therapy Clinical Trial requires a Third Party License Payment, then the Party required to make such payment shall be responsible for same.

ARTICLE 8

RECORDS AND STUDY DATA

8.1 Records. Each Party shall maintain complete and accurate records of all work conducted with respect to the Combined Therapy Clinical Trial and of all results, information, data, data analyses, reports, records, methods, processes, practices, formulae, instructions, skills, techniques, procedures, experiences and developments made by or provided to either Party, or by the Parties together, in the course of such Party(ies)' efforts with respect to the Combined Therapy Clinical Trial (including any statistical analysis plan and any bioanalysis plan to be conducted pursuant to the Protocol or otherwise agreed to by the Parties) (such results, information, data, data analyses, reports, case report forms, adverse event reports, trial records, methods, processes, practices, formulae, instructions, skills, techniques, procedures, experiences, developments, and the Protocol referred to as the "***Study Data***"). Such records shall fully and properly reflect all work done and results achieved in the performance of the Combined Therapy Clinical Trial in sufficient detail and in good scientific manner appropriate for patent and regulatory purposes.

8.2 Ownership of Study Data. BMS shall own the Study Data to the extent that it relates exclusively to the BMS Study Drug ("***BMS Study Data***"), and the Recipient shall own the Study Data to the extent that it relates exclusively to the Recipient Study Drug ("***Recipient Study Data***"). Both Parties shall jointly own any Study Data that does not relate exclusively to the Recipient Study Drug or the BMS Study Drug ("***Combined Therapy Study Data***"). Each Party shall, and does hereby, assign, and shall cause its Affiliates to so assign, to the other Party, without additional compensation, such right, title and interest in and to any Study Data as is necessary to fully effect the foregoing, and agrees to execute all instruments as may be reasonably necessary to effect same.

8.3 Use of Study Data.

(a) Use of a Party's Own Study Data. BMS may use and analyze the BMS Study Data for any purpose without obligation or accounting to the Recipient, who shall hold the BMS Study Data in confidence pursuant to this Agreement. The Recipient may use and analyze the Recipient Study Data for any purpose without obligation or accounting to BMS, who shall hold the Recipient Study Data in confidence pursuant to this Agreement.

(b) Use of Combined Therapy Study Data by BMS. BMS and its Affiliates and (sub)licensees shall have the right to use and analyze the Combined Therapy Study Data (i) in connection with the independent development, commercialization or other exploitation of the BMS Study Drug (alone or in combination with other drugs and/or other pharmaceutical agents) and/or for inclusion in the safety database for the BMS Study Drug, in each case without the consent of, or any obligation to account to, the Recipient, and (ii) to conduct studies with Samples pursuant to Section 8.5. Subject to Section 8.5, the results of all such analyses or uses shall be owned by BMS, including any intellectual property arising out of same, unless the Parties shall have agreed otherwise in a writing separate from this Agreement. BMS and its Affiliates and (sub)licensees shall also be entitled to use the Combined Therapy Study Data during and following the Term to (1) make regulatory filings, meet regulatory requirements, and seek approvals for the BMS Study Drug, either alone or as part of the Combined Therapy, (2) evaluate the safety and efficacy of the Combined Therapy and the BMS Study Drug, and (3) promote indications based on, and to

disseminate, the Combined Therapy Study Data for the benefit of the BMS Study Drug, either alone or as part of the Combined Therapy, where permitted by and in accordance with Applicable Law; *provided that* nothing in the foregoing is intended or shall be construed as granting BMS any right or license, expressly or impliedly to make, have made, use, sell, offer for sale, or import the Recipient Study Drug. The Recipient grants BMS and its Affiliates and (sub)licensees a Right of Cross-Reference to the Recipient Regulatory Documentation and the Combined Therapy Clinical Trial Documentation for the Recipient Study Drug or the Combined Therapy for the sole purpose of enabling BMS and its Affiliates and sublicensees to exercise its rights under clause (1) of this Section 8.3(b), which right shall survive any expiration or termination of this Agreement.

(c) Use of Combined Therapy Study Data by the Recipient. The Recipient and its Affiliates and licensees shall have the right to use and analyze the Combined Therapy Study Data (i) in connection with the independent development, commercialization or other exploitation of the Recipient Study Drug (alone or in combination with other drugs and/or other pharmaceutical agents and/or for inclusion in the safety database for the Recipient Study Drug, in each case without the consent of, or any obligation to account to, BMS and (ii) to conduct studies with Samples pursuant to Section 8.5. Subject to Section 8.5, the results of all such analyses or uses shall be owned by the Recipient, including any intellectual property arising out of same, unless the Parties shall have agreed otherwise in a writing separate from this Agreement. The Recipient, its Affiliates and licensees shall be entitled to use the Combined Therapy Study Data during and following the Term to (1) make regulatory filings, meet regulatory requirements and seek approvals for the Recipient Study Drug, either alone or as part of the Combined Therapy, (2) evaluate the safety and efficacy of the Combined Therapy and the Recipient Study Drug, and (3) promote indications based on, and to disseminate, the Combined Therapy Study Data for the benefit of the Recipient Study Drug, either alone or as part of the Combined Therapy, where permitted by and in accordance with Applicable Law; *provided that* nothing in the foregoing is intended or shall be construed as granting the Recipient any right or license, expressly or impliedly, to make, have made, use, sell, offer for sale, or import the BMS Study Drug. BMS grants the Recipient, its Affiliates and licensees of the Recipient Study Drug a Right of Cross-Reference to the relevant Regulatory Documentation Controlled by BMS for the BMS Study Drug for the sole purpose of enabling the Recipient to exercise its rights under clause (1) of this Section 8.3(c) in the Territory.

(d) Biomarker/Dx Agent Development. Each Party may use and disclose to a Third Party the Combined Therapy Study Data and its Compound's Study Data, under obligations of confidentiality consistent with this Agreement, to develop and commercialize a biomarker or diagnostic test for use with its Compound and/or the Combined Therapy, and, unless otherwise mutually agreed by the Parties in writing, will own any intellectual property arising out of the work funded or conducted by it with or through such Third Party and shall grant, and hereby grants, to the other Party a worldwide, perpetual, irrevocable, fully paid-up, royalty-free non-exclusive license, with the right to grant and authorize sublicenses, under such intellectual property arising out of the Combined Therapy Clinical Trial, solely to develop and commercialize biomarkers and/or diagnostic tests for use with such other Party's Compound and/or the Combined Therapy. The Parties will discuss in good faith any opportunities to jointly participate in the development of any such biomarker or diagnostic test for use with the Combined Therapy.

(e) No Other Uses. All other uses of Study Data are limited solely to those permitted by this Agreement, and neither Party may use Study Data for any other purpose without the consent of the other Party during and after the Term.

8.4 Access to Study Data. Subject to the provisions of Sections 8.1, each Party shall have access to all Study Data (including de-identified patient records). The Recipient shall make such Study Data in its possession available to BMS within a reasonable period, not to exceed [**], after such Study Data is available to or generated by the Recipient.

