As filed with the Securities and Exchange Commission on May 21, 2013

Registration No. 333-188605

UNITED STATES
SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

Amendment No. 1
to
FORM S-1
REGISTRATION STATEMENT
UNDER
THE SECURITIES ACT OF 1933

bluebird bio, Inc.

(Exact name of registrant as specified in its charter)

Delaware	2836	13-3680878
(State or other jurisdiction of incorporation or organization)	(Primary Standard Industrial Classification Code Number)	(I.R.S. Employer Identification Number)

840 Memorial Drive, 4th Floor
Cambridge, MA 02139
(617) 491-5601

(Address, including zip code, and telephone number, including area code, of registrant's principal executive offices)

Nick Leschly
President and Chief Executive Officer
bluebird bio, Inc.
840 Memorial Drive, 4th Floor
Cambridge, MA 02139
(617) 491-5601

(Name, address, including zip code, and telephone number, including area code, of agent for service)

Copies to:

Michael H. Bison, Esq.
Goodwin Procter LLP
Exchange Place
53 State Street
Boston, MA 02109
(617) 570-1000

Patrick O'Brien, Esq.
Ropes & Gray LLP
Prudential Tower
800 Boylston Street
Boston, MA 02199
(617) 951-7000

Approximate date of commencement of proposed sale to public: As soon as practicable after this Registration Statement is declared effective.

If any of the securities being registered on this Form are to be offered on a delayed or continuous basis pursuant to Rule 415 under the Securities Act of 1933, check the following box. ☐

If this Form is filed to register additional securities for an offering pursuant to Rule 462(b) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this Form is a post-effective amendment filed pursuant to Rule 462(c) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

If this Form is a post-effective amendment filed pursuant to Rule 462(d) under the Securities Act, check the following box and list the Securities Act registration statement number of the earlier effective registration statement for the same offering. ☐

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

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

The Registrant hereby amends this Registration Statement on such date or dates as may be necessary to delay its effective date until the Registrant shall file a further amendment which specifically states that this Registration Statement shall thereafter become effective in accordance with Section 8(a) of the Securities Act of 1933 or until the Registration Statement shall become effective on such date as the Securities and Exchange Commission, acting pursuant to said Section 8(a), may determine.

Explanatory Note

This Amendment No. 1 is being filed for the purpose of filing Exhibits 10.6 through 10.11. No changes or additions are being made hereby to the Prospectus constituting Part I of the Registration Statement (not included herein) or to Part II of the Registration Statement other than Items 13 and 15.

Part II

Information not required in prospectus

Item 13. Other expenses of issuance and distribution

The following table sets forth the costs and expenses, other than the underwriting discounts and commissions, payable by the registrant in connection with the sale of common stock being registered. All amounts are estimates except for the Securities and Exchange Commission, or SEC, registration fee, the FINRA filing fee and The Nasdaq Global Market listing fee.

Item	Amount to be paid
SEC registration fee	$ 11,765
FINRA filing fee	13,438
Nasdaq Global Market listing fee	*
Printing and engraving expenses	*
Legal fees and expenses	*
Accounting fees and expenses	*
Transfer Agent fees and expenses	*
Miscellaneous expenses	*
Total	$ *

* To be provided by amendment

Item 14. Indemnification of directors and officers

Section 145(a) of the Delaware General Corporation Law provides, in general, that a corporation may indemnify any 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), because he or she is or was a director, officer, employee or agent of the corporation, or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, against expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by the person in connection with such action, suit or proceeding, if he or she acted in good faith and in a manner he or she 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 or her conduct was unlawful.

Section 145(b) of the Delaware General Corporation Law provides, in general, that a corporation may indemnify any person 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 because the person is or was a director, officer, employee or agent of the corporation, or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, against expenses (including attorneys' fees) actually and reasonably incurred by the person in connection with the defense or settlement of such action or suit if he or she acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the best interests of the corporation, except that no indemnification shall be made with respect to any claim, issue or matter as to which he or she shall have been adjudged to be liable to the

corporation unless and only to the extent that the Court of Chancery or other adjudicating court determines that, despite the adjudication of liability but in view of all of the circumstances of the case, he or she is fairly and reasonably entitled to indemnity for such expenses which the Court of Chancery or other adjudicating court shall deem proper.

Section 145(g) of the Delaware General Corporation Law provides, in general, that a corporation may purchase and maintain insurance on behalf of any person who is or was a director, officer, employee or agent of the corporation, or is or was serving at the request of the corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise against any liability asserted against such person and incurred by such person in any such capacity, or arising out of his or her status as such, whether or not the corporation would have the power to indemnify the person against such liability under Section 145 of the Delaware General Corporation Law.

Article VII of our amended and restated certificate of incorporation (the "Charter"), provides that no director of our company shall be personally liable to us or our stockholders for monetary damages for any breach of fiduciary duty as a director, except for liability (1) for any breach of the director's duty of loyalty to us or our stockholders, (2) for acts or omissions not in good faith or which involve intentional misconduct or a knowing violation of law, (3) in respect of unlawful dividend payments or stock redemptions or repurchases, or (4) for any transaction from which the director derived an improper personal benefit. In addition, our Charter provides that if the Delaware General Corporation Law is amended to authorize the further elimination or limitation of the liability of directors, then the liability of a director of our company shall be eliminated or limited to the fullest extent permitted by the Delaware General Corporation Law, as so amended.

Article VII of the Charter further provides that any repeal or modification of such article by our stockholders or amendment to the Delaware General Corporation Law will not adversely affect any right or protection existing at the time of such repeal or modification with respect to any acts or omissions occurring before such repeal or modification of a director serving at the time of such repeal or modification.

Article V of our amended and restated by-laws (the "By-Laws"), provides that we will indemnify each of our directors and officers and, in the discretion of our board of directors, certain employees, to the fullest extent permitted by the Delaware General Corporation Law as the same may be amended (except that in the case of amendment, only to the extent that the amendment permits us to provide broader indemnification rights than the Delaware General Corporation Law permitted us to provide prior to such the amendment) against any and all expenses, judgments, penalties, fines and amounts reasonably paid in settlement that are incurred by the director, officer or such employee or on the director's, officer's or employee's behalf in connection with any threatened, pending or completed proceeding or any claim, issue or matter therein, to which he or she is or is threatened to be made a party because he or she is or was serving as a director, officer or employee of our company, or at our request as a director, partner, trustee, officer, employee or agent of another corporation, partnership, joint venture, trust, employee benefit plan or other enterprise, if he or she acted in good faith and in a manner he or she reasonably believed to be in or not opposed to the best interests of our company and, with respect to any criminal proceeding, had no reasonable cause to believe his or her conduct was unlawful. Article V of the By-Laws further provides for the advancement of expenses to each of our directors and, in the discretion of the board of directors, to certain officers and employees.

In addition, Article V of the By-Laws provides that the right of each of our directors and officers to indemnification and advancement of expenses shall be a contract right and shall not be exclusive of any other right now possessed or hereafter acquired under any statute, provision of the Charter or By-Laws, agreement, vote of stockholders or otherwise. Furthermore, Article V of the By-Laws authorizes us to provide insurance for our directors, officers and employees, against any liability, whether or not we would have the power to indemnify such person against such liability under the Delaware General Corporation Law or the provisions of Article V of the By-Laws.

In connection with the sale of common stock being registered hereby, we have entered into indemnification agreements with each of our directors and our executive officers. These agreements will provide that we will indemnify each of our directors and such officers to the fullest extent permitted by law and the Charter and By-Laws.

We also maintain a general liability insurance policy which covers certain liabilities of directors and officers of our company arising out of claims based on acts or omissions in their capacities as directors or officers.

In any underwriting agreement we enter into in connection with the sale of common stock being registered hereby, the underwriters will agree to indemnify, under certain conditions, us, our directors, our officers and persons who control us within the meaning of the Securities Act of 1933, as amended, against certain liabilities.

Item 15. Recent sales of unregistered securities

In the three years preceding the filing of this registration statement, we have issued the following securities that were not registered under the Securities Act:

Grants and modifications of warrants

In May 2007, December 2007, May 2008, August 2008, December 2008, April 2009, July 2009, October 2009 and December 2009, we issued warrants to purchase 1,133,100, 472,124, 472,124, 472,124, 472,124, 321,044, 321,044, 283,274, and 574,800 shares, respectively, of either (i) our Series A-1 Preferred Stock or (ii) such preferred stock that we may issue in a subsequent qualified financing. In March 2010, in connection with the Series B Preferred Stock financing, the 2007, 2008 and the April, July and October 2009 warrants were amended to provide that such warrants would be exercisable only for shares of our Series A-1 Preferred Stock at a per share price of $0.6619 and the December 2009 warrants were amended to provide that such warrants would be exercisable only for shares of our Series B Preferred Stock at a per share price of $0.3262. The warrant issuances were exempt pursuant to Section 4(2), as transactions by an issuer not involving a public offering. The shares of preferred stock issued upon exercise of warrants and the shares of common stock issued upon conversion of the preferred stock are deemed restricted securities for the purposes of the Securities Act.

Grants and exercises of stock options

Since January 1, 2010, we have granted stock options to purchase an aggregate of 74,066,242 shares of our common stock at exercise prices ranging from $0.05 to $0.43. Since January 1, 2010, we have issued an aggregate of 568,246 shares of our common stock upon exercise of stock options granted pursuant to our 2002 Employee, Director and Consultant Plan and our 2010 Stock Option and Grant Plan for aggregate consideration of $61,394.

The option grants and the issuances of common stock upon exercise of the options were exempt either pursuant to Rule 701, as a transaction pursuant to a compensatory benefit plan, or pursuant to Section 4(2), as a transaction by an issuer not involving a public offering. The shares of common stock issued upon exercise of options are deemed restricted securities for the purposes of the Securities Act.

Issuances of capital stock

Since January 1, 2010, we have granted and issued an aggregate of 7,327,566 shares of our common stock pursuant to our 2010 Stock Option and Grant Plan. The issuances of common stock were exempt either pursuant to Rule 701, as a transaction pursuant to a compensatory benefit plan, or pursuant to Section 4(2), as a transaction by an issuer not involving a public offering. The shares of common stock issued pursuant to our 2010 Stock Option and Grant Plan are deemed restricted securities for the purposes of the Securities Act.

In March 2010, we issued an aggregate of 61,555,660 shares of our Series B Preferred Stock for aggregate consideration of $16.8 million in cash and $3.3 million in converted bridge notes to five investors. In April 2011, we issued an aggregate of 53,648,066 shares of our Series B Preferred Stock at a price per share of $0.3262 for aggregate consideration of $17.5 million to the same five investors. In April 2011, we issued an aggregate of 39,942,483 shares of our Series C Preferred Stock at a price per share of $0.37554 to five investors for aggregate consideration of $15.0 million to the same five investors. In July 2012, we issued an aggregate of 120,409,385 shares of our Series D Preferred Stock at a price per share of $0.4983 for aggregate consideration of $60.0 million to 17 investors. These preferred stock issuances were exempt under the Securities Act pursuant to Section 4(2) and/or Regulation D promulgated thereunder as transactions not involving a public offering.

Item 16. Exhibits and financial statement schedules

(a) Exhibits

See the Exhibit Index attached to this Registration Statement, which is incorporated by reference herein.

(b) Financial statement schedules

Schedules not listed above have been omitted because the information required to be set forth therein is not applicable or is shown in the financial statements or notes thereto.

Item 17. Undertakings

The undersigned Registrant hereby undertakes to provide to the underwriters at the closing specified in the underwriting agreement certificates in such denominations and registered in such names as required by the underwriters to permit prompt delivery to each purchaser.

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers and controlling persons of the Registrant pursuant to the foregoing provisions, or otherwise, the Registrant has been advised that in the opinion of the SEC such indemnification is against public policy as expressed in the Securities Act, and is, therefore, unenforceable. In the event that a claim for indemnification against such liabilities (other than the payment by the

Registrant of expenses incurred or paid by a director, officer, or controlling person of the Registrant in the successful defense of any action, suit or proceeding) is asserted by such director, officer or controlling person in connection with the securities being registered, the Registrant will, unless in the opinion of its counsel the matter has been settled by controlling precedent, submit to a court of appropriate jurisdiction the question of whether such indemnification by it is against public policy as expressed in the Securities Act and will be governed by the final adjudication of such issue.

The undersigned Registrant hereby undertakes that:

1. For purposes of determining any liability under the Securities Act, the information omitted from the form of prospectus filed as part of this Registration Statement in reliance upon Rule 430A and contained in a form of prospectus filed by the Registrant pursuant to Rule 424(b)(1) or (4) or 497(h) under the Securities Act shall be deemed to be part of this Registration Statement as of the time it was declared effective.

2. For the purpose of determining any liability under the Securities Act, each post-effective amendment that contains a form of prospectus shall be deemed to be a new registration statement relating to the securities offered therein, and the offering of such securities at that time shall be deemed to be the initial bona fide offering thereof.

Signatures

Pursuant to the requirements of the Securities Act of 1933, as amended, the Registrant has duly caused this Amendment No. 1 to Registration Statement on Form S-1 to be signed on its behalf by the undersigned, thereunto duly authorized, in the city of Cambridge, Commonwealth of Massachusetts, on the 21st day of May, 2013.

bluebird bio, Inc.

By: /s/ Nick Leschly
Nick Leschly
President and Chief Executive Officer

Pursuant to the requirements of the Securities Act, this Amendment No. 1 to Registration Statement on Form S-1 has been signed by the following persons in the capacities and on the dates indicated.

Signature	Title	Date
/s/ Nick Leschly Nick Leschly	President, Chief Executive Officer and Director (Principal Executive Officer)	May 21, 2013
/s/ Jeffrey T. Walsh Jeffrey T. Walsh	Chief Operating Officer and Secretary (Principal Financial Officer)	May 21, 2013
* Linda C. Bain	Vice President, Finance and Business Operations and Treasurer (Principal Accounting Officer)	May 21, 2013
* Daniel S. Lynch	Chairman of the Board	May 21, 2013
* Wendy L. Dixon, Ph.D.	Director	May 21, 2013
* Steven Gillis, Ph.D.	Director	May 21, 2013
* John M. Maraganore, Ph.D.	Director	May 21, 2013
* Geert-Jan Mulder, M.D.	Director	May 21, 2013
* Dr. Axel Polack	Director	May 21, 2013
* David P. Schenkein, M.D.	Director	May 21, 2013
* Robert I. Tepper, M.D.	Director	May 21, 2013

*By: /s/ Jeffrey T. Walsh
Jeffrey T. Walsh
Attorney-in-fact

Exhibit index

Exhibit number	Description of exhibit
1.1*	Form of Underwriting Agreement.
3.1*	Form of Amended and Restated Certificate of Incorporation (to be effective upon pricing of this offering).
3.2*	Form of Amended and Restated Certificate of Incorporation (to be effective upon completion of this offering).
3.3**	Form of Amended and Restated By-laws.
4.1*	Specimen Common Stock Certificate.
4.2**	Form of Common Stock Warrant.
4.3**	Form of Series A-1 Preferred Stock Warrant.
4.4**	Form of Series B Preferred Stock Warrant.
4.5**	Amended and Restated Investors' Rights Agreement, dated as of July 23, 2012, by and among the Registrant and the Investors listed therein.
5.1*	Opinion of Goodwin Procter LLP.
10.1**	Second Amended and Restated 2002 Employee, Director and Consultant Plan, as amended, and forms of award agreement thereunder.
10.2**	2010 Stock Option and Grant Plan, as amended, and forms of award agreement thereunder.
10.3*	2013 Stock Option and Incentive Plan and forms of award agreement thereunder.
10.4**	Form of Indemnification Agreement between the Registrant and each of its Executive Officers and Directors.
10.5**	Amended and Restated Lease Agreement, dated May 18, 2007, by and between the Registrant and Rivertech Associates II, LLC, as amended.
10.6†	Patent License Agreement, dated December 11, 1996, by and between the Registrant (formerly known as Genetix Pharmaceuticals Inc., successor-in-interest to Innogene Pharmaceuticals Inc.) and Massachusetts Institute of Technology, as amended.
10.7†	Patent and Know-How License Agreement No. 07554F30, dated May 14, 2009, by and between the Registrant (formerly known as Genetix Pharmaceuticals Inc.) and INSERM-TRANSFERT, as amended.
10.8†	License Agreement, dated September 13, 2011, by and between the Registrant and Institut Pasteur, as amended.
10.9†	License Agreement, dated December 7, 2011, by and between the Registrant and Research Development Foundation.
10.10†	Novation Agreement, dated April 2, 2012, by and between the Registrant and The Board of Trustees of the Leland Stanford Junior University.
10.11†	Master Collaboration Agreement by and between the Registrant and Celgene Corporation, dated March 19, 2013.
10.12*	Form of Amended and Restated Employment Agreement by and between the Registrant and Nick Leschly.
10.13*	Form of Amended and Restated Employment Agreement by and between the Registrant and Jeffrey T. Walsh.