8.5 Samples.

(a) Samples shall be owned by the Recipient (to the extent not owned by the patient and/or the clinical trial site). Any such Samples shall be collected in accordance with the Protocol and applicable ICFs. Recipient shall be permitted to use such Samples for any purpose, including for those purposes set forth in the Protocol, without the prior written consent of BMS, provided, however, such uses that are not already set forth in the Protocol and are directed to the Combined Therapy shall be disclosed to BMS at reasonable amount of time prior to commencement of such Sample studies, such that BMS will have the opportunity to review the potential use or study design and the opportunity to remit payment for the cost of such use or associated with the performance of such study in return for co-ownership of the rights to such Samples and the data generated from such use, with the terms of such use to be set forth in a written agreement between the Parties setting forth the Samples to be used, and any appropriate terms/restrictions on such use, and costs to be borne by such parties, such terms to be agreed upon in each party's reasonable discretion. Nothing in this section 8.5(a) shall prevent BMS from remitting payment to the extent that it should require any samples. Any data and intellectual property arising out of such Sample use shall be owned by the Party conducting such study using same, *provided that*, to the extent that any such data or intellectual property relates solely to the Combined Therapy (or biomarkers solely for use with the Combined Therapy), shall be considered Combined Therapy Study Data, Combined Therapy Inventions and/or Combined Therapy Patent Rights, as the case may be. Samples for PK and ADA serum analysis will be stored for future use in the Recipient's sample repository, unless the Parties agree that BMS would store such samples, *provided that*, if the Party holding the Samples determines that it no longer has a use for the Samples and the other Party determines that it does, then the Samples shall, subject to Applicable Law and the terms of the signed ICFs, be transferred to the other Party and may be used solely thereafter by the other Party. If neither Party has any further use for the Samples, then the remaining Samples will be destroyed pursuant to the respective Party's standard operating procedures for sample retention and destruction, subject to the terms of and permission(s) granted in the informed consent forms signed by the subjects contributing the Samples in the Combined Therapy Clinical Trial.

(b) If mutually agreed, BMS will arrange for the Recipient to use BMS's preferred Third Party vendor(s), at the Recipient's expense, for bioanalytical work of Samples from Combined Therapy Clinical Trial subjects on the BMS Study Drug. Such vendor(s) will provide the results of their bioanalytical work of such Samples to the Recipient and BMS, which results will be included in the final clinical study report, along with the bioanalytical work of the Recipient Study Drug and BMS Study Drug performed by or on behalf of the Recipient. For the avoidance of doubt, all bioanalytical results for the BMS Study Drug and the Recipient Study Drug are deemed Study Data. All data derived pursuant to the Protocol from such Samples is deemed Study Data.

ARTICLE 9

CONFIDENTIALITY

9.1 Nondisclosure of Confidential Information.

(a) All written, visual, oral and electronic data, information, know-how or other proprietary information or materials, both technical and non-technical, disclosed by one Party to any other Party pursuant to this Agreement, or prior to the Effective Date and relating to matters contemplated by this agreement, and disclosed in the manner specified herein, that (a) if in tangible form, is labeled in writing as "proprietary" or "confidential" (or similar reference) or which by its nature would reasonably be understood to be of a proprietary or confidential nature, or (b) if in oral or visual form, is identified as proprietary or confidential or for internal use only at the time of disclosure or within [**] thereafter shall be "***Confidential Information***" of the disclosing Party, and all Study Data and Inventions shall be the Confidential

Information of the Party owning such Study Data or Invention (as provided in Section 8.2 with regard to Study Data and Section 6.1 with regard to Inventions). For purposes of this Agreement, regardless of which Party discloses such Confidential Information to the other, (i) all Recipient Study Inventions, Recipient Technology and Recipient Regulatory Documentation shall be Confidential Information of the Recipient and BMS shall be the receiving Party, (ii) all BMS Study Inventions, BMS Technology, and BMS Regulatory Documentation shall be Confidential Information of BMS and the Recipient shall be the receiving Party.

(b) The Parties agree that the terms of this Agreement shall be treated as Confidential Information of both Parties, and thus may be disclosed only as permitted by Section 9.3. Except as required by Applicable Law, each Party agrees not to issue any press release or public statement disclosing information relating to this Agreement or the transactions contemplated hereby or the terms hereof without the prior written consent of the other Party, except as permitted by Sections 9.3 and 9.6(b).

(c) Except to the extent expressly authorized in this Section 9.1 and Sections 9.2, 9.3 and 9.6 below, or as otherwise agreed in writing by the Parties, each Party agrees that, for the Term and for a period of seven (7) years thereafter (or, in the case of Confidential Information that constitutes a trade secret of either Party, indefinitely thereafter until the Party owning such Confidential Information informs the other Party that such information is no longer considered a trade secret, *provided, however,* that such Confidential Information is clearly labeled as a trade secret in writing), it shall (A) keep confidential and shall not publish or otherwise disclose and shall not use for any purpose other than as expressly provided for in this Agreement any Confidential Information of the other Party (including information relating to this Agreement or the transactions contemplated hereby or the terms hereof), (B) treat the other Party's Confidential Information with the same degree of care the receiving Party uses for its own confidential information but in no event with less than a reasonable degree of care; and (C) reproduce the disclosing Party's Confidential Information solely to the extent necessary or reasonably useful to accomplish the receiving Party's obligations under this Agreement or exercise the receiving Party's rights to use and disclose such Confidential Information as expressly provided for in this Agreement, with all such reproductions being considered the disclosing Party's Confidential Information Notwithstanding anything to the contrary in this Section 9.1, and subject to Section 8.3, the receiving Party may disclose the disclosing Party's Confidential Information to its employees, consultants, agents or permitted (sub)licensees solely on a need-to-know basis for the purpose of fulfilling the receiving Party's obligations under this Agreement or exercising the receiving Party's rights to use and disclose such Confidential Information as expressly provided for in this Agreement; *provided, however, that* (1) any such employees, consultants, agents or permitted (sub)licensees are bound by obligations of confidentiality and non-use at least as restrictive as those set forth in this Agreement, and (2) the receiving Party remains liable for the compliance of such employees, consultants, agents or permitted (sub)licensees with such obligations. Each receiving Party acknowledges that in connection with its and its representatives examination of the Confidential Information of the disclosing Party, the receiving Party and its representatives may have access to material, non-public information, and that the receiving Party is aware, and will advise its representatives who are informed as to the matters that are the subject of this Agreement, that State and Federal laws, including United States securities laws, may impose restrictions on the dissemination of such information and trading in securities when in possession of such information. Each receiving Party agrees that it will not, and will advise its representatives who are informed as to the matters that are the subject of this Agreement to not, purchase or sell any security of the disclosing Party on the basis of the Confidential Information to the extent such Confidential Information constitute material nonpublic information about the disclosing Party or such security.

(d) Combined Therapy Study Data shall be treated as Confidential Information of each Party and shall not be disclosed to Third Parties except to the extent it falls within the exceptions set forth in Section 9.2 below, is authorized under this Section 9.1 or Section 9.3, is required to be filed with a

Regulatory Authority or included in a product's label or package insert, is reasonably necessary to be disclosed in order for a Party to exercise its rights under Section 8.3(b) or 8.3(c) or it is disclosed pursuant to Section 9.6.

9.2 Exceptions. The obligations in Section 9.1 shall not apply with respect to any portion of Confidential Information that the receiving Party can demonstrate by contemporaneous tangible records or other competent proof:

(a) was already known to the receiving Party (or its Affiliates), other than under an obligation of confidentiality, either (i) at the time of disclosure by the disclosing Party, or (ii) if applicable, at the time that it was generated hereunder, whichever ((i) or (ii)) is earlier;

(b) was generally available to the public or otherwise part of the public domain either (i) at the time of its disclosure to the receiving Party, or (ii) if applicable, at the time that it was generated hereunder, whichever ((i) or (ii)) is earlier;

(c) became generally available to the public or otherwise part of the public domain after its disclosure and other than through any act or omission of the receiving Party in breach of this Agreement;

(d) was disclosed to the receiving Party (or its Affiliates), other than under an obligation of confidentiality, by a Third Party who had no obligation to the Party owning or Controlling the information not to disclose such information to others; or

(e) was independently discovered or developed by the receiving Party (or its Affiliates) without the use of, or reference to, the Confidential Information belonging to the disclosing Party.