Exhibit number	Description of exhibit
10.14*	Form of Amended and Restated Employment Agreement by and between the Registrant and Mitch Finer.
10.15*	Form of Amended and Restated Employment Agreement by and between the Registrant and David M. Davidson, M.D.
10.16*	Offer Letter, dated September 27, 2011 by and between the Registrant and Linda Bain.
10.17*	2013 Employee Stock Purchase Plan.
10.18**	Executive Cash Incentive Bonus Plan.
21.1**	Subsidiaries of Registrant.
23.1**	Consent of Ernst & Young LLP.
23.2**	Consent of McGladrey LLP.
23.3*	Consent of Goodwin Procter LLP (included in Exhibit 5.1).
24.1**	Power of Attorney (included on signature page).

* To be filed by amendment.

** Previously filed.

† Portions of this exhibit (indicated by asterisks) have been omitted pursuant to a request for confidential treatment and this exhibit has been submitted separately to the SEC.

Exhibit 10.6

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

and

INNOGENE PHARMACEUTICALS, INC.

PATENT LICENSE AGREEMENT

(EXCLUSIVE)

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

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CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

and

INNOGENE PHARMACEUTICALS, INC.

PATENT LICENSE AGREEMENT

This Agreement is made and entered into this 11th day of December, 1996 (the "EFFECTIVE DATE") by and between the MASSACHUSETTS INSTITUTE OF TECHNOLOGY, a corporation duly organized and existing under the laws of the Commonwealth of Massachusetts and having its principal office at 77 Massachusetts Avenue, Cambridge, Massachusetts 02139, U.S.A. (hereinafter referred to as "M.I.T."), and Innogene Pharmaceuticals, Inc. a corporation duly organized under the laws of Delaware and having its principal office at 41 Fresh Pond Lane, Cambridge, MA 02138 (hereinafter referred to as "LICENSEE").

WITNESSETH

WHEREAS, M.I.T. is the owner of certain PATENT RIGHTS (as later defined herein) relating to [***].

WHEREAS M.I.T. is the co-owner with Albert Einstein College of Medicine ("AECOM") of the PATENT RIGHTS of [***];

WHEREAS, M.I.T. and AECOM desire to have the PATENT RIGHTS developed and commercialized to benefit the public and is willing to grant a license thereunder,

WHEREAS, LICENSEE has represented to M.I.T., to induce M.I.T. to enter into this Agreement, that LICENSEE is experienced in the development, production, manufacture, marketing and sale of products similar to the LICENSED PRODUCT(s) (as later defined herein) and/or the use of the LICENSED PROCESS(es) (as later defined herein) and that it shall commit itself to a thorough, vigorous and diligent program of exploiting the PATENT RIGHTS so that public utilization shall result therefrom; and

WHEREAS, LICENSEE desires to obtain a license under the PATENT RIGHTS upon the terms and conditions hereinafter set forth.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

NOW, THEREFORE, in consideration of the premises and the mutual covenants contained herein, the parties hereto agree as follows:

1 - DEFINITIONS

For the purposes of this Agreement, the following words and phrases shall have the following meanings:

1.1 "LICENSEE" shall include a related company of Innogene Pharmaceuticals, Inc. the voting stock of which is directly or indirectly at least Fifty Percent (50%) owned or controlled by Innogene Pharmaceuticals, Inc. an organization which directly or indirectly controls more than Fifty Percent (50%) of the voting stock of Innogene Pharmaceuticals, Inc. and an organization, the majority ownership of which is directly or indirectly common to the ownership of Innogene Pharmaceuticals, Inc.

1.2 "PATENT RIGHTS" shall mean all of the following M.I.T. intellectual property:

a. the United States patents listed in Appendix A;

b. the United States patent applications listed in Appendix A, and divisionals, continuations and claims of continuation-in-part applications which shall be directed to subject matter specifically described in such patent applications, and the resulting patents;

c. any patents resulting from reissues or reexaminations of the United States patents described in a. and b. above;

d. the Foreign patents listed in Appendix A;

e. the Foreign patent applications listed in Appendix A, and divisionals, continuations and claims of continuation-in-part applications which shall be directed to subject matter specifically described in such Foreign patent applications, and the resulting patents;

f. Foreign patent applications filed after the EFFECTIVE DATE and divisionals, continuations and claims of continuation-in-part applications which shall be directed to subject matter specifically described in such patent applications, and the resulting patents; and

g. any Foreign patents, resulting from equivalent Foreign procedures to United States reissues and reexaminations, of the Foreign patents described in d., e. and f. above.

h. any U.S. and foreign patent applications and the resulting patents and any reissues and reexaminations which may be filed on the technology of any of the M.I.T. Cases in Appendix A, as the technology existed on the Effective Date.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

1.3 A "LICENSED PRODUCT" shall mean any product or part thereof which:

a. is covered in whole or in part by an issued, unexpired claim or a pending claim contained in the PATENT RIGHTS in the country in which any such product or part thereof is made, used or sold; or

b. is manufactured by using a process or is employed to practice a process which is covered in whole or in part by an issued, unexpired claim or a pending claim contained in the PATENT RIGHTS in the country in which any LICENSED PROCESS is used or in which such product or part thereof is used or sold.

If a claim has been abandoned or judged invalid or unenforceable by a court of competent jurisdiction, or an administrative agency, from which no appeal can be or is taken in any country, then any product or process falling only under that claim shall not be considered to be a LICENSED PRODUCT or LICENSED PROCESS in that country for the purposes of this Agreement.

1.4 A "LICENSED PROCESS" shall mean any process which is covered in whole or in part by an issued, unexpired claim or a pending claim contained in the PATENT RIGHTS.

1.5 "NET SALES" shall mean LICENSEE'S billings for LICENSED PRODUCTS and LICENSED- PROCESSES less the sum of the following:

a. discounts allowed in amounts customary in the trade for quantity purchases, cash payments, prompt payments, wholesalers and distributors;

b. sales, tariff duties and/or use taxes directly imposed and with reference to particular sales;

c. outbound transportation prepaid or allowed; and

d. amounts allowed or credited on returns.

No deductions shall be made for commissions paid to individuals whether they be with independent sales agencies or regularly employed by LICENSEE and on its payroll, or for cost of collections. NET SALES shall occur when a LICENSED PRODUCT or LICENSED

PROCESS shall be invoiced. If a LICENSED PRODUCT or LICENSED PROCESS shall be distributed or invoiced for a discounted price substantially lower than customary in the trade or distributed at no cost to affiliates or otherwise, NET SALES shall be based on the customary amount billed for such LICENSED PRODUCTS or LICENSED PROCESSES.

1.6 "TERRITORY" shall mean worldwide**.**

1.7 "FIELD OF USE" shall mean all.

1.8 "TANGIBLE PROPERTY" shall mean the biological materials listed in Appendix B and any derivatives or progeny thereof.

2 - GRANT

2.1 M.I.T. hereby grants to LICENSEE the right and license in the TERRITORY for the FIELD OF USE to practice under the PATENT RIGHTS and, to the extent not prohibited by other patents, to make, have made, use, lease, sell and import LICENSED PRODUCTS and to practice the LICENSED PROCESSES, until the expiration of the last to expire of the PATENT RIGHTS, unless this Agreement shall be sooner terminated according to the terms hereof.

2.2 LICENSEE agrees that LICENSED PRODUCTS leased or sold in the United States shall be manufactured substantially in the United States.

2.3 In order to establish a period of exclusivity for LICENSEE, M.I.T. hereby agrees that it shall not grant any other license to make, have made, use, lease, sell and import LICENSED PRODUCTS or to utilize LICENSED PROCESSES subject to the royalty-free, nonexclusive license rights of the United States Government per FAR 52.227-11, in the TERRITORY for the FIELD OF USE.

2.4 M.I.T. reserves the right to practice under the PATENT RIGHTS for noncommercial research purposes. AECOM reserves the right to practice under the PATENT RIGHTS of M.I.T. Case No. 7410 for noncommercial research purposes.

2.5 M.I.T. hereby grants to LICENSEE, during the term of this Agreement, an exclusive, royalty-free commercial license to use, reproduce, modify, make derivatives of, and transfer the TANGIBLE PROPERTY in conjunction with the LICENSED PRODUCTS and LICENSED PROCESSES or as otherwise necessary or useful for the exercise of the PATENT RIGHTS licensed hereunder. LICENSEE shall have the right to sublicense the TANGIBLE

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PROPERTY within LICENSEE'S reasonable discretion in order to exercise the PATENT RIGHTS granted under this Agreement. M.I.T. reserves the right to use, reproduce, modify, and make derivatives of the TANGIBLE PROPERTY for non-commercial research purposes. M.I.T. shall make reasonable efforts to transfer to LICENSEE functional samples of the TANGIBLE PROPERTY in their original form as listed in Appendix B, but shall have no obligation to replace such samples, and makes no warranty of their fitness for use.

2.6 M.I.T. reserves the right to distribute the TANGIBLE PROPERTY for research purposes only, to third parties including commercial entities.

2.7 M.I.T. also grants to LICENSEE a nonexclusive, non-royalty-bearing license to non-tangible know-how associated with the technology of any of the Cases of Appendix A, and further agrees that this know-how may be transferred by LICENSEE to third parties.

2.8 LICENSEE shall have the right to enter into sublicensing agreements for the rights, privileges and licenses granted hereunder. Upon any termination of this Agreement, sublicensees' rights shall be subject to Paragraph 13.6 hereof.

2.9 LICENSEE agrees to incorporate terms and conditions substantively similar to Articles 2, 5.1, 7.1, 7.2, 7.3, 7.5, 7.6, 8, 9, 10, 12 and 15 of this Agreement into its sublicense agreements, that are sufficient to enable LICENSEE to comply with this Agreement.

2.10 LICENSEE agrees to forward to M.I.T. a copy of any and all sublicense agreements promptly upon execution by the parties.

2.11 LICENSEE shall not receive from sublicensees anything of value in lieu of cash payments in consideration for any sublicense under this Agreement, without the express prior written permission of M.I.T.

2.12 Nothing in this Agreement shall be construed to confer any rights upon LICENSEE by implication, estoppel or otherwise as to any technology or PATENT RIGHTS of M.I.T., or any other entity other than the PATENT RIGHTS and TANGIBLE PROPERTY.

3 - DILIGENCE

3.1 LICENSEE shall use diligent efforts to bring LICENSED PRODUCTS to market through a thorough, vigorous program for exploitation of the PATENT RIGHTS and to continue active, diligent development and marketing efforts for LICENSED PRODUCTS throughout the life of this Agreement.

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3.2 LICENSEE shall raise a cumulative total of investment capital of at least:

a. [***]; and

b. [***]; and

c. [***].

3.3 [***]

a. [***];

b. [***];

c. [***]; and

d. [***].

3.4 LICENSEE'S failure to perform in accordance with either Paragraph 3.1 or 3.2 above shall be grounds for M.I.T. to terminate this Agreement pursuant to Paragraph 13.3 hereof, provided, however, if LICENSEE has expended at least [***], and is otherwise in compliance with the terms and conditions of this Agreement, the license under this Agreement will become nonexclusive, without the right to sublicense, except by approval of M.I.T., such approval not to be unreasonably withheld.

4 - ROYALTIES

4.1 For the rights, privileges and license granted hereunder, LICENSEE shall pay royalties to M.I.T. in the manner hereinafter provided to the end of the term of the PATENT RIGHTS or until this Agreement shall be terminated:

a. License Issue Fee of [***], which said License Issue Fee shall be deemed earned and due in three parts:

(i) [***] due upon the signing of the Agreement; and

(ii) [***] due upon the raising of Two Million Dollars ($2,000,000) in investment capital by LICENSEE.

(iii) [***] upon the filing by LICENSEE of a New Drug Application for the first LICENSED PRODUCT.

b. License Maintenance Fees of [***] per year payable on January 1, 1999 and on January 1 of each year thereafter, provided, however, License Maintenance Fees may be credited to Running Royalties subsequently due on NET SALES for each said year, if any. License Maintenance Fees paid in excess of Running Royalties shall not be creditable to Running Royalties for future years.

c. Running Royalties in an amount equal to [***] of NET SALES of the LICENSED PRODUCTS and LICENSED PROCESSES used, leased or sold by and/or for LICENSEE.

d. The following proportion of payments, including, but not limited to, sublicense issue fees and royalties, received from sublicensees in consideration for the LICENSED PRODUCTS and LICENSED PROCESSES, but excluding payments made for research funding:

(i) [***]; or

(ii) [***].

Provided, however, that in no case shall the payments for each sublicense in any given year be less than [***] of the net sales of the sublicensee in that year, determined on the same basis on which such net sales are reported to LICENSEE for purposes of determining royalties payable to LICENSEE under its sublicense.

Net sales shall be determined on substantially the same terms as "NET SALES" are defined herein, with only such changes as M.I.T. may approve, which approval shall not be unreasonably withheld.

4.2 If LICENSEE must pay royalties to a third party for patents necessary to the reduction or sale LICENSED PRODUCTS or LICENSED PROCESSES, LICENSEE may credit [***] of the royalties paid to the third party against the Running Royalties otherwise due under P. 4.1 (c) above, provided that in no event shall the amount paid to M.I.T. for that LICENSED PRODUCT or LICENSED PROCESS be less than [***] of the NET SALES of that LICENSED PRODUCT or LICENSED PROCESS.

4.3 No royalties shall be due on any LICENSED PRODUCT or LICENSED PROCESS which falls only under a pending patent which has not issued five years following its

priority date. If a patent subsequently issues, royalties on the LICENSED PRODUCT or LICENSED PROCESS shall resume from the issue date of such patent. If a patent subsequently issues, royalties on the LICENSED PRODUCT or LICENSED PROCESS shall resume from the issue date of such patent.

4.4 If LICENSEE sells a LICENSED PRODUCT or LICENSED PROCESS which delivers several active genes (totaling "B"), the delivery of only "A" of which fall under the PATENT RIGHTS, then the NET SALES for the purposes of the Running Royalties of P.4.1(c) and 4.1(d) above shall be [***].

4.5 All payments due hereunder shall be paid in full, without deduction of taxes or other fees which may be imposed by any government, except as otherwise provided in Paragraph 1.5(b).

4.6 If LICENSEE is prevented from [***], then LICENSEE shall not be required to pay to M.I.T. [***].

4.7 No multiple royalties shall be payable because any LICENSED PRODUCT, its manufacture, use, lease or sale are or shall be covered by more than one PATENT RIGHTS patent application or PATENT RIGHTS patent licensed under this Agreement.

4.8 Royalty payments shall be paid in United States dollars in Cambridge, Massachusetts, or at such other place as M.I.T. may reasonably designate consistent with the laws and regulations controlling in any foreign country. If any currency conversion shall be required in connection with the payment of royalties hereunder, such conversion shall be made by using the exchange rate prevailing at the Chase Manhattan Bank (N.A.) on the last business day of the calendar quarterly reporting period to which such royalty payments relate.

5 - REPORTS AND RECORDS

5.1 LICENSEE shall keep full, true and accurate books of account containing all particulars that may be necessary for the purpose of showing the amounts payable to M.I.T. hereunder. Said books of account shall be kept at LICENSEE'S principal place of business or the principal place of business of the appropriate division of LICENSEE to which this Agreement relates. Said books and the supporting data shall be open at all reasonable times[***] for five (5) years following the end of the calendar year to which they pertain, to the inspection

of a M.I.T. agent, who shall be an accounting firm of national standing, for the purpose of verifying LICENSEE'S royalty statement or compliance in other respects with this Agreement. Should such inspection lead to the discovery of a greater than [***] discrepancy in reporting to M.I.T.'s detriment, LICENSEE agrees to pay the full cost of such inspection.

5.2 LICENSEE shall deliver to M.I.T. true and accurate reports, giving such particulars of the business conducted by LICENSEE and its sublicensees under this Agreement as shall be pertinent to diligence under Article 3 and royalty accounting hereunder:

a. before the first commercial sale of a LICENSED PRODUCT or LICENSED PROCESS, annually, on January 31 of each year; and

b. after the first commercial sale of a LICENSED PRODUCT or LICENSED PROCESS, quarterly, within sixty (60) days after March 31, June 30, September 30 and December 31, of each year.