9.3 Authorized Disclosure. Notwithstanding any other provision of this Agreement, each Party may disclose Confidential Information belonging to the other Party to the extent such disclosure is reasonably necessary in the following instances:

(a) filing or prosecuting Patent Rights pursuant to Section 6.1(c);

(b) prosecuting or defending litigation;

(c) complying with Applicable Law or the rules or regulations of any securities exchange on which such Party's stock is listed;

(d) disclosure, in connection with the performance of this Agreement, to Affiliates, permitted (sub)licensees, contractors, IRBs, CROs, academic institutions, consultants, agents, investigators, and employees and contractors engaged by study sites and investigators involved with the Combined Therapy Clinical Trial, each of whom prior to disclosure must be bound by terms of confidentiality and non-use at least as protective of Confidential Information as those set forth in this Article 9;

(e) disclosure of the Combined Therapy Study Data, Combined Therapy Inventions and Combined Therapy Patent Rights to Regulatory Authorities in connection with the development of the Combined Therapy, the Recipient Study Drug or the BMS Study Drug;

(f) disclosure of relevant safety information contained within the Combined Therapy Study Data to investigators, IRBs and/or ethics committees and Regulatory Authorities that are involved in other clinical trials of the Recipient Study Drug with respect to the Recipient, and the BMS Study Drug with respect to BMS, and, in the event of a Material Safety Issue, to Third Parties that are collaborating

with the Recipient or BMS, respectively in the conduct of such other clinical trials of the Recipient Study Drug or the BMS Study Drug, in each case solely to the extent necessary for the conduct of such clinical trials and/or to comply with Applicable Law and regulatory requirements; and

Notwithstanding the foregoing, if a Party is required or otherwise intends to make a disclosure of any other Party's Confidential Information pursuant to Section 9.3(b) and/or Section 9.3(c), it shall give advance notice to such other Party of such impending disclosure and endeavor in good faith to secure confidential treatment of such Confidential Information and/or reasonably assist the Party that owns such Confidential Information in seeking a protective order or other confidential treatment.

9.4 Omitted

9.5 Disclosure to Third Party Co-Medication Manufacturer. Notwithstanding any other provision of this Agreement, BMS hereby authorizes the Recipient to disclose to the manufacturer of any co-medication necessary for the Combined Therapy Clinical Trial the applicable Protocol and any related Confidential Information necessary for such manufacturer to update its product label if such disclosure is necessary to obtain the co-medication for use in such Combined Therapy Clinical Trial; provided, however, that all materials delivered to such manufacturer will be redacted of all non-public information related to the BMS Study Drug. Any such disclosure shall be subject to confidentiality obligations at least as restrictive as those set forth herein and shall restrict the manufacturer to using the information provided solely to make regulatory filings relating to the use of the applicable co-medication in such Combined Therapy Clinical Trial.

9.6 Press Releases and Publications.

(a) The Parties shall jointly agree to the content and timing of all public communications with respect to this Agreement, press releases, Q&As, and the content of, and wording for, any listing the Combined Therapy Clinical Trial required to be listed on a public database or other public registry such as www.clinicaltrials.gov). For clarity, if either Party terminates this Agreement pursuant to Section 12.4, the Parties shall mutually agree upon any external communication related to such termination, which shall not include the rationale for such termination unless (and to the extent) mutually agreed by the Parties; *provided that* either Party shall be permitted to publicly disclose information that such Party determines in good faith is necessary to be disclosed to comply with Applicable Law or the rules or regulations of any securities exchange on which such Party's stock may be listed, or pursuant to an order of a court or governmental entity.

(b) The Recipient and BMS agree to collaborate to publicly disclose, publish or present (i) top-line results from the Combined Therapy Clinical Trial, limited if possible to avoid jeopardizing the future publication of the Study Data at a scientific conference or in a scientific journal, solely for the purpose of disclosing, as soon as reasonably practicable, the safety or efficacy results and conclusions that are material to either Party under applicable securities laws, and (ii) the conclusions and outcomes (the "***Results***") of the Combined Therapy Clinical Trial at a scientific conference as soon as reasonably practicable following the completion of such Combined Therapy Clinical Trial, subject in the case of (ii) to the following terms and conditions. The Party proposing to disclose, publish or present the Results shall deliver to the other Party a copy of the proposed disclosure, publication or presentation at least [**] before submission to a Third Party. The reviewing Party shall determine whether any of its Confidential Information that may be contained in such disclosure, publication or presentation should be modified or deleted, whether to file a patent application on any Recipient Study Invention (solely with respect to the Recipient) or BMS Study Invention (solely with respect to BMS) or Combined Therapy Invention disclosed therein. The disclosure, publication or presentation shall be delayed for an additional [**] (i.e., a total of [**] from the initial proposal) if the reviewing Party reasonably requests such extension to allow time for the preparation and filing of relevant patent applications. If the reviewing Party reasonably

requests modifications to the disclosure, publication or presentation to prevent the disclosure of Confidential Information of the reviewing Party (other than the Results or Study Data), the publishing Party shall edit such publication to prevent the disclosure of such information prior to submission of the disclosure, publication or presentation. In the event of a disagreement as to content, timing and/or venue or forum for any disclosure, publication or presentation of the Results, such dispute (a "***Publication Dispute***") shall be referred to the Executive Officers (or their respective designees); provided that, in the absence of agreement after such good faith discussions, and upon expiration of the additional [**]-period, (A) academic collaborators or clinical trial sites engaged by the Recipient in connection with the performance of the Combined Therapy Clinical Trial may publish Combined Therapy Study Data obtained by such academic collaborator or clinical trial site solely to the extent that such ability to publish such Combined Therapy Study Data is set forth in an agreement between the Recipient and such academic collaborator or clinical trial site relating to the conduct of Combined Therapy Clinical Trial and (B) the publishing Party may proceed with the disclosure, publication or presentation provided that such disclosure, publication or presentation is consistent with its internal publication guidelines and customary industry practices for the publication of similar data and does not disclose the Confidential Information of the other Party (other than the Results or Study Data). Authorship of any publication shall be determined based on the accepted standards used in peer-reviewed academic journals at the time of the proposed disclosure, publication or presentation. The Parties agree that they shall make reasonable efforts to prevent publication of a press release that could jeopardize the future publication of Study Data at a scientific conference or in a scientific journal but in no way will this or any other provision of this Agreement supersede the requirements of any Applicable Law or the rules or regulations of any securities exchange or listing entity on which a Party's stock is listed (including any such rule or regulation that may require a Party to make public disclosures about interim results of the Combined Therapy Clinical Trial).

(c) The Recipient agrees to include in all press releases, presentations and publications it makes related to the Combined Therapy Clinical Trial specific mention, if applicable, of the BMS Study Drug and the support and involvement of BMS. BMS agrees to include in all press releases, presentations and publications it makes related to the Combined Therapy Clinical Trial specific mention, if applicable, of the Recipient Study Drug and the support and involvement of the Recipient.

9.7 Compliance with Sunshine Laws.

(a) For purposes of compliance with reporting obligations under Sunshine Laws, as between the Parties, the Recipient represents that it is not, as of the Effective Date, subject to reporting obligations under the Sunshine Laws. Therefore, as between the Parties, BMS will report payments or other transfers of value ("***POTV***") made by the Recipient or the CRO related to the conduct of the Combined Therapy Clinical Trial and any applicable associated contractor engagements as required under the Sunshine Laws for the Combined Therapy Clinical Trial. BMS shall request delayed publication for any reported POTV for studies sponsored by the Recipient as permitted under the Sunshine Laws and if consistent with BMS's normal business practices. In the event that the Recipient becomes responsible for reporting POTV for studies sponsored by it in a given country during the Term, the Recipient shall provide written notification to BMS and the Parties will meet to confer to discuss how they wish to handle reporting thereafter. Interpretation of the Sunshine Laws for purposes of reporting any POTV by a Party shall be in such Party's sole discretion so long as the interpretation complies with Applicable Law.

(b) The Recipient (i) will provide (to the extent in the possession of the Recipient), or will utilize Commercially Reasonable Efforts to obligate and ensure that each CRO and other applicable Third Party contractors for the Combined Therapy Clinical Trial provides, BMS with any information requested by BMS as BMS may reasonably determine is necessary for BMS to comply with its reporting obligations under Sunshine Laws (with such amounts paid to, or at the direction of, healthcare providers, teaching hospitals and/or any other persons for whom POTVs must be reported under Sunshine Laws to be reported to BMS within a reasonable time period specified by BMS) and (ii) will reasonably cooperate

with, and will utilize Commercially Reasonable Efforts to obligate and ensure that each CRO and other applicable Third Party contractors for the Combined Therapy Clinical Trial reasonably cooperates with, BMS in connection with its compliance with such Sunshine Laws. The form in which the Recipient provides any such information shall be mutually agreed but sufficient to enable BMS to comply with its reporting obligations and BMS may disclose any information that it believes is necessary to comply with Sunshine Laws. Without limiting the foregoing, BMS shall have the right to allocate POTVs in connection with this Agreement in any required reporting under Sunshine Laws in accordance with its normal business practices. These obligations shall survive the expiration and termination of this Agreement to the extent necessary for BMS to comply with Sunshine Laws. The Recipient shall not be required to provide any information to BMS that is subject to disclosure pursuant to the Recipient's own obligations under the Sunshine Laws.

(c) For purposes of this Section 9.7, "***Sunshine Laws***" shall mean Applicable Laws requiring collection, reporting and disclosure of POTVs to certain healthcare providers, entities and individuals. These Applicable Laws may include relevant provisions of the Patient Protection and Affordable Health Care Act of 2010 and implementing regulations thereunder.

9.8 Destruction of Confidential Information. Upon expiration or termination of the Agreement, the receiving Party shall, upon request by the other Party, immediately destroy or return all of the other Party's Confidential Information relating solely to its Compound as monotherapy (but not to the Combined Therapy or the Combined Therapy Study Data) in its possession; *provided*, *however*, *that* the receiving Party shall be entitled to retain one (1) copy of Confidential Information solely for record-keeping purposes and shall not be required to destroy any Confidential Information required, or reasonably necessary, to be retained for any clinical trial activities that continue after expiration or termination, or off-site computer files created during automatic system back up which are subsequently stored securely by the receiving Party.

9.9 Nonsolicitation of Employees. Each Party agrees that, during the conduct of the Combined Therapy Clinical Trial and for six (6) months thereafter, neither it nor any of its Affiliates shall recruit, solicit or induce any employee of the other Party directly involved in the development or other activities conducted by the other Party under this Agreement to terminate his or her employment with such other Party and become employed by or consult for such other Party, whether or not such employee is a full-time employee of such other Party, and whether or not such employment is pursuant to a written agreement or is at-will. For purposes of the foregoing, "recruit", "solicit" or "induce" shall not be deemed to mean (a) circumstances where an employee of one Party initiates contact with the other Party or any of its Affiliates with regard to possible employment, or (b) general solicitations of employment not specifically targeted at employees of a Party or any of its Affiliates, including responses to general advertisements.

ARTICLE 10

REPRESENTATIONS AND WARRANTIES

10.1 Authority and Binding Agreement. Each Party represents and warrants to the other Party that (a) it has the corporate power and authority and the legal right to enter into this Agreement and perform its obligations hereunder, (b) it has taken all necessary corporate action on its part required to authorize the execution and delivery of the Agreement and the performance of its obligations hereunder, and (c) the Agreement has been duly executed and delivered on behalf of such Party and constitutes a legal, valid and binding obligation of such Party that is enforceable against it in accordance with its terms subject to bankruptcy, insolvency, reorganization, arrangement, winding-up, moratorium, and similar laws of general application affecting the enforcement of creditors' rights generally, and subject to general equitable principles, including the fact that the availability of equitable remedies, such as injunctive relief or specific performance, is in the discretion of the court.

10.2 No Conflicts. Each Party represents and warrants to the other Party that, to the best of its knowledge, it has not entered, and shall not enter, into any agreement with any Third Party that is in conflict with the rights granted to the other Party under this Agreement, and has not taken any action that would in any way prevent it from granting the rights granted to the other Party under this Agreement, or that would otherwise materially conflict with or adversely affect the rights granted to the other Party under this Agreement.

10.3 Litigation. Each Party represents and warrants to the other Party, to the best of its knowledge, it is not aware of any pending or threatened litigation (and has not received any communication) that alleges that its activities related to this Agreement have violated, or that by conducting the activities as contemplated in this Agreement it would violate, any of the intellectual property rights of any other Person (after giving effect to the license grants in this Agreement).

10.4 No Adverse Proceedings. Each Party represents and warrants to the other Party that, except as otherwise notified to the other Party, there is not pending or, to the knowledge of such Party, threatened, against such Party, any claim, suit, action or governmental proceeding that would, if adversely determined, materially impair the ability of such Party to perform its obligations under this Agreement.

10.5 Consents. Each Party represents and warrants to the other Party that, to the best of its knowledge, all necessary consents, approvals and authorizations of all regulatory and governmental authorities and other Persons (a) required to be obtained by such Party in connection with the execution and delivery of this Agreement have been obtained (or will have been obtained prior to such execution and delivery) and (b) required to be obtained by such Party in connection with the performance of its obligations under this Agreement have been obtained or will be obtained prior to such performance.

10.6 No Debarment. Each Party hereby certifies to the other that it has not used, and will not use the services of any person disqualified, debarred, banned, subject to debarment or convicted of a crime for which a person could be debarred by the FDA under 21 U.S.C. 335a, as amended (or subject to a similar sanction of any other Regulatory Authority), in any capacity in connection with any of the services or work provided under the Combined Therapy Clinical Trial and that this certification may be relied upon in any applications to the FDA or any other Regulatory Authority. It is understood and agreed that this certification imposes a continuing obligation upon each Party to notify the other promptly of any change in the truth of this certification. Upon request by a Party, the other Party agrees to provide a list of persons used to perform the services or work provided under any activities conducted for or on behalf of such Party or any of its Affiliates pursuant to this Agreement who, within the [**] preceding the Effective Date, or subsequent to the Effective Date, were or are convicted of one of the criminal offenses required by 21 U.S.C. 335a, as amended, to be listed in any application for approval of an abbreviated application for drug approval.