These reports shall include at least the following:

a. [***];

b. [***];

c. [***];

d. [***];

e. [***];

f. [***]; and

g. [***].

5.3 With each such report submitted, LICENSEE shall pay to M.I.T. the royalties due and payable under this Agreement. If no royalties shall be due, LICENSEE shall so report.

5.4 On or before the ninetieth (90th) day following the close of LICENSEE'S fiscal year, LICENSEE shall provide M.I.T. with LICENSEE'S certified financial statements for the preceding fiscal year including, at a minimum, a balance sheet and an income statement.

5.5 The amounts due under Articles 4 and 6 shall, if overdue, bear interest until payment at a per annum rate [***]. The payment of such interest shall not foreclose M.I.T. from exercising any other rights it may have as a consequence of the lateness of any payment.

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6 - PATENT PROSECUTION

6.1 Upon the Effective Date, LICENSEE shall assume responsibility for the filing, prosecution and maintenance of the PATENT RIGHTS in the U.S. and in foreign countries elected by LICENSEE, using a patent attorney of LICENSEE'S choice. Such prosecution shall be in M.I.T.'s name. LICENSEE shall not abandon any substantive claim or fail to make a payment with respect to any of the PATENT RIGHTS filed by M.I.T. prior to the Effective Date in the U.S., Canada, the countries of the European Patent Office, or Japan unless LICENSEE has notified M.I.T. in sufficient time for M.I.T. to assume such prosecution or make payment at its own expense. M.I.T. shall be copied on all correspondence with government patent offices relating to prosecution and maintenance of the PATENT RIGHTS, M.I.T. shall have reasonable opportunities to advise LICENSEE and shall cooperate with LICENSEE in such filing, prosecution and maintenance.

6.2 Payment of all fees and costs relating to the filing, prosecution and maintenance of the PATENT RIGHTS shall be the responsibility of [***].

7 - INFRINGEMENT

7.1 LICENSEE and M.I.T. shall each inform the other promptly in writing of any alleged infringement of the PATENT RIGHTS by any third party that comes to the notifying party's attention and of any available evidence thereof of which the notifying party is aware.

7.2 [***]

7.3 [***]

7.4 [***]

7.5 [***]

7.6 [***]

7.7 [***]

8 - PRODUCT LIABILITY

8.1 LICENSEE shall at all times during the term of this Agreement and thereafter, indemnify, defend and hold M.I.T, AECOM, their trustees, directors, officers, employees and affiliates, harmless against all claims, proceedings, demands and liabilities of any kind

whatsoever, including legal expenses and reasonable attorneys' fees, arising out of the death of or injury to any person or persons or out of any damage to property, resulting from the production, manufacture, sale, use, lease, consumption or advertisement of the LICENSED PRODUCT(s) and/or LICENSED PROCESS(es) and/or TANGIBLE PROPERTY or arising from any obligation of LICENSEE hereunder.

8.2 LICENSEE shall obtain and carry in full force and effect commercial, general liability insurance, including product liability and errors and omissions insurance, which shall protect LICENSEE, M.I.T. and AECOM with respect to events covered by Paragraph 8.1 above. Such insurance shall be written by a reputable insurance company authorized to do business in the Commonwealth of Massachusetts, shall list M.I.T. as an additional named insured thereunder, shall be endorsed to include product liability coverage and shall require thirty (30) days written notice to be given to M.I.T. prior to any cancellation or material change thereof. The limits of such insurance shall not be less than [***]. LICENSEE shall provide M.I.T. with Certificates of Insurance evidencing the same.

8.3 EXCEPT AS OTHERWISE EXPRESSLY SET FORTH IN THIS AGREEMENT, M.I.T., ALBERT EINSTEIN COLLEGE OF MEDICINE (AECOM), THEIR TRUSTEES, DIRECTORS, OFFICERS, EMPLOYEES, AND AFFILIATES MAKE NO REPRESENTATIONS AND EXTEND NO WARRANTIES OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, VALIDITY OF PATENT RIGHTS CLAIMS, ISSUED OR PENDING, AND THE ABSENCE OF LATENT OR OTHER DEFECTS, WHETHER OR NOT DISCOVERABLE. NOTHING IN THIS AGREEMENT SHALL BE CONSTRUED AS A REPRESENTATION MADE OR WARRANTY GIVEN BY M.I.T. OR AECOM THAT THE PRACTICE BY LICENSEE OF THE LICENSE GRANTED HEREUNDER SHALL NOT INFRINGE THE PATENT RIGHTS OF ANY THIRD PARTY. IN NO EVENT SHALL M.I.T. OR AECOM, THEIR TRUSTEES, DIRECTORS, OFFICERS, EMPLOYEES AND AFFILIATES BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND, INCLUDING ECONOMIC DAMAGE OR INJURY TO PROPERTY AND LOST PROFITS, REGARDLESS OF WHETHER M.I.T. OR AECOM SHALL BE ADVISED, SHALL HAVE OTHER REASON TO KNOW, OR IN FACT SHALL KNOW OF THE POSSIBILITY OF THE FOREGOING.

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9 - EXPORT CONTROLS

LICENSEE acknowledges that it is subject to United States laws and regulations controlling the export of technical data, computer software, laboratory prototypes and other commodities (including the Arms Export Control Act, as amended and the United States Department of Commerce Export Administration Regulations). The transfer of such items may require a license from the cognizant agency of the United States Government and/or written assurances by LICENSEE that LICENSEE shall not export data or commodities to certain foreign countries without prior approval of such agency. M.I.T. neither represents that a license shall not be required nor that, if required, it shall be issued.

10 - NON-USE OF NAMES

LICENSEE shall not use the names or trademarks of the Massachusetts Institute of Technology or Lincoln Laboratory, nor Albert Einstein College of Medicine (AECOM), nor any adaptation thereof, nor the names of any of their employees, in any advertising, promotional or sales literature without prior written consent obtained from M.I.T., AECOM, or said employee, in each case, except that LICENSEE may state that it is licensed by M.I.T. under one or more of the patents and/or applications comprising the PATENT RIGHTS.

11 - ASSIGNMENT

This Agreement is not assignable except to successors of substantially all of LICENSEE'S business related to the subject matter of this Agreement, by merger or other operation of law, and in the case a merger in which the stockholders of LICENSEE will own less than 50% of the outstanding voting power of the resulting corporation, with the consent of M.I.T., such consent not to be unreasonably withheld.

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12 - DISPUTE RESOLUTION

12.1 Except for the right of either party to apply to a court of competent jurisdiction for a temporary restraining order, a preliminary injunction, or other equitable relief to preserve the status quo or prevent irreparable harm, any and all claims, disputes or controversies arising under, out of, or in connection with the Agreement, including any dispute relating to patent validity or infringement, which the parties shall be unable to resolve within [***] shall be mediated in good faith. The party raising such dispute shall promptly advise the other party of such claim, dispute or controversy in a writing which describes in reasonable detail the nature of such dispute. By not later than [***] after the recipient has received such notice of dispute, each party shall have selected for itself a representative who shall have the authority to bind such party, and shall additionally have advised the other party in writing of the name and title of such representative. By not later than [***] after the date of such notice of dispute, the party against whom the dispute shall be raised shall select a mediation firm in the Boston area and such representatives shall schedule a date with such firm for a mediation hearing. The parties shall enter into good faith mediation and shall share the costs equally. If the representatives of the parties have not been able to resolve the dispute within [***] after such mediation hearing, then any and all claims, disputes or controversies arising under, out of, or in connection with this Agreement, including any dispute relating to patent validity or infringement, shall be resolved by final and binding arbitration in Boston, Massachusetts under the rules of the American Arbitration Association, or the Patent Arbitration Rules if applicable, then obtaining. The arbitrators shall have no power to add to, subtract from or modify any of the terms or conditions of this Agreement, nor to award punitive damages. Any award rendered in such arbitration may be enforced by either party in either the courts of the Commonwealth of Massachusetts or in the United States District Court for the District of Massachusetts, to whose jurisdiction for such purposes M.I.T. and LICENSEE each hereby irrevocably consents and submits.

12.2 Notwithstanding the foregoing, nothing in this Article shall be construed to waive any rights or timely performance of any obligations existing under this Agreement.

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13 - TERMINATION

13.1 If LICENSEE shall cease to carry on its business, this Agreement shall terminate upon notice by M.I.T.

13.2 Should LICENSEE fail to make any payment whatsoever due and payable to M.I.T. hereunder, M.I.T. shall have the right to terminate this Agreement effective on thirty (30) days' notice, unless LICENSEE shall make all such payments to M.I.T. within said thirty (30) day period. Upon the expiration of the thirty (30) day period, if LICENSEE shall not have made all such payments to M.I.T., the rights, privileges and license granted hereunder shall automatically terminate.

13.3 Upon any material breach or default of this Agreement by LICENSEE (including, but not limited to, breach or default under Paragraph 3.3), other than those occurrences set out in Paragraphs 13.1 and 13.2 hereinabove, which shall always take precedence in that order over any material breach or default referred to in this Paragraph 13.3, M.I.T. shall have the right to terminate this Agreement and the rights, privileges and license granted hereunder effective on ninety (90) days' notice to LICENSEE. Such termination shall become automatically effective unless LICENSEE shall have cured any such material breach or default prior to the expiration of the ninety (90) day period.

13.4 LICENSEE shall have the right to terminate this Agreement at any time on six (6) months' notice to M.I.T., and upon payment of all amounts due M.I.T. through the effective date of the termination.

13.5 Upon termination of this Agreement for any reason, nothing herein shall be construed to release either party from any obligation that matured prior to the effective date of such termination; and Articles 1, 8, 9, 10, 12, 13.5, 13.6, and 15 shall survive any such termination. LICENSEE and any sublicensee thereof may, however, after the effective date of such termination sell all LICENSED PRODUCTS, and complete LICENSED PRODUCTS in the process of manufacture at the time of such termination and sell the same, provided that LICENSEE shall make the payments to M.I.T. as required by Article 4 of this Agreement and shall submit the reports required by Article 5 hereof.

13.6 Upon termination of this Agreement for any reason, any sublicensee not then in default shall remain in force and effect in accordance with its terms, with M.I.T. taking the place of LICENSEE, but not subject to any performance obligations of LICENSEE.

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14 - PAYMENTS, NOTICES AND OTHER COMMUNICATIONS

Any payments, notice or other communication pursuant to this Agreement shall be sufficiently made or given on the date of mailing if sent to such parry by certified first class mail, return receipt requested, postage prepaid, addressed to it at its address below or as it shall designate by written notice given to the other party:

In the case of M.I.T.:

Director
Technology Licensing Office
Massachusetts Institute of Technology
77 Massachusetts Avenue, NE25-230
Cambridge, Massachusetts 02139

In the case of LICENSEE:

Innogene Pharmaceuticals, Inc.
41 Fresh Pond Lane
Cambridge, MA 02138

15 - MISCELLANEOUS PROVISIONS

15.1 All disputes arising out of or related to this Agreement, or the performance, enforcement, breach or termination hereof, and any remedies relating thereto, shall be construed, governed, interpreted and applied in accordance with the laws of the Commonwealth of Massachusetts, U.S.A., except that questions affecting the construction and effect of any patent shall be determined by the law of the country in which the patent shall have been granted.

15.2 The parties hereto acknowledge that this Agreement sets forth the entire Agreement and understanding of the parties hereto as to the subject matter hereof, and shall not be subject to any change or modification except by the execution of a written instrument signed by the parties.

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15.3 The provisions of this Agreement are severable, and in the event that any provisions of this Agreement shall be determined to be invalid or unenforceable under any controlling body of the law, such invalidity or unenforceability shall not in any way affect the validity or enforceability of the remaining provisions hereof.

15.4 LICENSEE agrees to mark the LICENSED PRODUCTS sold in the United States with all applicable United States patent numbers. All LICENSED PRODUCTS shipped to or sold in other countries shall be marked in such a manner as to conform with the patent laws and practice of the country of manufacture or sale.

15.5 The failure of either party to assert a right hereunder or to insist upon compliance with any term or condition of this Agreement shall not constitute a waiver of that right or excuse a similar subsequent failure to perform any such term or condition by the other party.

IN WITNESS WHEREOF, the parties have duly executed this Agreement the day and year set forth below.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY		INNOGENE PHARMACEUTICALS, INC.	
By	/s/ Lita Nelsen	By	/s/ Irving M. London
Name	Lita L. Nelsen, Director	Name	Irving M. London
Title	Technology Licensing Office	Title	President
Date	Dec 18, 1996	Date	Dec 18, 1996

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APPENDIX A

PATENT RIGHTS on the EFFECTIVE DATE

UNITED STATES PATENT RIGHTS

[***]

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APPENDIX B

DESIGNATED FOREIGN COUNTRIES

Foreign countries in which PATENT RIGHTS shall be filed, prosecuted and maintained accordance with Article 6:

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FIRST AMENDMENT

This First Amendment, effective as of the date set forth above the signatures of the parties below, is between the Massachusetts Institute of Technology ("M.I.T."), a Massachusetts corporation having its principal office at 77 Massachusetts Avenue, Cambridge, Massachusetts, 02139 and Genetix Pharmaceuticals, Inc. ("COMPANY"), a Delaware corporation, with a principal place of business at 840 Memorial Drive, Cambridge, Massachusetts 02139.

WHEREAS, COMPANY and M.I.T. wish to modify the provisions of the Exclusive Patent License Agreement dated December 18, 1996 as amended, ("LICENSE AGREEMENT").

NOW, THEREFORE, in consideration of the promises and mutual covenants contained herein, the parties hereby agree to modify the LICENSE AGREEMENT as follows:

1. The following text shall be added to the end of Appendix A:

   [***]

2. Section 4.1.b shall be changed such that [***] shall be deleted and replaced with [***].

3. A Case Addition Fee for MIT Case 10104 [***] shall be due February 1, 2004.

The remaining terms and conditions of the LICENSE AGREEMENT remain intact.

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IN WITNESS WHEREOF, the parties have caused this Agreement to be executed under seal by their duly authorized representatives.

The Effective Date of this First Amendment is December 12, 2003.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY		GENETIX PHARMACEUTICALS, INC.	
By:	/s/ Lita Nelsen	By:	/s/ Ronald Dorazio MD
Name:	Lita L. Nelsen, Director	Name:	Ronald Dorazio, MD
Title:	Technology Licensing Office	Title:	Vice President
Date:	12/22/03	Date:	Dec. 17, 2003

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SECOND AMENDMENT

WHEREAS the Massachusetts Institute of Technology ("MIT") and Genetix Pharmaceuticals Inc. of Cambridge, Massachusetts ("Genetix" or "Company," formerly Innogene Pharmaceuticals, Inc.) are parties to the Patent License Agreement ("License Agreement") entered into on December 18, 1996; and

WHEREAS Genetix currently lacks sufficient cash funds to substantially advance the development of its lead product candidate LentiGlobin™ which incorporates technology subject to the License Agreement or to make further payments under the License Agreement which could become due; and

WHEREAS Genetix has entered into a subsequent letter agreement ("Letter Agreement") with MIT dated April 9, 2004 and providing for conditional retraction of MIT's earlier Letter of Termination upon a financing of Genetix and certain payments by Genetix to MIT, as well as a further agreement ("First Amendment") dated December 12, 2003 amending the License Agreement to incorporate certain new technology and payments by Genetix; and

WHEREAS Genetix' lead product in development, LentiGlobin™, incorporates multiple technologies requiring licenses from multiple parties each bearing royalty, license fee, and sublicensing terms which are substantial and in the case of sublicensing terms are prohibitive in and of themselves, and Genetix now anticipates requirement for an additional license from at least one further party; and

WHEREAS [***]; and

WHEREAS Genetix has not entered into any sublicense under the License Agreement nor has it initiated negotiation of such a sublicense; and

WHEREAS Genetix desires to realize the equity investment so that it may continue operations and advance LentiGlobin™ into human clinical trials, and Genetix has therefore proposed to MIT to amend Section 4.1.d of the License Agreement to eliminate the requirement for certain payments to made pursuant to future sublicenses, for the satisfaction of new investors; and

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WHEREAS MIT stands to benefit financially from receipt by Genetix of the investment, through the intended further development and potential commercialization of LentiGlobin™ under the License Agreement as amended below;

Now, therefore, MIT and Genetix agree as follows (the "Second Amendment"):

1. The first sentence of Section 4.1.d of the License Agreement shall be amended and replaced with the following:

"The following proportion of payments received from sublicensees in consideration for the LICENSED PRODUCTS and LICENSED PROCESSES:

i. [***]; or

ii. [***]."

The remainder of the same Section, beginning "Provided, however…" shall remain as previously agreed and written.

2. The License Agreement, the Letter Agreement, the First Amendment, and this Second Amendment reflect the entire Agreement between MIT and Genetix. This Agreement may only be modified in writing signed by a duly authorized representative of MIT and a duly authorized representative of Genetix.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY	GENETIX PHARMACEUTICALS, INC.
/s/ Lita Nelsen	/s/ Walter C. Ogier
Lita Nelsen, Director, Technology Licensing Office	Walter C. Ogier, President and CEO
Dated: May 6, 2004	Dated: May 6, 2004

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THIRD AMENDMENT

This Amendment is to the license agreement dated December 11, 1996 between Massachusetts Institute of Technology and Bluebird Bio Inc. (formerly Innogene Pharmaceuticals, Inc., formerly Genetix Pharmaceuticals Inc.), hereinafter referred to as "LICENSEE", as subsequently amended by the First Amendment dated December 12, 2003 and the Second Amendment dated May 6, 2004.

The parties hereby further agree as follows:

1. The annual License Maintenance Fee payments of Paragraph 4.1(b) shall be changed to [***] per year.
2. Paragraph 4.1(c) shall be replaced with the following:

   Running Royalties in an amount equal to [***] of NET SALES of LICENSED PRODUCTS and LICENSED PROCESSES used, leased and/or sold by LICENSEE or its SUBLICENSEES:
3. Paragraph 4.1 (d), as amended in the Second Amendment, shall be replaced with the following:

   (i) If only the PATENT RIGHTS are sublicensed: [***]; excluding however:

   ((a)) [***]; and

   ((b)) [***]; and

   ((c)) [***].

   (ii) If the sublicense revenue is paid for a package including the PATENT RIGHTS and products developed by LICENSEE and/or substantial technology and/or intellectual property developed by LICENSEE: [***]; excluding, however:

   ((a)) [***]; and

   ((b)) [***]; and

   ((c)) [***]; and

   ((d)) [***].
4. Section 4.2 shall be deleted and replaced in its entirety by:

   4.2 If LICENSEE (or its SUBLICENSEE) must pay royalties to a third party for patents necessary to the production or sale of LICENSED PRODUCTS or

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LICENSED PROCESSES, LICENSEE may credit [***] of the royalties paid to the third party against the Running Royalties otherwise due under P.4.1 (c) above, provided that in no event shall the amount paid to M.I.T. for that LICENSED PRODUCT or LICENSED PROCESS be less than [***] of NET SALES.

This Amendment with the effective date of June 1, 2011 is hereby agreed to by:

MASSACHUSETTS INSTITUTE OF TECHNOLOGY		BLUEBIRD BIO, INC.	
By:	/s/ Lita Nelsen	By:	/s/ Nick Leschly
Name:	Lita L. Nelsen, Director	Name:	Nick Leschly
Title:	Technology Licensing Office	Title:	CEO

Exhibit 10.7

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PATENT AND KNOW-HOW LICENSE AGREEMENT
N° 07554F30

BY AND BETWEEN

INSERM-TRANSFERT, a limited company organized under the laws of France, whose registered headquarters are located 7 rue Watt, 75013 PARIS, France, N° SIRET 434 033 619 00025, code APE 731Z, RCS Paris B 434 033 619, represented by its Chairman of the Board of Management, Mrs. Cecile Tharaud, acting as delegatee of Institut National de la Santé Et de la Recherche Médicale (hereinafter referred to as " **INSERM**"), French National Institute of Health and Medical Research, a public scientific and technological establishment having its principal offices at 101 rue de Tolbiac, 75654 Paris Cedex 13, France,

Hereinafter referred to as "**INSERM-TRANSFERT**",

Acting as representative of INSERM Unit U745 " *Genetic and Biotherapy of Degenerative and Proliferative Diseases of the Nervous System* ", directed by Pr Aubourg (hereinafter referred to as "**Laboratory**") and located at Faculty of Pharmaceutical and Biological Sciences, 4 avenue de L'Observatoire, 75006, Paris, France

On the one hand

AND

GENETIX, Inc. having its principal place of business at 840 Memorial Drive, Cambridge, MA 02139 USA,

Hereinafter referred to as "**LICENSEE**",

On the other hand

Hereinafter individually or collectively designated by " **Party**" or "**Parties**"

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BACKGROUND

A. LICENSEE is a biotechnology company which is doing business in the field of gene therapy. It has offices in the US and in France.

B. INSERM-TRANSFERT is INSERM's wholly owned technology transfer subsidiary, created by a French decree in June 6, 2000. Effective January 1st 2006, INSERM delegated to INSERM-TRANSFERT the management of its technology transfer activities. Accordingly INSERM-TRANSFERT is empowered to negotiate, sign and manage license agreements including the present agreement.

C. LICENSEE wishes to obtain a license from INSERM-TRANSFERT to the Patents and the related Know How (as these terms are defined hereunder), and INSERM-TRANSFERT is willing to grant LICENSEE such a license, all on the terms and conditions set forth below. The Parties entered into a Term Sheet N° 07554F10 for a license agreement on April 18, 2008, which detailed part of the conditions of the present agreement.

D. In parallel to such discussions, the Parties and INSERM have also been discussing the execution of a collaborative research agreement (N° 07554F20).

Considering the Parties' common interests, they decided to enter into this Patent and Know-How License Agreement concurrently with said "collaborative research agreement N° 07554F20".

The Parties wish to state in this preamble that the financing undertaking by LICENSEE was one of causes which led INSERM-TRANSFERT to sign both of these agreements (this Patent and Know-How Licence Agreement and the collaborative research agreement N° 07554F20); this is the reason why, should LICENSEE fail to perform its financing undertaking, INSERM-TRANSFERT will be provided with certain rights and obligations on the research programs and results therefrom in the conditions more fully detailed herein in order to seek a new partner to finalize the works and the files so as to obtain the marketing authorizations for the medicines in connection with the LentiD for Adrenoleukodystrohpy therapies.

NOW, THEREFORE, in consideration of the mutual covenants, conditions and undertakings herein contained, the Parties hereto agree as follows:

Preliminary ARTICLE - DEFINITIONS

As used in this agreement (hereinafter the "**Agreement**"), the following terms shall have the meanings indicated:

"**Affiliate**" shall mean an entity that directly, or indirectly through one or more intermediaries, controls, or is controlled by, or is under common control with

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LICENSEE. For this purpose, the term « control » shall mean the ownership of more than 50% of the voting shares of such corporation or 50% of the ownership interests in such other business entity.

"**Field**" shall mean [***].

"**Know-How**": shall mean all technical information, know-how, process, biological material, data or other subject matter developed by Pr. Patrick Aubourg and [***] of INSERM Unit 745, owned or controlled by INSERM that exists as of the effective date of this Agreement, which is reasonably necessary or useful for the practice of the Patent, and know how / data (published / unpublished) which has lead to French Afssaps clinical study authorization, development of the study to be carrying out between Unit 745 and LICENSEE and the future results of this study. This includes all data generated before the collaboration between INSERM and [***].

"**Net Sales**" shall mean the amount of sales, excluding taxes, of the Products (in all its forms) invoiced to third parties, including distributors, by LICENSEE or its Affiliates, less any customary COGS, SG&A marketing, sales distribution costs, normal trade discounts and credit notes issued in respect of returned Products in each country of the Territory. It is understood that the deductions shall not exceed [***]. In case LICENSEE could prove that the costs incurred by LICENSEE to sell Products are much higher than the deductions allowed in this Agreement, the Parties shall discuss to re-evaluate the percentage of deductions allowed.

Net Sales shall not include intermediate sales between LICENSEE and its Affiliate or its Affiliates between them. Net Sales shall only include the sales between the Affiliates (or LICENSEE) and third parties (and not the sales between LICENSEE and its Affiliates or its Affiliates between them).

"**Patents**": shall mean patent N° [***] filed on [***] (US) by INSERM and issued under N° [***], related to X-Linked adrenoleucodystrophy gene and corresponding protein Patent, and any foreign patent application corresponding thereto, and any divisional, continuation, or re-examination application, and each patent that issues or reissues from any of these patent applications. The following divisional application have been issued from the patent N° [***]: N° [***] and N° [***].

"**Products**" shall mean any therapeutic product, gene, composition or process the manufacture, use or sale of which would constitute, but for the license granted herein, an infringement of the Patent and/or Know-How.

"**Sublicensee**" shall mean any non-Affiliate third party to whom LICENSEE has granted the right to manufacture and sell Products, with respect to Products made and sold by such third party.

"**Territory**" shall mean the whole world.

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ARTICLE 1 - OBJECT AND SCOPE OF THE AGREEMENT

1.1 Subject to the limitations set forth in this Agreement, INSERM-TRANSFERT hereby grants to LICENSEE an exclusive, royalty-bearing license, with the right to grant sublicenses, in the Territory under the Patents and Know-How to develop, make, have made, use, and sell or otherwise distribute Products within the Field.

For the avoidance of doubt, this license authorizes LICENSEE to use the Patents and Know-How in the context of conducting research and development of [***], with INSERM and INSERM-TRANSFERT as outlined and defined in the "collaborative research agreement N° 07554F20" concluded separately by LICENSEE, INSERM and INSERM-TRANSFERT. In case the Laboratory fails in carrying out its part of the research program of the "collaborative research agreement N° 07554F20", this license authorizes LICENSEE to use the Patents and Know-How to conduct research alone or with any third party for the purpose of developing, make, have made, use and sell or otherwise distribute Products within the Field as described herein.

In the event that LICENSEE shall develop a Product and/or in the event that a result of any nature, whether patentable or not, is discovered and/or developed by LICENSEE, independently from its collaboration with INSERM and/or INSERM TRANSFERT within the "collaborative research agreement N° 07554F20", the Parties agree that such Product and/or result shall belong exclusively to LICENSEE and that any new patent in relation thereto shall be filed by LICENSEE.

1.2 INSERM reserves the right to use the Patent and the related Know-How for educational, clinical and preclinical studies purposes.

ARTICLE 2 - DURATION

The Agreement is effective as of its last date of signature and shall last until the expiration on a country by country basis of the last to expire of any patent encompassed within the scope of the Patent or ten (10) years from the date of the first commercial sale of a Product whichever is later.

ARTICLE 3 - SUBLICENSE

Prior to the execution of any sublicense, LICENSEE shall provide INSERM-TRANSFERT written notification of the identity and address of the potential Sublicensee for approval, which approval shall not be unreasonably withhold. Should not INSERM-TRANSFERT withhold the Sublicensee within thirty (30) days from LICENSEE notification, then the Sublicensee shall be deemed approved by INSERM-TRANSFERT.

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Subject to any confidentiality obligation of LICENSEE, LICENSEE shall also notify INSERM-TRANSFERT with the terms of the sublicense for minimum information necessary for INSERM-TRANSFERT for internal reports, prior the signature of any sublicense.

Promptly following the execution of any sublicense, LICENSEE will communicate INSERM-TRANSFERT a signed copy of the agreement (possibly with some blank on information having to stay confidential between LICENSEE and Sublicensee).

For the avoidance of doubt, INSERM-TRANSFERT acknowledges that the terms of the sublicense and the sublicense agreement itself may be covered by a confidentiality obligation and that, as a consequence, the notification and communication obligations of LICENSEE described above may be subject to obtaining prior written consent of Sublicensee. In this respect, failure from Sublicensee to agree to such notification and communication of the sublicense terms and agreement to INSERM-TRANSFERT shall not give rise to any claim from INSERM-TRANSFERT and/or liability of LICENSEE.

ARTICLE 4 - DUE DILIGENCE

4.1 LICENSEE agrees to undertake all commercially reasonable efforts to develop Product as soon as practical, consistent with its reasonable business practices and judgment in compliance with the steps of the development plan attached in Exhibit 1 of the "collaborative research agreement N° 07554F20" as may be amended from time to time by the Parties. Should a significant variance from the development plan occurs and/or the LICENSEE fail to reasonably comply with the steps of the said development plan, the Parties shall meet within one (1) month following the notification made by INSERM-TRANSFERT to LICENSEE in order to engage in good faith discussions aiming at amending the development plan and/or finding a remedy to such failure from LICENSEE. Should the Parties fail to reach an agreement in this respect within three (3) months from the start of their discussions, INSERM-TRANSFERT may terminate the present Agreement in accordance with the termination procedure set out in Articles 9.4 and 9.5 below. Notwithstanding the above, as long as reasonable efforts are being pursued to maintain the development of a Product, the Agreement shall remain valid in force and INSERM-TRANSFERT shall not be able to terminate the Agreement as set out in Articles 9.4 and 9.5 below.

4.2 LICENSEE undertakes to use all commercially reasonable efforts to introduce Product into the commercial market as soon as practical, consistent with its reasonable business practices and judgment and necessary approvals by the regulatory authorities in the Territory.

4.3 LICENSEE shall comply with all applicable laws and regulations in connection with its activities pursuant to the Agreement.

4.4 LICENSEE shall provide to INSERM-TRANSFERT, within sixty (60) days from December 31 of each calendar year, a written annual progress report on the progress of its

Product development or efforts to commercialize under the development plan. Such progress reports shall include, among others, the following topics: summary of work completed, summary of work in progress, current schedule of anticipated regulatory approvals, manufacturing, sublicensing efforts and market plans for introduction of Product.

4.5 INSERM-TRANSFERT shall inform its third party licensees of LICENSEE'S interests in the development and the commercialization strategies of any diagnosis product in the field of [***].

ARTICLE 5 - FINANCIAL TERMS

5.1 Milestone Payments.

In partial consideration of the rights and license granted by INSERM-TRANSFERT to LICENSEE under this Agreement, LICENSEE agrees to make the following payments to INSERM-TRANSFERT upon the completion by LICENSEE or its Affiliates of each milestone specified below:

- Issue fee: [***] excluding taxes, upon the execution of the Agreement.
- Milestone fees shall be paid to INSERM-TRANSFERT according to the following schedule for maintenance of the license:

Milestone	**Fee** in euros, excluding taxes
[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]

Above payments shall be payable by LICENSEE for each Product and shall be non-refundable and non-creditable against royalty payments hereunder. For the avoidance of doubt, payments shall not be payable in relation to different versions of the Product containing the [***] gene.

5.2 Royalty.

5.2.1 LICENSEE agrees to pay to INSERM-TRANSFERT a running royalty equal to [***] of Net Sales by LICENSEE or its Affiliates, in the Territory. Should third party intellectual property rights be required for commercialization with total royalties due above [***], INSERM-TRANSFERT shall have a reduction of its royalty equal to [***] of the incremental royalty. None-the-less, the INSERM-TRANSFERT royalty shall not be reduced below [***] of Net Sales by LICENSEE or its Affiliates, in the Territory.

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5.2.2 In the event of a Sublicense, LICENSEE shall also pay to INSERM-TRANSFERT the following royalties under any royalty and non-royalty sublicense income (except in the case of equity investment) received by LICENSEE or its Affiliates from any Sublicensee if sublicense is granted before:

- [***]
- [***]
- [***]

For the avoidance of doubt, non-royalty sublicense income shall include any upfront license fee and milestone payments.

In case of equity investment by LICENSEE in counterpart of a sublicense of Patents and Know-How, LICENSEE shall pay sublicense royalties set forth above, and INSERM-TRANSFERT and LICENSEE shall confer together to define an appropriate and fair compensation for INSERM-TRANSFERT when LICENSEE shall sell said equities as part of the aforementioned sublicense.

5.3 Royalty Reports and Payments.

After the first commercial sale by LICENSEE, its Affiliate or Sublicensees of a Product for which royalties are payable under this Article 5, LICENSEE shall make annual written reports to INSERM-TRANSFERT within ninety (90) days after the end of each calendar year, stating in each such report [***]. Simultaneously with the delivery of each such report, LICENSEE shall pay to INSERM-TRANSFERT the total royalties and non sublicense income, if any, due to INSERM-TRANSFERT for the period of such report. If no payments are due, LICENSEE shall so report. The aforesaid reports shall be certified as true and accurate by a duly authorized officer of LICENSEE.

5.4 Payment Method.

The sums due by LICENSEE shall be paid within thirty (30) days following receipt of the invoice from INSERM-TRANSFERT which shall state the amount of the sums due in application of the present Agreement and shall be paid by bank transfer to [***].

All payments hereunder shall be made in Euros.

Any payments or portions thereof due under this Article 5 which are not paid on the date such payments are due under this Agreement shall bear interest equal to [***] on the date such payment is due.