10.7 Compliance with Applicable Law. Each Party represents and warrants to the other Party that it shall comply with all Applicable Law of the country or other jurisdiction, or any court or agency thereof, applicable to the performance of its activities hereunder or any obligation or transaction hereunder, including those pertaining to the production and handling of drug products, such as those set forth by the Regulatory Authorities, as applicable, and the applicable terms of this Agreement in the performance of its obligations hereunder.

10.8 Affiliates. Each Party represents and warrants to the other Party that, to the extent the intellectual property, Regulatory Documentation or Technology licensed by it hereunder are Controlled by its Affiliates or a Third Party, it has the right to use, and has the right to grant (sub)licenses to the other Party to use, such intellectual property, Regulatory Documentation or Technology in accordance with the terms of this Agreement.

10.9 Ethical Business Practices. Each Party represents and warrants to the other Party that

neither it nor its Affiliates will make any payment, either directly or indirectly, of money or other assets, including the compensation such Party derives from this Agreement (collectively a "***Payment***"), to government or political party officials, officials of International Public Organizations, candidates for public office, or representatives of other businesses or persons acting on behalf of any of the foregoing (collectively "***Officials***") where such Payment would constitute violation of any law, including the Foreign Corrupt Practices Act of 1977, 15 U.S.C. §§ 78dd-1, et seq. In addition, regardless of legality, neither it nor its Affiliates will make any Payment either directly or indirectly to Officials if such Payment is for the purpose of improperly influencing decisions or actions with respect to the subject matter of this Agreement. All activities will be conducted in compliance with the U.S. False Claims Act and the U.S. Anti-Kickback Statute.

10.10 Accounting. Each Party represents and warrants to the other Party that all transactions under the Agreement shall be properly and accurately recorded in all material respects on its books and records and that each document upon which entries in such books and records are based is complete and accurate in all material respects.

10.11 Single Agent Compound Safety Issues. Each Party represents and warrants that, to the best of its knowledge, it is not aware of any material safety or toxicity issue with respect to its Single Agent Compound that are not reflected in the investigator's brochure for its Single Agent Compound existing as of the Effective Date.

10.12 Compliance with Licensor Agreements. Each Party will use, and will cause its Affiliates to use, Commercially Reasonable Efforts to comply with its obligations under any agreements entered into by it or its Affiliates with a Third Party under which it is licensed any intellectual property rights or confidential information relating to a Compound (and not to voluntarily terminate same) to the extent necessary for the Combined Therapy Clinical Trial to be conducted and completed in accordance with the terms of this Agreement and for the other Party to receive the rights and benefits provided to it under this Agreement.

10.13 DISCLAIMER OF WARRANTY. THE EXPRESS REPRESENTATIONS AND WARRANTIES STATED IN THIS ARTICLE 10 ARE IN LIEU OF, AND THE PARTIES DO HEREBY DISCLAIM, ALL OTHER REPRESENTATIONS AND WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, INCLUDING WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR USE, AND NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

ARTICLE 11

INDEMNIFICATION

11.1 BMS Indemnification. BMS hereby agrees to defend, hold harmless and indemnify (collectively, "***Indemnify***") the Recipient, its Affiliates, and its and their agents, directors, officers, employees and subcontractors (the "***Recipient Indemnitees***") from and against any and all liabilities, expenses and/or losses, including reasonable legal expenses and attorneys' fees (collectively "***Losses***") resulting from Third Party suits, claims, actions and demands (each, a "***Third Party Claim***") to the extent that they arise or result from (a) the negligence or intentional misconduct of any BMS Indemnitee or any (sub)licensee of BMS conducting activities on behalf of BMS under this Agreement, (b) any breach by BMS of any provision of this Agreement, (c) any injury (other than resulting from known adverse effects) to a subject in the Combined Therapy Clinical Trial to the extent caused solely by the BMS Study Drug, or (d) the use by BMS, its Affiliates, contractors or (sub)licensees of Combined Therapy Study Data, BMS Study Data, BMS Study Inventions, BMS Study Patent Rights, Combined Therapy Inventions and

Combined Therapy Patent Rights (other than with respect to Third Party Claims that are covered under Section 6.4); but excluding, in each case ((a) through (d)), any such Losses to the extent arising or resulting from a cause or event for which the Recipient is obligated to Indemnify the BMS Indemnitees pursuant to Section 11.2.

11.2 Recipient Indemnification. The Recipient hereby agrees to Indemnify BMS, its Affiliates, and its and their agents, directors, officers, employees and subcontractors (the "***BMS Indemnitees***") from and against any and all Losses resulting from Third Party Claims to the extent that they arise or result from (a) the negligence or intentional misconduct of any Recipient Indemnitee or any (sub)licensee of the Recipient conducting activities on behalf of the Recipient under this Agreement, (b) any breach by the Recipient of any provision of this Agreement, (c) any injury (other than resulting from known adverse effects) to a subject in the Combined Therapy Clinical Trial to the extent caused solely by the Recipient Study Drug, or (d) the use by the Recipient, its Affiliates, contractors or (sub)licensees of Combined Therapy Study Data, Recipient Study Data, Recipient Study Inventions, Recipient Study Patent Rights, Combined Therapy Inventions and Combined Therapy Patent Rights (other than with respect to Third Party Claims that are covered under Section 6.4); but excluding, in each case ((a) through (d)), any such Losses to the extent arising or resulting from a cause or event for which BMS is obligated to Indemnify the Recipient Indemnitees pursuant to Section 11.1.

11.3 Indemnification Procedure. Each Party's agreement to Indemnify the other Party is conditioned on the performance of the following by the Party seeking indemnification: (a) providing written notice to the Indemnifying Party of any Loss and/or Third Party Claim of the types set forth in Section 11.1 and 11.2 promptly, and in any event within [**], after the Party seeking indemnification has knowledge of such Loss and/or Third Party Claim; *provided that*, any delay in complying with the requirements of this clause (a) will only limit the Indemnifying Party's obligation to the extent of the prejudice caused to the Indemnifying Party by such delay, (b) permitting the Indemnifying Party to assume full responsibility to investigate, prepare for and defend against any such Loss and/or Third Party Claim, (c) providing reasonable assistance to the Indemnifying Party, at the Indemnifying Party's expense, in the investigation of, preparation for and defense of any Loss and/or Third Party Claim, and (d) not compromising or settling such Loss and/or Third Party Claim without the Indemnifying Party's written consent, such consent not to be unreasonably withheld or delayed.

11.4 Separate Defense of Claims. In the event that the Parties cannot agree as to the application of Sections 11.1 and/or 11.2 to any particular Loss, the Parties may conduct separate defenses of such Loss. Each Party further reserves the right to claim indemnity from the other in accordance with Sections 11.1 and/or 11.2 upon resolution of the underlying claim, notwithstanding the provisions of Section 11.3(b).

11.5 Insurance. Each Party shall maintain commercially reasonable levels of insurance or other adequate and commercially reasonable forms of protection or self-insurance to satisfy its indemnification obligations under this Agreement. Each Party shall provide the other Party with written notice at least [**] prior to the cancellation, non-renewal or material change in such insurance or self-insurance which would materially adversely affect the rights of the other Party hereunder. The maintenance of any insurance shall not constitute any limit or restriction on damages available to a Party under this Agreement.