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5.5 Records; Inspection.

LICENSEE shall keep complete, true and accurate books of account and records for the purpose of determining the royalty amounts payable under this Article 5. Such books and records shall be kept reasonably accessible for at least three (3) years following the end of the calendar quarter to which they pertain. Such records will be open [***] during such three (3) year period by an independent auditor for the purpose of verifying the royalty statements. INSERM-TRANSFERT shall bear the costs and expenses of inspections conducted under this Article 5.5, unless a variation or error producing an underpayment in royalties payable exceeding [***] of the amount paid for the period covered by the inspection is established in the course of any such inspection, whereupon all costs relating to the inspection and any unpaid amounts that are discovered will be paid by LICENSEE, together with interest on such unpaid amounts at the rate specified in Article 5.4 above. In any case, all underpayments claimed by INSERM-TRANSFERT shall be dully documented by the auditor and LICENSEE shall have the right to contest the results of any inspection conducted under this Article 5.5.

5.6 Withholding tax:

LICENSEE shall assist INSERM-TRANSFERT in taking steps to avoid any double taxation and shall provide INSERM-TRANSFERT at its request with any document necessary to that end. LICENSEE shall use its best efforts to enable INSERM-TRANSFERT to have any withholding tax taken into account under the respective applicable Double Taxation Treaty.

ARTICLE 6 - INTELLECTUAL PROPERTY

6.1 Starting three (3) months after the execution of this Agreement, LICENSEE shall contribute to the payments of the Patent costs on the Territory, including costs imparted as from the execution of this Agreement.

INSERM-TRANSFERT shall control the prosecution, defence and maintenance of the Patent in the Territory; provided however that INSERM-TRANSFERT shall keep LICENSEE reasonably informed and consult with LICENSEE with respect to (i) the scope and content of all patent applications within the Patent; and (ii) content or proposed responses to official actions of national patent offices regarding the prosecution of the Patent. For purposes of this provision, "prosecution, defence and maintenance" of patents and patent applications shall be deemed to include, without limitation, the conduct of interferences or oppositions, invalidity suit and/or requests for re-examinations, reissues or extensions of patent terms.

LICENSEE shall pay [***] of all expenses pre-approved in writing by LICENSEE and incurred in accordance with the present Article 6.1.

Such patent expenses are non-refundable and non-creditable against any royalty payments and milestones payments due hereunder.

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6.2 Infringement by third party

6.2.1 If it is believed in good faith that Patents are infringed by a third party, the Party first having knowledge of such infringement shall promptly notify the other in writing, which notice shall set forth the facts of such infringement in reasonable detail.

[***]

[***]

6.2.2 [***]

6.3 [***]

ARTICLE 7 - CONFIDENTIALITY

The Parties agree to respect and keep strictly confidential all scientific and technical information belonging to the other Party about which they may have knowledge due to the negotiation and execution of the Agreement.

In particular, LICENSEE agrees to keep and maintain strictly confidential all information that it may receive during the transfer of the Know-How.

The Parties agree to insure that their personnel and any other persons in their relationship in any respect whatsoever, respect and accept the obligations of confidentiality described in the Agreement.

The bilateral confidentiality obligations between the Parties pursuant to the present Article shall not include the use or disclosure of confidential information which the receiving Party can prove:

a) was disclosed by the mutual agreement of both Parties, or was disclosed by the owning Party,

b) was in the public domain at the moment of disclosure or entered the public domain through no act or fault of the receiving Party,

c) was made available as a matter of lawful right by a third party,

d) was in the possession of the receiving Party at the time of disclosure by the owning Party or was developed independently by its agents or employees who did not have access to confidential information,

e) was disclosed by lawful right, to remain in compliance with existing regulations, an arbitration settlement or a final legal decision.

The obligations of confidentiality set out herein shall remain in effect during the term of the Agreement [***].

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ARTICLE 8 - REPRESENTATIONS AND WARRANTIES

8.1 INSERM-TRANSFERT represents and warrants that the entering into the Agreement with LICENSEE, the grant of rights to LICENSEE under such Agreement and the exploitation of such rights by LICENSEE does not and will not constitute a breach of any preexisting agreements with any third party, including [***], nor has or will INSERM-TRANSFERT share any third party's, including [***]'s, confidential and/or proprietary information with LICENSEE.

The rights granted herein shall not include any right under [***]'s confidential and/or proprietary information.

8.2 LICENSEE hereby represents and warrants to INSERM-TRANSFERT that it had access to all patent files and information necessary to fully appreciate the scope of the Patents and Know-How granted hereunder.

LICENSEE accepts the license to the Patents and Know-How "as is". Neither INSERM-TRANSFERT nor INSERM and the inventors offer any guarantee as to the validity or scope of the Patents and Know-How under this Agreement. No warranties, express or implied, are offered under this Agreement as to the merchantability or the fitness for a particular purpose of the Patents and Know-How under this Agreement or that the use of the Patents and Know-How by LICENSEE, its Affiliates or its Sublicensees will not infringe any other patents or any other intellectual property rights of third parties.

8.3 LICENSEE shall hold harmless each of INSERM-TRANSFERT, INSERM and their directors, trustees, officers, employees, agents and the successors and assigns of any of the foregoing (collectively, the "**Indemnitees**") against any and all claims brought by third parties alleging personal injury or property damage in conjunction with, or arising out of (1) practice by LICENSEE, its Affiliate and Sublicensees, their directors, trustees, officers, employees, contractors, subcontractors and agents, of the Patents or (2) the design, manufacture, distribution or use of Products by or under the authority of LICENSEE; provided that any Indemnitee seeking indemnification hereunder shall (i) promptly notify LICENSEE of such claim (ii) gives LICENSEE sole control of the defense or settlement of such claim, and (iii) provides LICENSEE, at LICENSEE's expenses, with reasonable assistance and full information with respect to such claim. Such indemnity shall include all costs and expenses, including reasonable attorneys' fees and any costs of settlement.

8.4 INSERM-TRANSFERT shall hold harmless LICENSEE and their directors, trustees, officers, employees, agents and the successors and assigns of any of the foregoing (collectively, the "**Licensee Indemnitees**") against any and all claims brought by third parties alleging any loss, damage or prejudice in conjunction with, or arising out of any use or practice of the Patents before the signature date of this Agreement by or under the authority of INSERM-TRANSFERT, INSERM, their Affiliates, their directors, trustees, officers, employees, contractors, subcontractors and agents; provided that any Licensee

Indemnitee seeking indemnification hereunder shall (i) promptly notify INSERM-TRANSFERT of such claim (ii) gives INSERM-TRANSFERT sole control of the defense or settlement of such claim, and (iii) provides INSERM-TRANSFERT, at INSERM-TRANSFERT's expenses, with reasonable assistance and full information with respect to such claim. Such indemnity shall include all costs and expenses, including reasonable attorneys' fees and any costs of settlement.

ARTICLE 9 - TERMINATION

9.1 INSERM-TRANSFERT grants to LICENSEE a right to unilaterally terminate the Agreement three (3) months after execution of the Agreement; in such case, the issue fee mentioned hereabove shall not be refundable to LICENSEE. No other monies will be due to INSERM-TRANSFERT.

9.2 Either LICENSEE or INSERM-TRANSFERT may terminate the Agreement, in the event the other shall have materially breached or defaulted in the performance of any of its material obligations hereunder and such breach shall have continued for sixty (60) days after written notice is given by the non breaching Party to the breaching Party specifying the breach.

9.3 In the event LICENSEE becomes the subject of a voluntary or involuntary petition in bankruptcy, LICENSEE shall immediately notify INSERM-TRANSFERT in writing. If such petition is not dismissed with prejudice within one hundred and twenty (120) days after filing, INSERM-TRANSFERT shall have the right to terminate this Agreement by giving LICENSEE written notice. Termination of this Agreement pursuant to this provision shall be effective upon LICENSEE's receipt of such written notice.

9.4 INSERM-TRANSFERT may terminate this Agreement in case LICENSEE can not prove, within sixty (60) days from written notice by INSERM-TRANSFERT to do so, that it has been diligent or it has made its commercially reasonable efforts as described in Article 4 above.

9.5 Specific provision

In consideration of:

(i) the financing undertaking set out in article 4.1 of the "collaborative research agreement N° 07554F20",

(ii) the financial undertaking set out in Article 5 of this Agreement,

(iii) the undertakings relating to intellectual property matters defined in article 8 of the "collaborative research agreement N° 07554F20" and in Article 6 of this Agreement as well as the forecast budget to finance in accordance with the step plan set out in Exhibit 1 of the "collaborative research agreement N° 07554F20" ("development plan").

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

LICENSEE accepts the principle that should INSERM-TRANSFERT exercise its termination right for breach stated in the last paragraph of the preamble by application of Articles 4.1, 9.4 and/or 9.5 herein, the status of all the works and research programs performed in connection with the "collaborative research agreement N° 07554F20" signed among the same Parties concurrently with this Agreement as well as the results, whether protected or not, which will derive therefrom will be deemed to follow the principles of article 10.3 of the "collaborative research agreement N° 07554F20".

All the files carried out and the results obtained, which will constitute the state of the works in progress, under any form whatsoever, at the date on which INSERM-TRANSFERT exercises its termination right in compliance with the terms stated in the last paragraph of the preamble by application of Articles 4.1 will be dealt with and transferred to the INSERM and LICENSEE in consideration of the status of the works concerned based on the above mentioned principles.

Each Party undertakes to carry out all the procedures and sign all the documents that the other Party may request for the proper performance of such transfer in favor of one or the other Party, based on the above mentioned principles.

Should the "collaborative research agreement N° 07554F20" be terminated in accordance with articles 10.3 of said agreement, this Agreement shall be automatically terminated.

9.6 Articles 7 and 8 shall survive the expiration and any termination of this Agreement. Except as otherwise provided in this Article 9, all rights and obligations of the Parties under this Agreement shall terminate upon the expiration or termination of this Agreement.

ARTICLE 10 - GENERAL

10.1 Independent Contractors.

The relationship of LICENSEE and INSERM-TRANSFERT established by this Agreement is that of independent contractors. Nothing in this Agreement shall be construed to create any other relationship between LICENSEE and INSERM-TRANSFERT. No Party shall have any right, power or authority to contract or incur any expense, liability or obligation, express or implied, on behalf of the other Party.

10.2 Use of name.

Except as required by law, neither LICENSEE nor INSERM-TRANSFERT shall use the name of LICENSEE, INSERM-TRANSFERT or INSERM in issuing any press release or other public statements in connection with this Agreement intended for use in the public media without the approval of such Party, which approval shall not be unreasonably withheld.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

10.3 Assignment.

This Agreement may not be assigned by any Party without the prior written consent of the other Party hereto.

10.4 Change of control.

Should a change in control occur of LICENSEE, the Agreement shall be transferable to the acquiring third party with notice to INSERM-TRANSFERT. Such third party will be bound by the terms of this Agreement. An amendment shall be sign between INSERM-TRANSFERT and said acquiring third party. Said acquiring third party shall provide a new development plan to INSERM-TRANSFERT stating its development strategy to exploit Patents and Know-How.

10.5 Force Majeure.

In the event any Party hereto is prevented from or delayed in the performance of any of its obligations hereunder by reason of acts of God, war, strikes, riots, storms, fires, or any other cause whatsoever beyond the reasonable control of the Party, the Party so prevented or delayed shall be excused from the performance of any such obligation to the extent and during the period of such prevention or delay.

10.6 Notices.

Any notice or other communication required by this Agreement shall be made in writing and given by prepaid, first class, certified mail, return receipt requested, and shall be deemed to have been served on the date received by the addressee at the following address or such other address as may from time to time be designated to the other Party in writing:

If to INSERM-TRANSFERT:
Inserm Transfer SA
7 rue Watt
75013 Paris
France

If to LICENSEE:
Genetix Pharmaceuticals, Inc.
840 Memorial Drive
Cambridge, MA 02139 USA
Attn: CEO

10.7 Governing Law - Dispute.

The Agreement shall be construed in accordance with the laws of FRANCE.

Any dispute or controversy arising out of this Agreement which could not have been resolved amicably shall be settled by French Courts.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

10.8 Headings.

Headings included herein are for convenience only, do not form a part of this Agreement and shall not be used in any way to construe or interpret this Agreement.

10.9 Severability.

If any provision of this Agreement shall be found by a court to be void, invalid or unenforceable, the same shall be reformed to comply with applicable law or stricken if not so conformable, so as not to affect the validity or enforceability of the remainder of this Agreement.

10.10 Entire Agreement.

This Agreement and its Exhibits constitute the entire understanding and agreement between the Parties with respect to the subject matter hereof and may not be modified, amended or discharged except as expressly stated herein or by a written agreement duly executed by both Parties.

10.11 Counterparts.

This Agreement may be executed in counterparts, each of which shall be deemed an original, and taken together shall constitute one and the same agreement.

10.12 Government approval or registration.

If this Agreement or any associated transaction (in particular registration at the Registre National des Brevets and National Patent Office, and any fiscal registration) is required by the law of any nation to be either approved or registered with any governmental agency, LICENSEE shall assume all legal obligations to do so.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

IN WITNESS WHEREOF, the Parties hereto have caused their duly authorized representatives to execute this Agreement.

Done in two (2) original copies, on May 14, 2009

For Inserm-Transfert

/s/ Cecile Tharaud
Mrs. Cecile Tharaud
Chairman of the Board of Management

For Genetix

/s/ Alfred Slanetz
Mr. Alfred Slanetz
CEO

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

PATENT AND KNOW-HOW LICENSE AGREEMENT No 07554F30
AMENDMENT No 1

BY AND BETWEEN

INSERM-TRANSFERT, a limited company (*société anonyme à directoire et conseil de surveillance*) organized under the laws of France, whose registered headquarters are located 7 rue Watt, 75013 **PARIS,** France, N° SIRET 434 033 619 00025, code APE 731 Z, RCS Paris B 434 033 619, represented by its Chairman of the Board of Management, Mrs. Cecile Tharaud, acting as delegate of Institute National de la Santa Et de la Recherche Medicale (hereinafter referred to as **"INSERM"),** French National Institute of Health and Medical Research, a public scientific and technological establishment having its principal offices at 101 rue de Tolbiac, 75654 Paris Cedex, 13, France,

Hereafter referred to as **"INSERM-TRANSFERT",**

Acting as representative of INSERM Unit U986 GENOMIQUE, FACTEURS ENVIRONNEMENTAUX ET BIOTHERAPIE DES MALADIES ENDOCRINIENNES ET NEUROLOGIQUES directed by Professor Pierre Bougnères (hereinafter referred to as **"Laboratory")** and located at Hopital de Bicêtre, 80 rue du Général Leclerc, BAT PINCUS – Secteur Marron – 1er étage, 94276 LE KREMLIN BICETRE CEDEX, Paris, France.

On the one hand

AND

bluebird bio, Inc. (formerly Genetix, Inc.) having its principal place of business at 840 Memorial Drive, Cambridge, MA 02139,

Hereinafter referred to as **"LICENSEE",**

On the other hand

Hereinafter individually or collectively designated as **"Party" or "Parties"**

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

BACKGROUND

A. INSERM-TRANSFERT and LICENSEE are parties to that certain Patent and Know-How License Agreement, N° 07554F30, dated as of May 14, 2009 (the **"License Agreement"),** pursuant to which, among other things, INSERM-TRANSFERT granted a license to LICENSEE under the Patents and related Know-How on terms and conditions set forth in the License Agreement.

B. Following execution of the License Agreement, LICENSEE will start clinical trials and has used Know-How in connection with its regulatory filings relating thereto.

C. INSERM-TRANSFERT and LICENSEE wish to enter into this Amendment No 1 to the License Agreement (**"Amendment No 1"**) to amend the financial terms of the License Agreement so as to accurately reflect the value of the license granted.

D. Capitalized terms used but not otherwise defined herein shall have the meanings ascribed to such terms in the License Agreement.

NOW, THEREFORE, in consideration of the mutual covenants, conditions and undertakings herein contained, the Parties hereto agree as follows:

1. Amendment Fee. In consideration of the execution of this Amendment No 1, LICENSEE agrees to pay to INSERM-TRANSFERT a one-time payment of [***] within thirty (30) business days of the full execution of this Amendment No 1. This payment is irrevocable, non refundable and non creditable against any past or future payments under the License Agreement.

2. Additional Payments. The Parties agree to negotiate in good faith towards the entry of a new research and collaboration agreement involving research between LICENSEE and Prs. Patrick Aubourg and Pierre Bougneres, which agreement will include funding from LICENSEE to INSERM in support of such research in an amount not to exceed [***].

3. Definitions.

The definition of Net Sales in the License Agreement is hereby amended and restated as follows:

"**Net Sales**" shall mean the amount of sales, excluding taxes, of the Products (in all its forms) invoiced to third parties, including distributors, by LICENSEE or its Affiliates or its Sublicensees, less any customary COGS, SG&A marketing, sales distribution costs, normal trade discounts and credit notes issued in respect of returned Products in each country of the Territory. It is understood that the deductions shall not exceed [***]. In case LICENSEE could prove that costs incurred by LICENSEE to sell Products are much higher than the deductions allowed in this Agreement, the Parties shall discuss to re-evaluate the percentage of deductions allowed. Net Sales shall not include intermediate sales between LICENSEE and its Affiliates or between LICENSEE or its Affiliates and any Sublicensee.

Further, the Parties agree that the definition of Know-How will be expanded to include clinical data [***], as well as other clinical data that relates to follow up on the subjects participating in the clinical study. Such expanded definition will be included in a second amendment to the License Agreement that the Parties have agreed to execute by February 1, 2013.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

4. Section 1.1. Section 1.1 is amended and restated in its entirety as follows:

"1.1. Subject to the terms of this Agreement, INSERM-TRANSFERT hereby grants to LICENSEE an exclusive, royalty-bearing license, with the right to grant sublicenses ("Sublicense(s)"), in the Territory under the Patents and Know-How to develop, make, have made, use and sell or otherwise distribute Products within the Field.

For the avoidance of doubt, this license authorizes LICENSEE to use the Patents and Know-How, alone or with any third party, in the context of conducting research and development of [***], including, without limitation, making submissions to regulatory authorities in the Territory, to develop, make, have made, use and sell or otherwise distribute Products within the Field.

5. Section 5.1. Section 5.1 of the Original Agreement is hereby amended and restated as follows:

"5.1 Milestone Payments.

In partial consideration of the rights and license granted by INSERM-TRANSFERT to LICENSEE under this Agreement, LICENSEE agrees to make the following payments to INSERM-TRANSFERT upon the completion by LICENSEE or its Affiliates or Sublicensees of each milestone specified below:

Milestone fees shall be paid to INSERM-TRANSFERT according to the following schedule for maintenance of the license:

Milestone	**excluding taxes**
[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]
[***]	[***]

Each milestone is payable one time only no matter how many times any of the milestone events are achieved (i.e., if one Product is replaced by another Product, then the milestone shall be paid one time only, on the first Product to achieve that milestone). The above payments shall be non-refundable and non-creditable against other payments hereunder."

For the avoidance of doubt, the above milestones payments are due for the whole duration of the License Agreement, even if the last to expire of any patent encompassed within the scope of the Patents has expired.

6. Section 5.2.1. Section 5.2.1 of the License Agreement is hereby amended and restated as follows:

"5.2.1 LICENSEE agrees to pay to INSERM-TRANSFERT a running royalty equal to [***] of Net Sales by LICENSEE or its Affiliates or Sublicensees in the Territory."

For the avoidance of doubt, royalty payments at the rate of [***] of Net Sales are due for the whole duration of the License Agreement, even if the last to expire of any patent encompassed within the scope of the Patents has expired.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

7. Section 5.2.2. Section 5.2.2 of the License Agreement is hereby amended and restated as follows:

"5.2.2 In the event LICENSEE or its Affiliates executes a Sublicense for Product commercialization rights, LICENSEE shall pay to INSERM-TRANSFERT a sublicensing fee equal to [***] upon receipt of the first Sublicense income (whether for a royalty or non royalty income) from such Sublicense. For further clarity, no Sublicense fee would be owed for LICENSEE's or its Affiliates' grant to a contract manufacturing organization of Product commercial manufacturing rights. For the avoidance of doubt, the foregoing sublicensing fee shall be paid by LICENSEE only one time for each of LICENSEE's commercial partners regardless of the number of Sublicenses necessary for LICENSEE's relationship with such commercial partner (e.g., LICENSEE shall only pay one sublicensing fee in connection with granting a Sublicense to a commercial partner and a Sublicense to a contract manufacturing organization to manufacture Products for such commercial partner)."

8. Section 9.5. Section 9.5 of the License Agreement is hereby deleted and shall be of no further force and effect.

9. Miscellaneous. Except as specifically amended hereby, the License Agreement shall remain in full force and effect in accordance with its terms.

10. Counterparts. This Amendment No 1 may be executed in counterparts, each of which shall be deemed an original, and taken together shall constitute one and the same instrument.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

IN WITNESS WHEREOF, the Parties hereto have caused their duly authorized representatives to execute this Amendment.

Done in two (2) original copies, on December 21, 2012.

FOR INSERM-TRANSFERT:

Alexendra CARREL
General Counsel
Inserm Transfert

/s/ Cecile Tharaud

P/O Name: Cecile Tharaud
Title: CEO

FOR LICENSEE:

bluebird bio, Inc.

/s/ Jeffrey T. Walsh

Name: Jeffrey T. Walsh
Title: COO

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

PATENT AND KNOW-HOW LICENSE AGREEMENT No 07554F32
AMENDMENT No 2

BETWEEN

INSERM-TRANSFERT SA, *"Société Anonyme à Directoire et Conseil de Surveillance",* a limited company organized under the laws of France, with share capital of €9,573,470, whose registered headquarters are located at 7 rue Watt, 75013 Paris, France, SIRET No. 434 033 619 00025 business (APE) code 7219Z, Paris Trade and Companies Registry No. B 434 033 619, represented by its Chairman of the Management Board, Mrs. Cécile Tharaud,

Acting as delegatee of the French National Institute of Health and Medical Research (*Institut National de la Santé et de la Recherche Médicale* - hereinafter "**INSERM**"), a public scientific and technological institute, having its registered headquarters at 101 rue de Tolbiac, 75013 Paris, France.

OF THE FIRST PART

AND

bluebird bio, Inc. (formerly known as Genetix, Inc.) a corporation organized under the laws of the state of Delaware, U.S.A., having its principal place of business at 840 Memorial Drive, Cambridge, Massachusetts 02139 U.S.A.

Hereinafter referred to as "**LICENSEE"**

OF THE SECOND PART,

Referred to individually as a "**Party**" and collectively as the "**Parties**"

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

BACKGROUND

A. INSERM delegated to INSERM-TRANSFERT, its wholly-owned private law technology transfer subsidiary, the management of its technology transfer activities including the negotiation and signature of research, collaborative, license, service and confidentiality and non disclosure agreements relating to the research conducted solely or jointly by INSERM's research units.

Pursuant to this agreement, INSERM-TRANSFERT is authorized to use and call on the material and human resources of the INSERM laboratories for the proper performance of the agreements entered into by INSERM-TRANSFERT, it being specified that INSERM-TRANSFERT is in charge of the negotiation, signature and follow-up of these agreements, and INSERM is in charge of the implementation and performance of the works that are the subject of these agreements as well as the financial management thereof.

It is however specified that this delegation does not entail the transfer to INSERM-TRANSFERT of the property rights held by or jointly held with INSERM.

For the performance of this License Agreement (as defined below), INSERM is not considered as a third party.

B. INSERM is the sponsor of the INSERM Trial (as defined below).

C. INSERM-TRANSFERT, acting on behalf of INSERM, and LICENSEE entered into a Patent and Know-How License Agreement on 14 May 2009 ("**Original License Agreement**"), and amended on 21 December, 2012 ("**Amendment No 1**") (Original License Agreement and Amendment No 1 collectively, "**License Agreement**"). Pursuant to the License Agreement, INSERM-TRANSFERT granted to LICENSEE an exclusive, royalty bearing license, with the right to grant sublicenses, in the Territory under the Patents and Know-How to further develop a treatment for adrenoleukodystrophy.

D. The purpose of Amendment No 1 was to amend the financial terms of the License Agreement so as to accurately reflect the value of the license granted.

E. INSERM has collected and will continue to collect certain clinical data from the INSERM Trial. In addition to the rights granted under the License Agreement, INSERM-TRANSFERT agrees to provide LICENSEE with access to Clinical Data (as defined below) and LICENSEE, in connection with such access, is willing to pay a lump sum payment, as further described in this Amendment No 2 to the License Agreement ("**Amendment No 2**").

F. The purpose of this Amendment No 2 is to expand the definition of Know-How to include Clinical Data and to provide for the conditions of (i) the transfer of Clinical Data from INSERM to LICENSEE, (ii) access by LICENSEE to Clinical Data, and (iii) additional funding from LICENSEE to INSERM-TRANSFERT in connection with such transfer and access.

G. Terms used in this Amendment No 2 and not defined herein will have the meaning ascribed to them in the License Agreement.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

NOW, THEREFORE, in consideration of the mutual covenants, conditions and undertakings herein contained, the Parties hereto agree to amend the License Agreement as follows:

1. The following definitions are added to the Preliminary Article - DEFINITIONS of the License Agreement:

"Applicable Law" means all European and national laws, regulations, rules and guidances applicable to the conduct of the INSERM Trial, including, without limitation, the EU Clinical Trial Directive, the EU Data Protection Directive and publications of the International Conference on Harmonization of Technical Requirements for Registration of Pharmaceuticals for Human Use.

"Clinical Data" means the Trial Subject (as defined below) de-identified data (i.e. not containing any direct identifiers about human subjects) in the CRFs (as defined below) and/or medical records collected and to be collected by the Laboratory (as defined below) pursuant to the Clinical Protocol (as defined below) and which INSERM and Investigator agreed to transfer to LICENSEE as reflected in the description of the content of the Database to be attached as Exhibit A.

"Clinical Data Term" means (a) for Clinical Data that is not Published Clinical Data (as defined below), ten (10) years from the Clinical Data Transfer Effective Date (as defined below), it being specified that INSERM-TRANSFERT agrees to discuss in good faith a no-fee extension of this term should the LICENSEE Purpose not be met at the end of the initial ten (10) year period, and (b) for Published Clinical Data that is generally available to the public, for such period of time following the Clinical Data Transfer Effective Date as LICENSEE deems necessary to meet the Licensee Purpose.

"**Clinical Data Transfer Effective Date**" means the date specified under Article 11 below.

"Clinical Protocol" means protocol no. [***], as well as amendments that relate to the Gap Period and the Follow Up Period (each as defined below), together with all other amendments thereto, approved by the relevant French regulatory authorities.

"CRFs" means the paper (or, as the case may be, electronic) case report forms prepared and owned by INSERM containing, among other information, the Clinical Data generated during the Original Period and the Follow-Up Period (all as defined below).

"Database" means the secured electronic data entry system built by or on behalf of LICENSEE, with content pursuant to Exhibit A, for use by INSERM and Investigator (as defined below) as a repository for Clinical Data.

"**Follow Up Period**" means the portion of the INSERM Trial that extends from the Gap Period to fifteen (15) years post transplant for each Trial Subject.

"Gap Period" means the portion of a Trial Subject's participation in the INSERM Trial that begins on completion of the year 2 visit and ends on the date the first Clinical Protocol amendment is approved by the relevant French regulatory authorities, at which time, the Follow Up Period will begin.

"Laboratory" means INSERM Unit U986 (previously U 745) GENOMIQUE, FACTEURS ENVIRONNEMENTAUX ET BIOTHERAPIE DES MALADIES ENDOCRINIENNES ET NEUROLOGIQUES directed by Professor Pierre Bougnères (or his successor) and located at Hopital de Bicêtre, 80 rue du Général Leclerc, BAT PINCUS – Secteur Marron – 1er étage, 94276 LE KREMLIN BICETRE CEDEX, Paris, France.

"INSERM Trial" means the clinical trial sponsored by INSERM pursuant to the Clinical Protocol and conducted during the Original Period, the Gap Period and the Follow Up Period.

"LICENSEE Purpose" means the use by LICENSEE (a) of Clinical Data that is not Published Clinical Data (i) to support regulatory filings to put a Product into registration phase, (ii) in publications and presentations subject to the terms of Section 11.7(b) and provided the Trial Subject is not directly or indirectly identifiable by name (of Trial Subject or his/her relatives), initials, contact information, date of birth or country of origin, and (iii) as may be required to comply with legal and regulatory obligations, and (b) of Published Clinical Data, for any and all purposes.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

"Original Period" means the first two (2) years of a Trial Subject's participation in the INSERM Trial.

"Published Clinical Data" means the Clinical Data published in the following article:

- [***],

and any other Clinical Data published in a scientific publication or presented in scientific congresses. Any Clinical Data which is not Published Clinical Data as specified in this definition shall be deemed confidential and subject to all terms applicable to the use of Clinical Data under this Agreement.

"Project Plan" means the set of activities, timeframes and requirements set forth in Exhibit B agreed to by INSERM and LICENSEE in connection with INSERM's provision of Clinical Data to LICENSEE pursuant to this Agreement, as may be amended from time by mutual written agreement of INSERM, INSERM-TRANSFERT, and LICENSEE.

"Summary Clinical Data" means a summarized version of the Clinical Data that has been subjected to processing or manipulation by LICENSEE and which does not contain the name (of Trial Subject or his/her relatives), initials, contact information, date of birth or country of origin of the Trial Subject. An exhaustive list of what shall constitute Summary Clinical Data is attached as Exhibit C to this Amendment No 2.

"Trial Subjects" means all patients enrolled in the INSERM Trial.

2. The definition of Know-How contained to the Preliminary Article - DEFINITIONS of the License Agreement is hereby amended and restated as follows:

"**Know-How"**: shall mean (a) all technical information, know-how, process, biological material, data or other subject matter developed by Pr. Patrick Aubourg and [***] of the Laboratory, owned or controlled by INSERM that exists as of the effective date of this Amendment No 2, which is reasonably necessary or useful for the practice of the Patent, (b) all know how/data (published/unpublished) which has led to French regulatory agency authorization of the INSERM Trial, development of the INSERM Trial and the future results of the INSERM Trial, and (c) Clinical Data. For further clarity, Know-How includes all data generated before the collaboration between INSERM [***].

3. Section 1.1 to ARTICLE 1 - OBJECT AND SCOPE OF THE AGREEMENT of the License Agreement is amended and restated as follows:

"1.1. Subject to the terms of this Agreement (including its amendments), INSERM-TRANSFERT hereby grants to LICENSEE an exclusive, royalty-bearing license, with the right to grant Sublicenses, in the Territory under the Patents and Know-How to develop, make, have made, use and sell or otherwise distribute Products within the Field.

(a) For the avoidance of doubt and without prejudice to the terms of use of the Clinical Data by LICENSEE, this license authorizes LICENSEE to use the Patents and Know-How, alone or with any third party, in the context of conducting research and development of [***], including, without limitation, making submissions to regulatory authorities, to develop, make, have made, use and sell or otherwise distribute Products within the Field and in the Territory.

(b) For the avoidance of doubt, this license authorizes LICENSEE to release Summary Clinical Data to support LICENSEE's publications and presentations (subject to INSERM and Investigator's approval under Section 11.7) and for business purposes, including raising capital, as LICENSEE deems necessary in connection with the due diligence requirements under the License Agreement, it being specified that Section 11.7(a) (ii) shall not apply to such release but will be subject to any other terms of use as provided in this License Agreement (including its amendments)."

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4. The following Subsection 1.3 is added to ARTICLE 1 - OBJECT AND SCOPE OF THE AGREEMENT of the License Agreement.

"1.3 More specifically, as owner of the Clinical Data, INSERM may use Clinical Data for any non-profit research (including clinical research) and educational purposes, to the exclusion of any use by an industrial partner in the Field or transmission of the Clinical Data to an industrial partner for any use inside the Field. For the avoidance of doubt, it is specified that Clinical Data may be freely used for any purpose by INSERM outside the Field, including any transmission and use by an industrial partner ."

5. ARTICLE 2 - DURATION of the License Agreement is hereby amended and restated as follows:

"2.1 The Agreement is effective as of its last date of signature and shall last until the last to occur of the following: (a) the expiration on a country by country basis of the last to expire of any patent encompassed within the scope of the Patents, including any supplementary protection certificate (SPC) (or other extension of protection) and any commercial exclusivity for orphan and/or paediatric drugs, if applicable, or (b) the end of a ten (10) year period after the date of the first commercial sale of a Product."