11.6 LIMITATION OF LIABILITY. NEITHER PARTY SHALL BE LIABLE TO THE OTHER PARTY FOR INDIRECT, INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES, INCLUDING LOST PROFITS, ARISING FROM OR RELATING TO THIS AGREEMENT AND/OR SUCH PARTY'S PERFORMANCE HEREUNDER, REGARDLESS OF ANY NOTICE OF THE POSSIBILITY OF SUCH DAMAGES AND REGARDLESS OF THE CAUSE OF ACTION (WHETHER IN CONTRACT, TORT, BREACH OF WARRANTY OR OTHERWISE). NOTHING IN THIS SECTION 11.6 IS INTENDED TO LIMIT OR RESTRICT THE INDEMNIFICATION RIGHTS OR OBLIGATIONS OF A PARTY UNDER SECTIONS 11.1 OR 11.2 IN RELATION TO, OR DAMAGES

AVAILABLE FOR, BREACHES OF CONFIDENTIALITY OBLIGATIONS IN ARTICLE 9 OR FOR A PARTY'S GROSS NEGLIGENCE OR WILLFUL MISCONDUCT.

ARTICLE 12

TERM AND TERMINATION

12.1 Term. This Agreement shall be effective as of the Effective Date and, unless earlier terminated pursuant to Sections 12.2, 12.3 or 12.4 or any other termination right expressly stated in this Agreement, shall continue in effect until completion of the Combined Therapy Clinical Trial by all centers participating in the Combined Therapy Clinical Trial, delivery of all Study Data, including all completed case report forms, all final analyses and all final clinical study reports contemplated by the Combined Therapy Clinical Trial to both Parties, and the completion of any statistical analyses and bioanalyses contemplated by the Protocol or otherwise agreed to by the Parties to be conducted under this Agreement (the "***Term***").

12.2 Termination for Material Breach.

(a) Notice and Cure Period. If a Party (the "***Breaching Party***") is in material breach of its obligations under this Agreement, the other Party (the "***Non-Breaching Party***") shall have the right to give the Breaching Party notice specifying the nature of such material breach. The Breaching Party shall have a period of [**] after receipt of such notice to cure such material breach (the "***Cure Period***") in a manner reasonably acceptable to the Non-Breaching Party. For the avoidance of doubt, this provision is not intended to restrict in any way either Party's right to notify the other Party of any other breach or to demand the cure of any other breach.

(b) Termination Right. The Non-Breaching Party shall have the right to terminate this Agreement, upon written notice, in the event that the Breaching Party has not cured such material breach within the Cure Period, *provided, however, that* if such breach is capable of cure but cannot be cured within the Cure Period, and the Breaching Party commences actions to cure such material breach within the Cure Period and thereafter diligently continue such actions, the Breaching Party shall have an additional [**] to cure such breach. If a Party contests such termination pursuant to the dispute resolution procedures under Section 13.3, such termination shall not be effective until a conclusion of the dispute resolution procedures in Section 13.3, as applicable, resulting in a determination that there has been a material breach that was not cured within the Cure Period (which Cure Period shall be tolled for the period from notice of such dispute until resolution of such dispute pursuant to Section 13.3 or abandonment of such dispute by the disputing Party).

12.3 Termination for Bankruptcy. Either Party may terminate this Agreement if, at any time, the other Party shall file in any court or agency pursuant to any statute or regulation of any state, country or jurisdiction, a petition in bankruptcy or insolvency or for reorganization or for an arrangement or for the appointment of a receiver or trustee of such other Party or of such other Party's assets, or if the other Party proposes a written agreement of composition or extension of its debts, or if the other Party shall be served with an involuntary petition against it, filed in any insolvency proceeding, and such petition shall not be dismissed or stayed within [**] after the filing thereof, or if the other Party will propose or be a party to any dissolution or liquidation, or if the other Party shall make an assignment for the benefit of its creditors.

12.4 Termination due to Material Safety Issue; Clinical Hold.

(a) Either Party shall have the right to terminate this Agreement immediately (after meeting and discussing with the other Party in good faith as described in the following sentence) upon written notice if it deems it necessary to protect the safety, health or welfare of subjects enrolled in the

Combined Therapy Clinical Trial due to the existence of a Material Safety Issue. In the event of a termination due to a Material Safety Issue, prior to the terminating Party providing written notice, each Party's safety committee shall, to the extent practicable, meet and discuss in good faith the safety concerns raised by the terminating Party and consider in good faith the input, questions and advice of the non-terminating Party, but should any dispute arise in such discussion, the dispute resolution processes set forth in Section 13.3 shall not apply to such dispute and the terminating Party shall have the right to issue such notice and such termination shall take effect without the Parties first following the procedures set forth in Section 13.3.

(b) If a Clinical Hold with respect to either the BMS Study Drug or the Recipient Study Drug should arise at any time after the Effective Date, the Parties will meet and discuss the basis for the Clinical Hold, how long the Clinical Hold is expected to last, and how they might address the issue that caused the clinical hold. If, after [**] of discussions following the Clinical Hold, either Party reasonably concludes that the issue adversely impacts the Combined Therapy Clinical Trial and is not solvable or that unacceptable and material additional costs/delays have been and/or will continue to be incurred in the conduct of the Combined Therapy Clinical Trial, then such Party may immediately terminate this Agreement.

12.5 Effect of Termination. Upon expiration or termination of this Agreement, (a) the licenses granted to the Recipient to conduct the Combined Therapy Clinical Trial in Section 3.1 (and any sublicenses granted under Section 3.2) shall terminate, and (b) the Parties shall use reasonable efforts to wind down activities under this Agreement in a reasonable manner and avoid incurring any additional expenditures or non-cancellable obligations; *provided that*, in the case of termination pursuant to Section 12.4, the Recipient may continue to dose subjects enrolled in the Combined Therapy Clinical Trial through completion of the Protocol if dosing is required by the applicable Regulatory Authority(ies) and/or Applicable Law. Any such wind-down activities will include the return to BMS, or destruction, of all BMS Study Drug provided to the Recipient and not consumed in the Combined Therapy Clinical Trial, except in the event that the Recipient terminates this Agreement pursuant to Section 12.2 or 12.3, in which case the Recipient shall continue to have the right to use any BMS Study Drug provided to Recipient for the conduct of the Combined Therapy Clinical Trial.

12.6 Survival. The following Articles and Sections of this Agreement and all definitions relating thereto shall survive any expiration or termination of this Agreement for any reason: Section 2.1(b), Section 2.4, Section 4.5, Sections 5.1(e)-(h), Section 5.1(j), Section 5.1(k), Section 5.1(o), Article 6 ("*Intellectual Property*"), Article 7 ("*Costs and Expenses)*, Article 8 ("*Records and Study Data*"), Article 9 ("*Confidentiality*"); Article 10 ("*Representations and Warranties*"), Article 11 ("*Indemnification*"), Section 12.5 ("*Effect of Termination*"), Section 12.6 ("*Survival*"), Section 13.1 ("*Entire Agreement*"), Section 13.2 ("*Governing Law*"), Section 13.3 ("*Dispute Resolution*"), Section 13.4 ("*Injunctive Relief*"), Section 13.6 ("*Notices*"), Section 13.7 ("*No Waiver, Modifications*"), Section 13.8 ("*No Strict Construction*"), Section 13.9 ("*Independent Contractor*"), Section 13.10 ("*Assignment, Licenses*"), Section 13.11 ("*Headings*"), Section 13.13 ("*Severability*"), Section 13.15 ("*No Benefit to Third Parties*"), and Section 13.16 ("*Construction*").