2.2

(a) In the event of an early termination of the License Agreement by LICENSEE as provided under Section 9.1, or by INSERM-TRANSFERT as provided under Sections 9.2, 9.3 and/or 9.4, LICENSEE shall return to INSERM all Clinical Data that is not Published Clinical Data and shall not make any further use of such Clinical Data and more generally of the Patents and Know-How; provided however, that any such early termination shall not affect any use of Clinical Data, Patents or Know-How made by LICENSEE prior to the effective date of such early termination. By way of example, LICENSEE shall not be required to remove any Clinical Data incorporated by LICENSEE into regulatory submissions made prior to the effective date of termination.

(b) In the event of a material breach or default by INSERM or INSERM TRANSFERT in the performance of any of its material obligations hereunder and such breach shall have continued for sixty (60) days after written notice given by LICENSEE specifying the breach, LICENSEE may either:

(i) terminate the License Agreement (as amended under this Amendment No 2) as a whole pursuant to Section 9.2, in which case, LICENSEE shall return to INSERM all Clinical Data that is not Published Clinical Data and shall not make any further use of such Clinical Data and more generally of the Patents and Know-How; provided however, that any such early termination shall not affect any use of Clinical Data, Patents or Know-How made by LICENSEE prior to the effective date of such early termination. By way of example, LICENSEE shall not be required to remove any Clinical Data incorporated by LICENSEE into regulatory submissions made prior to the effective date of termination; or

(ii) partially terminate the License Agreement (as amended under this Amendment No 2) (" **Partial Termination**"). "Partial Termination" means (1) all rights and obligations of the Parties under the License Agreement shall terminate for the future except for the Parties rights and obligations under Articles 7, 8, and 10.7 which shall survive such termination, and (2) the rights of LICENSEE to (a) use Clinical Data transferred to LICENSEE prior to the effective date of such Partial Termination in accordance with the LICENSEE Purpose and Summary Clinical Data in accordance with Section 1.1(b) and to use Patents and Know-How transferred to LICENSEE prior to the effective date of such Partial Termination, in each case, in accordance with the terms of the License Agreement (as amended by this Amendment No 2) and (b) conduct source document verification [***], shall survive such Partial Termination. In any case, the License Agreement (as amended by this Amendment No 2) and notably the financial terms, shall remain in force regarding the rights and obligations of the Parties concerning Clinical Data, the Patents and Know-How transferred to LICENSEE prior to the effective date of such Partial Termination.

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6. The following Subsection 5.1.2 is added to ARTICLE 5 - FINANCIAL TERMS of the License Agreement:

"5.1.2 Clinical Data Access Fee: In consideration for the transfer of Clinical Data from four (4) Trial Subjects from INSERM to LICENSEE and the access to Clinical Data granted to LICENSEE pursuant to the License Agreement and this Amendment No. 2, LICENSEE shall pay to INSERM-TRANSFERT the total sum of [***]. Invoices are to be submitted to LICENSEE by email to: [***]. Installments will be paid within thirty (30) days of receipt of an invoice as follows:

(i) [***];

(ii) [***];

(iii) [***], and

(iv) [***]."

7. A new paragraph is added at the end of ARTICLE 7 - CONFIDENTIALITY of the License Agreement:

"Notwithstanding the above paragraph and subject to the rights to Clinical Data granted to LICENSEE under Article 11 which will prevail in the event of a conflict with the provisions of this Article 7, it is specified that the Clinical Data must be maintained confidential by LICENSEE without any time limit, unless it can prove that any of the exceptions listed under a) to e) above applies. For the avoidance of doubt, confidentiality obligations do not apply to Published Clinical Data"

8. Sections 8.3 and 8.4 of ARTICLE 8 - REPRESENTATIONS AND WARRANTIES of the License Agreement are replaced in their entirety with the following new Sections 8.3 and 8.4:

"8.3 LICENSEE shall hold harmless each of INSERM-TRANSFERT and INSERM and their respective directors, trustees, officers, employees, and agents, and the successors and assigns of any of the foregoing (collectively, the "**INSERM Indemnitees**") against any and all claims brought by third parties alleging any loss, damage or prejudice in conjunction with, or arising out of (i) practice by any LICENSEE Indemnitee (as defined below) of the Patents, or (ii) the design, manufacture, distribution or use of Products by or under the authority of LICENSEE, or (iii) use by a LICENSEE Indemnitee of the Know-How, except, in each case, to the extent resulting from (a) an INSERM Indemnitee's gross negligence or willful misconduct, or (b) INSERM-TRANSFERT's breach of the terms of the License Agreement or this Amendment No 2; provided that any INSERM Indemnitee seeking indemnification

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hereunder shall (1) promptly notify LICENSEE of such claim, (2) give LICENSEE sole control of the defense or settlement of such claim, and (3) provide LICENSEE, at LICENSEE's expenses, with reasonable assistance and full information with respect to such claim. Such indemnity shall include all costs and expenses, including reasonable attorneys' fees and any costs of settlement."

"8.4 INSERM-TRANSFERT and INSERM shall hold harmless LICENSEE, its Affiliates and Sublicensees, and their respective directors, trustees, officers, employees, contractors, subcontractors and agents, and the successors and assigns of any of the foregoing (collectively, the " **LICENSEE Indemnitees**") against any and all claims brought by third parties alleging any loss, damage or prejudice in conjunction with, or arising out of (i) any use or practice of the Patents before the signature date of the Original License Agreement by or under the authority of an INSERM Indemnitee, or (ii) use of the Know-How by an INSERM Indemnitee or (iii) the conduct of the INSERM Trial, except, in each case, to the extent resulting from (a) a LICENSEE Indemnitee's gross negligence or willful misconduct, or (b) LICENSEE's breach of the terms of the License Agreement or this Amendment No 2; provided that any LICENSEE Indemnitee seeking indemnification hereunder shall (1) promptly notify INSERM-TRANSFERT of such claim, (2) give INSERM-TRANSFERT sole control of the defense or settlement of such claim, and (3) provide INSERM-TRANSFERT, at INSERM-TRANSFERT's expenses, with reasonable assistance and full information with respect to such claim. Such indemnity shall include all costs and expenses, including reasonable attorneys' fees and any costs of settlement."

9. Sections 9.1 and 9.6 of ARTICLE 9 - TERMINATION of the License Agreement are replaced in their entirety with the following new Sections 9.1 and 9.6:

9.1 INSERM-TRANSFERT grants to LICENSEE a right to unilaterally terminate the Agreement (as amended) three (3) months after execution of the Agreement; in such case, the issue fee, including the Amendment Fee provided for in Amendment No 1 and the Clinical Data access fee mentioned hereabove shall not be refundable to LICENSEE. No other monies will be due to INSERM-TRANSFERT.

9.6 Articles 7, 8, and 10.7 shall survive the expiration and any termination of this License Agreement (as amended). Further, in the event of a Partial Termination by LICENSEE pursuant to Section 2.2 (b) (ii), the rights of LICENSEE to specified in such Section 2.2(b) (ii) shall survive such termination. Except as otherwise provided in this Article 9, all rights and obligations of the Parties under this License Agreement (as amended) shall terminate upon the expiration or termination of this License Agreement (as amended).

10. The following new Article, ARTICLE 11 - CLINICAL DATA ACCESS, is added to the License Agreement:

"ARTICLE 11 - CLINICAL DATA ACCESS

11.1 Scope of granted access: INSERM, through the Laboratory, shall provide LICENSEE with the Clinical Data for use for the LICENSEE Purpose only, during the Clinical Data Term and in accordance with the terms of the exclusive license to Patents and Know-How granted to LICENSEE under the License Agreement to the extent they do not conflict with the specific provisions contained in this Amendment No 2, in which case, the latter shall prevail. INSERM retains full ownership of the Clinical Data, no ownership right or any other license being transferred to LICENSEE other than as specifically contemplated in the License Agreement and this Amendment No 2. INSERM-TRANSFERT and/or INSERM and/or Investigator (as defined below) shall be free to publish the Clinical Data. All Trial Subject medical records and other source documents of INSERM will remain the property of INSERM.

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11.2 Investigator/Compliance: (i) Dr. Patrick Aubourg is experienced in the conduct of clinical research studies in humans and will personally conduct and supervise the INSERM Trial (the "**Investigator**"). INSERM represents and warrants that INSERM and the Investigator will conduct the INSERM Trial in accordance with (a) Applicable Law, (b) the Clinical Protocol, and (c) the terms of this Amendment No 2. INSERM is the regulatory sponsor of the INSERM Trial and will fulfill, or cause the fulfillment of, all responsibilities of a regulatory sponsor.

(ii) Should Dr. Patrick Aubourg no longer be able to perform his duties as Investigator of the INSERM Trial, INSERM-TRANSFERT shall inform LICENSEE within ten (10) business days and the Parties shall together seek in good faith a solution of replacement. Should no mutually acceptable replacement be found within three (3) months of INSERM-TRANSFERT's information notice, INSERM will freely appoint a replacement for Dr. Patrick Aubourg who will be responsible for the remaining of the INSERM Trial .

11.3 Approvals: INSERM represents and warrants that INSERM has obtained or will obtain, and maintain, written approval from ANSM, the Comité de Protection des Personnes (CPP), the appropriate ethics committee (the " **EC**") and any other relevant regulatory authorities (a) for the conduct of the INSERM Trial and (b) the relevant informed consent form (which form includes an express authorizing for the transfer of Clinical Data to countries and parties outside the European Union) to be signed by all Trial Subjects (or their legal representatives) (together with any amendments thereto, the " **Informed Consent Form**"),.

11.4 Database: LICENSEE will be responsible for building and maintaining, at its own cost, the Database. LICENSEE will own the Database, without prejudice to INSERM's ownership of the Clinical Data, and provide the Database to INSERM for use in the INSERM Trial.

[***]

11.5 Transfer Authorizations: INSERM-TRANSFERT and INSERM agree that, subject to approval of the Informed Consent Form by the relevant regulatory authorities, they will include express language in such Informed Consent Form specifying that the Trial Subject authorizes transfer and use of his/her personal data contained in the Clinical Data to third parties located in countries outside the European Union, in particular the United States.

Provided that INSERM, INSERM TRANSFERT and Investigator have used diligent efforts and acted in good faith to obtain signed Informed Consent Forms from Trial Subjects and regulatory approvals for the transfer to and use of Clinical Data by LICENSEE as contemplated herein, INSERM, INSERM TRANSFERT and/or Investigator cannot be held liable (i) in case the Trial Subjects (or their legal representatives) do not execute the Informed Consent Form and/or (ii) in case the prior regulatory authorization is not obtained for the transfer and use of the Clinical Data and/or in case, as a consequence of (i) or (ii), INSERM is not in the capacity to provide LICENSEE with Clinical Data. In such a case, this Amendment 2 shall be immediately terminated, without INSERM and/or INSERM TRANSFERT and/or Investigator being liable for any damages or other kind of compensation. For clarity, in such event, no Clinical Data Access Fees shall be due to INSERM and/or INSERM TRANSFERT from LICENSEE under Section 5.1.2.

11.6 [***]

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11.7 Project Plan and Use of Clinical Data:

(a) INSERM and Investigator will collect the specified data as defined in the Clinical Protocol onto a source document and will perform entry of Clinical Data into the Database as set forth in the Project Plan.

LICENSEE agrees that the Clinical Data that is not Published Clinical Data:

(i) is to be used by LICENSEE or by approved subcontractors solely in accordance with the terms of the License Agreement and this Amendment No 2; and the International Data Transfer Agreement (as defined below).

(ii) will not be released by LICENSEE to any third parties or entities except as permitted under the License Agreement and this Amendment No 2 and provided that LICENSEE guarantees that said third parties and entities (including Affiliates) to which Clinical Data that is not Published Clinical Data is released are subject to obligations regarding the transfer and confidentiality of personal data that are at least as stringent as those imposed on LICENSEE under the License Agreement, this Amendment No 2 and the International Data Transfer Agreement and remains liable towards INSERM and/or INSERM TRANSFERT and/or Investigator for compliance by said third parties and entities of such obligations; and

(iii) is to be used by LICENSEE in compliance with applicable laws and regulations.

If INSERM, INSERM-TRANSFERT and/or Investigator receive a request from a Trial Subject and/or the French competent authorities to obtain a list of all third parties to which Clinical Data have been released by LICENSEE in accordance with the terms of the License Agreement and this Amendment No 2, LICENSEE undertakes to provide such list within seven (7) business days of receiving a written request for such a list from INSERM, INSERM-TRANSFERT and/or Investigator.

LICENSEE warrants that, without prejudice to Section 11.6 it shall take no action to identify any Trial Subject.

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(b) The contribution of INSERM and the Laboratory will be reflected expressly in all written or oral public disclosures within the framework of the LICENSEE Purpose. LICENSEE is not authorized to publish or present (i) the Clinical Data that is not Published Clinical Data or (ii) the Summary Clinical Data (other than as authorized under this Agreement), without prior written authorization by INSERM and the Investigator. Absent any answer or objection of INSERM and/or Investigator within sixty (60) days of submission of an intended publication or presentation by LICENSEE to INSERM and Investigator, INSERM and Investigator shall be deemed to have agreed to such publication or presentation.

ARTICLE 11 - 11.8. The following general terms will apply to this Amendment No 2:

Subject to the following paragraph, this Amendment No 2 shall be deemed executed and enter into effect on the latest date of signature by either of the Parties (the "**Signature Date**").

Notwithstanding the above, the transfer to LICENSEE of the Clinical Data and use by LICENSEE of the Clinical Data shall only intervene and Article 11.2(i) is only applicable after the date the latest of the following conditions precedent has been completed (the " **Clinical Data Transfer Effective Date**"):

(a) Agreement between INSERM and LICENSEE on the terms of an international data transfer agreement (the " **International Data Transfer Agreement**"), which shall contain terms similar to that of the Standard contractual clauses for the transfer of personal data from the Community to third parties as defined in the Commission decision 2004/915/EC,

(b) The prior authorization of the relevant regulatory authorities for the transfer of the Clinical Data to LICENSEE and use for the LICENSEE Purpose on the basis of the draft of International Data Transfer Agreement which INSERM and LICENSEE shall have agreed upon beforehand. The Parties agree to modify the negotiated draft of the International Data Transfer Agreement and, if applicable, the provisions of this Amendment No 2 which were incorporated in the International Data Transfer Agreement, as reasonably appropriate, so as to comply with the decision and potential requirements for amendments of the relevant regulatory authorities, and

(c) The execution of the International Data Transfer Agreement and, if applicable of an amendment to the present Amendment No 2 as provided under paragraph (b) above, and

(d) INSERM obtaining the approval of the Informed Consent Forms containing the transfer authorization language described in paragraphs 11.3 and 11.5 above by the competent regulatory authority and EC, and execution of at least one Informed Consent Form by a Trial Subject (or his/her legal representative), and

(e) INSERM obtaining the approval of the competent regulatory authorities, especially on the Clinical Protocol.

Should one or several of the above conditions precedent fail to be completed within twelve (12) months from the Signature Date at the latest, then this Amendment No 2 shall be immediately terminated, without INSERM and/or INSERM TRANSFERT and/or Investigator being liable for any damages or other kind of compensation. For clarity, in such event, no Clinical Data access fees shall be due to INSERM and/or INSERM TRANSFERT from LICENSEE under Section 5.1.2.

It is specified that in the case not all four (4) Trial Subjects (or their legal representatives), but at least one Trial Subject (or his/her legal representative), execute the Informed Consent Form, the Clinical Data access fees provided under Section 5.1.2 shall be prorated based on the number of Trial Subjects having executed the Informed Consent Form.

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This Amendment No 2 shall be effective for the term of the License Agreement, it being however specified that, other than as expressly stated below, neither INSERM nor INSERM-TRANSFERT nor Investigator shall be liable in case of (i) completion, abandonment or termination of the INSERM Trial, whether decided by INSERM or resulting from the fact that INSERM is no more authorised by the relevant French authority to perform the INSERM Trial (and notably to perform the Gap Period and/or the Follow-Up Period) or if the performance of the INSERM Trial is suspended by the said authority or (ii) in case one or several Trial Subjects later withdraw(s) its (their) consent(s).

In the case of the foregoing (i) or (ii), the terms of Amendment No 2 governing the transfer and use of the Clinical Data shall only apply to Clinical Data collected until the INSERM Trial is terminated or the consent(s) is withdrawn and (a) any future payments due from LICENSEE pursuant to subsection 5.1.2 of Article 5 for access to Clinical Data shall be prorated based on the amount of Clinical Data received by LICENSEE, and (b) the rights and obligations of LICENSEE under this Amendment No 2 to use Clinical Data already received shall continue, unless applicable law or relevant regulatory authorities forbid any use of already collected Clinical Data. Notwithstanding the foregoing, to the extent Clinical Data from a Trial Subject has already been transferred to LICENSEE and used for the LICENSEE Purpose, LICENSEE shall not have to remove Clinical Data from any regulatory filings.