ARTICLE 13

MISCELLANEOUS

13.1 Entire Agreement. The Parties acknowledge that this Agreement shall govern all activities of the Parties with respect to the Combined Therapy Clinical Trial from the Effective Date forward. This Agreement, including the Exhibits hereto and together with the Supply and Quality Documentation, sets forth the complete, final and exclusive agreement between the Parties concerning the subject matter hereof

and supersedes all prior agreements and understandings between the Parties with respect to such subject matter. There are no covenants, promises, agreements, warranties, representations, conditions or understandings, either oral or written, between the Parties with respect to such subject matter other than as are set forth in this Agreement. All Exhibits attached hereto are incorporated herein as part of this Agreement.

13.2 Governing Law. This Agreement shall be governed and construed in accordance with the internal laws of the State of Delaware, USA, excluding any choice of law rules that may direct the application of the laws of another jurisdiction.

13.3 Dispute Resolution.

(a) The Parties' Designated Clinical Contacts (for clinical and regulatory matters) and the Parties Designated Supply Contacts (for supply matters) shall attempt in good faith to resolve any dispute or concern that either Party may bring to the other Party's attention.

(b) In the event of any dispute, controversy or claim arising out of, relating to or in connection with any provision of this Agreement (each a "***Dispute***"), other than a Publication Dispute or a dispute as to whether a Material Safety Issue exists, that cannot be resolved by the applicable Designated Contacts of each Party, then upon the request of either Party by written notice, the Parties shall refer such Dispute to the Executive Officers. This Agreement shall remain in effect during the pendency of any such dispute. In the event that no resolution is made by the Executive Officers (or their designee) in good faith negotiations within [**] after such referral to them, then:

(i) if such Dispute constitutes an Arbitration Matter, such Dispute shall be resolved through arbitration in accordance with the remainder of this Section 13.3; *provided, however, that* with respect to any such Dispute that relates to a matter described in Section 13.4, either Party shall have the right to seek an injunction or other equitable relief without waiting for the expiration of such [**]-period

(ii) if such Dispute constitutes a Publication Dispute, the specific dispute resolution processes contained in Section 9.6(b) will apply;

(iii) if such Dispute regards the supply, quality or compliance with specifications of the Recipient Study Drug, the Dispute will be resolved by the Recipient; *provided that* (A) the Recipient shall have no authority to amend, change or waive compliance with this Agreement, which matters may be approved only by the written consent of both Parties, (B) all determinations made by the Recipient shall be consistent with the terms of this Agreement, and (C) any disputes relating to the supply, quality or compliance with specifications of the BMS Study Drug shall be the responsibility of BMS.

(c) If a Dispute that constitutes an Arbitration Matter remains unresolved after escalation to the Executive Officers as described above, either Party may refer the matter to arbitration as described herein. Any arbitration under this Agreement shall be conducted under the auspices of the American Arbitration Association by a panel of three (3) arbitrators pursuant to that organization's Commercial Arbitration Rules then in effects. The fees and expenses of the arbitrators shall be borne in equal shares by the Parties. Each Party shall bear the fees and expenses of its legal representation in the arbitration. The arbitral tribunal shall not reallocate either the fees and expenses of the arbitrators or of the Parties' legal representation. The arbitration shall be held in New York, New York, USA, which shall be the seat of the arbitration. The language of the arbitration shall be English.

13.4 Injunctive Relief. Notwithstanding anything herein to the contrary, a Party may seek an injunction or other injunctive relief from any court of competent jurisdiction in order to prevent immediate and irreparable injury, loss or damage on a provisional basis. For the avoidance of doubt, if either Party (a)

discloses Confidential Information of the other Party other than as permitted under Article 9, (b) uses (in the case of the Recipient) the BMS Study Drug or BMS Technology or (in the case of BMS) the Recipient Study Drug or Recipient Technology in any manner other than as expressly permitted under this Agreement or (c) otherwise is in material breach of this Agreement and such material breach could cause immediate harm to the value of the Recipient Study Drug (if BMS is in material breach) or the BMS Study Drug (if the Recipient is in material breach), the other Party shall have the right to seek an injunction or other equitable relief precluding the other Party from continuing its activities related to the Combined Therapy Clinical Trial without waiting for the conclusion of the dispute resolution procedures under Section 13.3.

13.5 Force Majeure. The Parties shall be excused from the performance of their obligations under this Agreement (other than the payment of monies owed to the other Party) to the extent that such performance is prevented by force majeure and the non-performing Party promptly provides notice of the prevention to the other Party. Such excuse shall be continued so long as the condition constituting force majeure continues and the nonperforming Party takes reasonable efforts to remove the condition. For purposes of this Agreement, force majeure shall mean acts of God, strikes or other concerted acts of workers, civil disturbances, fires, earthquakes, acts of terrorism, floods, explosions, riots, war, rebellion, sabotage or failure or default of public utilities or common carriers or similar conditions beyond the control of the Parties.

13.6 Notices. Any notice required or permitted to be given under this Agreement shall be in writing, shall specifically refer to this Agreement and shall be deemed to have been sufficiently given for all purposes if such notice is timely and is: (a) mailed by first class certified or registered mail, postage prepaid, return receipt requested, (b) sent by express delivery service, or (c) personally delivered. Unless otherwise specified in writing, the mailing addresses of the Parties shall be as described below.

For the Recipient:	Idera Pharmaceuticals Inc. 505 Eagleview Boulevard, Suite 212 Exton, PA 19425 Attention: VP, Business Development
With a copy to:	Idera Pharmaceuticals Inc. 505 Eagleview Boulevard, Suite 212 Exton, PA 19425 Attention: General Counsel
For BMS:	Bristol-Myers Squibb Company Route 206 and Province Line Road Princeton, NJ 08543-4000 Attention: VP, Business Development
With a copy to:	Bristol-Myers Squibb Company Route 206 and Province Line Road Princeton, NJ 08543-4000 Attention: VP & Assistant General Counsel, Licensing and Business Development

Any such communication shall be deemed to have been received when delivered. It is understood and agreed that this Section 13.6 is not intended to govern the day-to-day business communications necessary between the Parties in performing their duties, in due course, under the terms of this Agreement.

13.7 No Waiver; Modifications. It is agreed that no waiver by a Party hereto of any breach or default of any of the covenants or agreements herein set forth shall be deemed a waiver as to any subsequent

and/or similar breach or default. No amendment, modification, release or discharge shall be binding upon the Parties unless in writing and duly executed by authorized representatives of both Parties.

13.8 No Strict Construction. This Agreement has been prepared jointly and shall not be strictly construed against either Party. No presumption as to construction of this Agreement shall apply against either Party with respect to any ambiguity in the wording of any provision(s) of this Agreement irrespective of which Party may be deemed to have authored the ambiguous provision(s).

13.9 Independent Contractor. The Parties are independent contractors of each other, and the relationship between the Parties shall not constitute a partnership, joint venture or agency. Neither Party shall be the agent of the other or have any authority to act for, or on behalf of, the other Party in any matter.

13.10 Assignment; Licensees.

(a) Assignment. Neither Party may assign or transfer this Agreement or any rights or obligations hereunder without the prior written consent of the other Party, *except* that a Party may make such an assignment without the other Party's consent (i) to an Affiliate, (ii) to a Third Party that merges with, consolidates with or acquires substantially all of the assets or voting control of the assigning Party or (iii) to a Third Party that acquires all the rights of the assigning Party to the Recipient Study Drug, in the case of the Recipient, or the BMS Study Drug, in the case of BMS. If assigned or transferred to an Affiliate, the assigning/transferring Party shall remain jointly and severally responsible and liable with the assignee/transferee Affiliate for the assigned rights and/or obligations. If assigned to a Third Party, any permitted successor or assignee of rights and/or obligations hereunder shall, in a writing to the other Party, expressly assume performance of such rights and/or obligations. Any assignment or attempted assignment by any Party in violation of the terms of this Section 13.10(a) shall be null and void and of no legal effect.

(b) Licensees. If a Party grants a third party a license (other than a license solely to make a product for a Party to develop and commercialize its Single Agent Compound on a worldwide basis or in any geographic region and/or for all purposes or a limited field, (a "***Licensee***"), such Party will obtain the Licensee's agreement to abide by the terms of this Agreement in the same manner as the licensing Party.

13.11 Headings. The captions to the several Sections and Articles hereof are not a part of this Agreement, but are included merely for convenience of reference only and shall not affect its meaning or interpretation.

13.12 Counterparts. This Agreement may be executed in two (2) or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one (1) and the same instrument. This Agreement may be executed by facsimile or electronic (e.g., pdf) signatures and such signatures shall be deemed to bind each Party hereto as if they were original signature.

13.13 Severability. If any provision of this Agreement is held to be illegal, invalid or unenforceable under any present or future law, and if the rights or obligations of a Party under this Agreement will not be materially and adversely affected thereby, (a) such provision shall be fully severable, (b) this Agreement shall be construed and enforced as if such illegal, invalid or unenforceable provision had never comprised a part hereof, (c) the remaining provisions of this Agreement shall remain in full force and effect and shall not be affected by the illegal, invalid or unenforceable provision or by its severance herefrom and (d) in lieu of such illegal, invalid or unenforceable provision, there shall be added automatically as a part of this Agreement a legal, valid and enforceable provision as similar in terms to such illegal, invalid or unenforceable provision as may be possible and reasonably acceptable to the Parties.

13.14 Further Assurance. Each Party shall duly execute and deliver, or cause to be duly executed and delivered, such further instruments and do and cause to be done such further acts and things, including the filing of such assignments, agreements, documents and instruments, as may be necessary or

as the other Party may reasonably request in order to perfect any license, assignment or other transfer or any properties or rights under, or pursuant, to this Agreement.

13.15 No Benefit to Third Parties. The representations, warranties and agreements set forth in this Agreement are for the sole benefit of the Parties and their successors and permitted assigns, and they shall not be construed as conferring any rights on any other parties.

13.16 Construction.

(a) General. Except as otherwise explicitly specified to the contrary, (i) references to a Section, Article or Exhibit means a Section or Article of, or Exhibit to, this Agreement and all subsections thereof, unless another agreement is specified, (ii) references to a particular statute or regulation include all rules and regulations promulgated thereunder and any successor statute, rules or regulations then in effect, in each case including the then-current amendments thereto, (iii) words in the singular or plural form include the plural and singular form, respectively, (iv) the terms "including," "include(s)," "such as," and "for example" used in this Agreement mean including the generality of any description preceding such term and will be deemed to be followed by "without limitation", (v) the words "hereof," "herein," "hereunder," "hereby" and derivative or similar words refer to this Agreement, (vi) "or" is used in the conjunctive ("and/or") unless the context requires otherwise, (vii) "will" and "shall" are synonyms, and (viii) days means calendar days. No presumption as to construction of this Agreement shall apply against either Party with respect to any ambiguity in the wording of any provision(s) of this Agreement irrespective of which Party may be deemed to have authored the ambiguous provision(s).

(b) No Response. Except as expressly set forth in this Agreement, where a provision of this Agreement provides for a Party to respond within a designated period following written notice from the other Party, and if such Party fails to respond, then the failure to respond shall not be deemed to create or imply: (i) that the non-responding Party agrees or disagrees with the proposed action to be taken by the other Party, (ii) any amendment, change or waiver of the terms of this Agreement, or (iii) any consent that an action proposed to be taken may be taken if it conflicts with the terms of this Agreement and/or waiver of any rights it may have to seek remedies at law or in equity for breach of this Agreement as a result of the action taken.

[*Signature page follows*]

IN WITNESS WHEREOF, the Parties, intending to be legally bound hereby, have caused this Agreement to be executed by their duly authorized representatives as of the Effective Date.

Idera Pharmaceuticals, Inc.	**Bristol-Myers Squibb Company**
By: /s/ Vincent Milano	By: /s/ Fouad Namouni
Name: Vincent Milano	Name: Fouad Namouni
Title: CEO	Title: SVP Head of Oncology Development
Date: 5/18/2018	Date: 5/17/2018

Exhibit Index

Attached:

Appendix A: Draft Protocol

APPENDIX A

PROTOCOL

Confidential Materials omitted and filed separately with the Securities and Exchange Commission.
A total of 82 pages were omitted. [**].

Exhibit 31.1

CERTIFICATION OF CHIEF EXECUTIVE OFFICER PURSUANT TO EXCHANGE ACT RULES 13a-14 AND 15d-14, AS ADOPTED PURSUANT TO SECTION 302 OF SARBANES-OXLEY ACT OF 2002

I, Vincent J. Milano, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Idera Pharmaceuticals, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
    a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
    b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
    c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
    d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
    a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
    b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Dated: August 2, 2018

/s/ VINCENT J. MILANO
Vincent J. Milano
Chief Executive Officer

Exhibit 31.2

CERTIFICATION OF CHIEF FINANCIAL OFFICER PURSUANT TO EXCHANGE ACT RULES 13a-14 AND 15d-14, AS ADOPTED PURSUANT TO SECTION 302 OF SARBANES-OXLEY ACT OF 2002

I, Louis J. Arcudi, III certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Idera Pharmaceuticals, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
    a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
    b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
    c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
    d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
    a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
    b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Dated: August 2, 2018

/s/ LOUIS J. ARCUDI, III
Louis J. Arcudi, III
Chief Financial Officer

Exhibit 32.1

CERTIFICATION OF CHIEF EXECUTIVE OFFICER PURSUANT TO 18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Quarterly Report on Form 10-Q of Idera Pharmaceuticals, Inc. (the "Company") for the period ended June 30, 2018 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), the undersigned, Vincent J. Milano, Chief Executive Officer of the Company, hereby certifies, pursuant to 18 U.S.C. Section 1350, that to his knowledge:

(1) the Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

A signed original of this written statement has been provided to Idera Pharmaceuticals, Inc. and will be retained by Idera Pharmaceuticals, Inc. and furnished to the Securities and Exchange Commission or its staff upon request.

Dated: August 2, 2018

/s/ VINCENT J. MILANO
Vincent J. Milano
Chief Executive Officer

Exhibit 32.2

CERTIFICATION OF CHIEF FINANCIAL OFFICER PURSUANT TO 18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Quarterly Report on Form 10-Q of Idera Pharmaceuticals, Inc. (the "Company") for the period ended June 30, 2018 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), the undersigned, Louis J. Arcudi, III, Chief Financial Officer of the Company, hereby certifies, pursuant to 18 U.S.C. Section 1350, that to his knowledge:

(1) the Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

A signed original of this written statement has been provided to Idera Pharmaceuticals, Inc. and will be retained by Idera Pharmaceuticals, Inc. and furnished to the Securities and Exchange Commission or its staff upon request.

Dated: August 2, 2018

/s/ LOUIS J. ARCUDI, III
Louis J. Arcudi, III
Chief Financial Officer