For clarity, to the extent this Agreement imposes restrictions on use and disclosure of Clinical Data, such restrictions shall not apply to Clinical Data that is Published Clinical Data.

The use and access by LICENSEE to the Clinical Data that is not Published Clinical Data shall automatically terminate at the earliest of the following two dates:

- At the expiry of the Clinical Data Term; or
- in case of early termination as provided under Article 2.2.

Except as specifically set forth in this Amendment No 2, all provisions of the License Agreement shall remain in full force and effect.

In witness whereof, the Parties have executed this Amendment No 2 in English by their respective duly authorized representatives on the date indicated below in two (2) copies, one (1) for each Party.

INSERM-TRANSFERT

Signature /s/ Cécile Tharaud

Name: Cécile Tharaud
Title : CEO
Date : 3/15/13

bluebird bio, Inc.

Signature /s/ Nick Leschly
(Authorized signatory of the company)

Name: Nick Leschly
Title: CEO
Date : 3/11/13

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EXHIBIT A
DESCRIPTION OF DATABASE CONTENT (eg categories of data collected)

[***]

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EXHIBIT B
PROJECT PLAN

[***]

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EXHIBIT C
LIST OF WHAT SUMMARY CLINICAL DATA SHALL CONTAIN

[***]

Exhibit 10.8

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LICENSE AGREEMENT

Between

INSTITUT PASTEUR, a non profit private foundation organized under the laws of France with offices at 25-28 rue du Docteur Roux, 75 724 Paris Cedex 15, France, VAT FR 65 775 684 897, represented by M. Christophe Mauriet, Senior Executive Vice-President for Administration, and M. Jean Derégnaucourt, Executive Vice President Business Development

Hereinafter referred to as "Institut Pasteur"

On one hand,

And

BLUEBIRDBIO INC., a company incorporated under the laws of Massachusetts, with offices at 840 Memorial Drive, Cambridge, MA 02139, United States, represented by Nick Leschly, Chief Executive Officer

Hereinafter referred to as "Licensee",

On the other hand,

Hereinafter mentioned as a Party or the Parties.

Recitals

1. Institut Pasteur has identified and patented a specific nucleotide sequence having a triplex structure, hereinafter referred to as "DNA flap", covered by patents and patent applications.

2. Institut Pasteur has granted several exclusive or non exclusive licenses on the DNA flap under several fields to companies.

3. Licensee is a company developing innovative gene therapies for severe genetic disorders.

4. Licensee wishes to obtain a license of such patents and commercialize products for gene therapy.

5. Licensee and Institut Pasteur have decided to discuss terms of a license agreement according to the terms and conditions of this Agreement.

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Now, therefore, the Parties hereby agree as follow:

Article 1. Definitions

For the purpose of this Agreement, the terms used in this Agreement, in singular or in plural, shall have the respective meanings set forth below:

- "Affiliate" means with respect to Licensee any party which (directly or indirectly) is controlled by, controls, or is under common control with, Licensee. For the purposes of this definition, the terms "control" and "controlled" mean the direct or indirect ownership of more than fifty percent (50%) of the outstanding voting securities of an entity, or such other relationship as results in actual control over the management, assets, business and affairs of such entity.
- "Agreement" shall mean this license agreement together with its appendices which make integral part of it.
- "Confidential Information" shall mean any and all confidential information, whatever its nature or its format, which is disclosed by one Party to the other Party hereunder and that is marked confidential or with similar term, if disclosed in writing, or if disclosed orally, identified as confidential at the time of disclosure. Notwithstanding the foregoing, any information which, by its nature and under the circumstances surrounding its disclosure is generally considered proprietary and confidential shall be deemed Confidential Information regardless of whether it is properly marked with legends or properly reduced to writing.
- "Development Plan" shall mean a document defining the research and development of the Licensee and/or Affiliates as well as the commercial and financial development estimates of Licensee and/or Affiliates for its Product(s) using the Technology in the Field.
- "Effective Date" shall mean the date of the last signature of this Agreement by the Parties.
- "Ex vivo gene therapy" shall mean that cells are extracted from a patient, corrected by placing a healthy or functional gene(s) and transplanted back into patient.
- "Field" shall mean ex vivo gene therapy for human disorders limited to adrenoleukodystophy (ALD) (including but not limited to AMN, CCALD, and all other variants of this disease caused by genetic mutations), beta hemoglobinopathies (including but not limited to beta-thalassemia and sickle cell anemia), [***], the "Field" includes in vivo as well as ex vivo gene therapy. Licensee and/or Affiliates shall have the right to request Institut Pasteur to expand the definition of "Field" to include additional clinical areas. [***] For clarity, the Field excludes any other fields and specifically prophylactic and therapeutic human and veterinary vaccination against all kind of pathogens, and the field of services of production and commercialisation of Good Manufacturing Practice (GMP) batches of lentiviral vectors for clinical trials. For clarity, the Field shall include production of GMP batches, by Licensee and its Affiliates [***]. For clarity, Institut Pasteur has already granted exclusive rights for services of production and commercialisation of Good Manufacturing Practice (GMP) batches of lentiviral vectors for clinical trials. [***]
- "Improvement" shall mean any new invention, patentable or not, patented or not, of the Technology, which under applicable law, depends on, at least, one claim of the Patents. For clarity, an Improvement does not include any Product.

- "Net Sales" shall mean the gross amount, excluded taxes, invoiced for sale of Products manufactured or sold in the Territory, in finish or semi finish form by Licensee and/or Affiliates less the following items, consistent with U.S. GAAP:

  a) trade, quantity and cash discounts actually allowed;

  b) commissions, discounts, refunds, rebates, charge backs, retroactive price adjustments, and any other allowances paid to non-governmental Third Parties that effectively reduce net selling price;

  c) credits, allowances and refunds for actual Product rejections, returns and allowances;

  d) taxes, duties and other governmental charges on the sale, shipment or transfer of the Product; and

  e) duly justified governmental discounts, refunds, rebates, charge backs, retroactive price adjustments and any other allowances that effectively reduce net selling price.

  It is understood that deductions set forth in a), b) and c) herein above shall not exceed [***] of gross revenue, excluded taxes, invoiced for sale of Products in the Territory.

- "Patents" shall mean the patents and patents applications listed in Appendix 1, along with all other patent rights (including but not limited to continuations, continuations-in-part (but only for those claims of such continuations-in-part that are fully supported by the patents and patent applications listed in Appendix 1 as of the Effective Date), divisionals, renewals, reissues, re-examinations, patent term extensions) that claim priority in whole or in part to any such patents and patent applications.
- "Product" shall mean all composition or product for gene therapy or method in the Field that incorporate the Technology.
- "Rare Diseases" shall include adrenoleukodystophy (ALD) (including but not limited to AMN, CCALD, and all other variants of this disease caused by genetic mutations), beta hemoglobinopathies (including but not limited to beta-thalassemia and sickle cell anemia), [***]. Whether in the case of [***], such diseases shall be considered on a case-by-case basis and considered a Rare Diseases if the incidence or prevalence is similar to those diseases listed as Rare Diseases above. In these situations, Licensee and/or Affiliates shall provide justification as to whether such disease is a Rare Disease, in writing, prior to payment of the Milestone #4 or #5 as applicable.
- "Technology" shall mean lentivirus vector containing DNA flap sequence covered by whole or part of the claims of the Patents.
- "Territory" shall mean all countries of the world, regarded together as a single indivisible territory.
- "Third Party" shall mean any party which is not Institut Pasteur or Licensee or its Affiliates.

Article 2. Scope

2.1. Under this Agreement, Institut Pasteur grants to Licensee and its Affiliates, that Licensee and its Affiliates accepts at their own risks, a license under the Patents in the Field and in the Territory for research and development, and to manufacture, have manufactured, make, have made, use, have used, sell, have sold, offer for sale, have offered for sale, import or have imported the Products, to the exclusion of any other rights, which is:

- exclusive for Products containing human (HIV-1 and HIV-2) lentivirus vector, and ;
- non exclusive for Products containing non-human lentivirus vector.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

2.2. No right granted herein shall prevent Institut Pasteur or its licensees or research partners to conduct research in the Field.

2.3. This Agreement includes the right for Licensee and/or Affiliates to grant sublicenses in the Field and the Territory to and through multiple tier(s) of Third Party(ies).

Article 3. Licensee's obligation

3.1. Licensee shall make, or shall cause its Affiliates and sublicensee to make, all reasonable commercial efforts (by reference to a company of similar size and scope to Licensee as of the Effective Date) to develop and commercialize one or more Products in the Field and to obtain any necessary governmental approvals in respect of, and market the Product(s) in the Field, if any. It is expressly agreed that fulfillment of the above obligation is an absolute requirement for this Agreement to be maintained into force.

3.2. Licensee shall provide annually, upon each anniversary date of the Effective Date, to Institut Pasteur an updated Development Plan, which will be Confidential Information of Licensee. [***]

3.3. Licensee is the sole responsible for securing the compliance of Products with applicable laws, rules and regulations, in particular, but without limitation, such as relating to ethics, the treatment of animals, and genetically modified organisms, if any.

Article 4. Intellectual property

4.1. The provisions of this Agreement shall not modify the ownership of the Technology and Patents.

4.2. Any Improvement of the Technology made without Institut Pasteur by the Licensee shall belong to Licensee.

4.3. Any Improvement of the Technology made with the help of Institut Pasteur will be co-owned by Institut Pasteur and Licensee. A specific agreement shall be established between the co-owners within six (6) months following the identification of the joint Improvement.

4.4. Upon request of Institut Pasteur, Institut Pasteur and Licensee agrees to meet in view to determine the conditions under which Licensee shall grant Institut Pasteur, a non exclusive, free license on the Improvement if possible and available mentioned in articles 4.2 and 4.3 above, for internal research purpose. Licensee and/or Affiliates shall ask to Institut Pasteur to submit a supplementary protection certificate (SPC) for any Product. To this aim, Licensee shall provide Institut Pasteur all necessary information. This SPC shall automatically be part of the Agreement.

4.5. From the Effective Date, Licensee shall pay to Institut Pasteur [***] of future external expenses engaged by Institut Pasteur for securing issuance of, and maintaining Patents or extending the duration of the Patents. Institut Pasteur shall not abandon any Patent without the prior notice of Licensee.

4.6. Upon written request, but at most once a year, Institut Pasteur shall keep Licensee informed of the status of issuance procedures of Patents, and shall update Appendix 1 accordingly.

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4.7. Licensee acknowledges that Institut Pasteur has expended significant resources and efforts to develop the Patents, and that the Patents represents highly valuable interests, and agrees not to take any action to jeopardize, limit or interfere in any manner with Institut Pasteur's ownership and intellectual property rights with respect to the Patents.

4.8. In the case a Patent is challenged (including but not limited to a re-examination, opposition or interference proceeding, but not including when part of an infringement action described above), the Parties shall make available to the other all information they have, and shall meet to decide the defense strategy. [***]

Article 5. Infringement

5.1. Institut Pasteur and Licensee shall as soon as they become aware thereof mutually advise each other of any infringement of Patents by a Third Party in the Field. Institut Pasteur and Licensee shall make available to the other all information at their disposal on the basis of which nature and extend can be assessed.

5.2. [***]

5.3. In the case Licensee is sued by a Third Party regarding Technology in a Product, the Parties shall make available to the other all information they have, and shall meet to decide the defense strategy, if any, with respect to such Technology.

Article 6. Consideration

6.1. Within thirty (30) days of the Effective Date, Licensee shall pay to Institut Pasteur a one-time, non-refundable license issuance fee [***] exclusive of taxes. This amount cannot be set-off against future royalties.

6.2. For the development of each Product indication by indication, except in the case mentioned below, Licensee and/or Affiliates shall pay to Institut Pasteur the following milestones:

	[***]	[***]	[***]	[***]
Milestone 1: [***]	[***]	[***]	[***]	[***]
Milestone 2: [***]	[***]	[***]	[***]	[***]
Milestone 3: [***]	[***]	[***]	[***]	[***]
Milestone 4: [***]	[***]	[***]	[***]	[***]
Milestone 5: [***]	[***]	[***]	[***]	[***]
Milestone 6: [***]	[***]	[***]	[***]	[***]

For the foregoing table:

- [***]

- For each Product (including multiple indications for the same Product), only one column is applied and each milestone in such column is paid only once at the first occurrence of such event
- [***]
- [***]
- [***]
- [***]
- [***]

For further clarity, with respect to the second tabbed paragraph above, if the same Product is developed or approved for more than one indication, the specified milestones for a column shall be paid one time only at the first occurrence of such event. As a specific example, [***].

6.3. Until the expiration of the last Patent claiming a Product in the Territory, Licensee and/or Affiliates shall pay to Institut Pasteur the following yearly royalty fees:

- [***] of Net Sales for a Product with an indication in a Rare Disease, without stacking clause, and
- [***] of Net Sales for a Product with an indication in a disease other than a Rare Disease, without stacking clause;

[***].

6.4. If the combined royalties Licensee and/or Affiliates would be required to pay to Institut Pasteur and Third Parties, is higher than [***] for one Product, Licensee and/or Affiliates may ask Institut Pasteur to negotiate the royalty fees of the article 6.3.

6.5. Licensee and/or Affiliates shall pay to Institut Pasteur a minimum annual fee [***] exclusive of taxes per twelve (12) month period and due at the end of such period which shall start from the fifth anniversary of the Effective Date of this Agreement for all Products. For clarity, such payment shall be offset by the royalties payments made to Institut Pasteur during such 12 month period. If no Product is on the market after the fifth anniversary of the Effective Date, this minimum annual fee shall be reduced [***] exclusive of taxes until the first Product shall be on the market, date on which the minimum annual fee shall be again [***] exclusive of taxes per twelve (12) month period.

6.6. Licensee and/or Affiliates shall pay to Institut Pasteur [***] of all cash and cash-equivalent consideration, whatever its nature, and in particular without limitation, all sums, milestones, royalties, exchange value of any counterpart in kind or in industry (but not duly justified payments for research and development) received by Licensee and/or Affiliates from its all sublicenses agreements granted by Licensee and/or Affiliates on the sole Technology.

6.7. On a indication-by-indication basis, in case of sublicenses relating to a Product, Licensee and/or Affiliates shall pay to Institut Pasteur on any and all cash and cash-equivalent consideration, whatever its nature, and in particular without limitation, all sums, milestones, royalties, exchange value of any counterpart in kind or in industry (but not duly justified payments for research and development) received by Licensee and/or Affiliates from a sublicensee:

- [***] if the sublicense is signed for Product(s) in a preclinical stage development, or,
- [***] if the sublicense is signed for Product(s) in a clinical stage of development.

6.8. If the combined royalties Licensee and/or Affiliates would be required to pay to Institut Pasteur and Third Parties, is higher than [***] for one Product, Licensee and/or Affiliates may ask Institut Pasteur to negotiate the royalty fees of the article 6.7.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

6.9. Notwithstanding the foregoing, in the case of a sublicense of the Technology for a Product for ALD (including but not limited to AMN, CCALD, and all other variants of this disease caused by genetic mutations), beta-thalassemia and/or sickle cell anemia, Institut Pasteur shall receive the same Milestones and Royalties as if Licensee and/or Affiliates itself were developing and commercializing such Product(s) (and thus no amounts shall be payable to Institut Pasteur under Article 6.7). Licensee and/or Affiliates shall be liable for ensuring such payment in accordance with the terms of this Agreement.

Article 7. Payment

7.1. Payment of royalties due under this Agreement shall be made within forty-five (45) days from the invoice date, after the end of each six-month period's Net Sales (ending 30 June and 31 December) for the sum corresponding to that period.

7.2. Any payment due by Licensee, pursuant to this Agreement, shall be made in euros by check or by wire transfer to a bank account as designated by Institut Pasteur from time to time.

7.3. Royalties arising out of Net Sales achieved in currencies other than the Euro shall be converted at the current average exchange rate one month prior to the date upon which the royalties report is due, and shall be borne by Licensee.

7.4. Notwithstanding the provisions of this Agreement, sums paid to Institut Pasteur shall in any event be retained by Institut Pasteur. Any VAT (Value Added Tax) due, if any, shall be added to the invoiced amount at the then current rate, and shall be borne by Licensee.

7.5. Any withholding tax payable by Licensee on royalties due hereunder shall be deducted from royalties due for the relevant country. Licensee shall be responsible for obtaining and providing to Institut Pasteur evidence of the payment of such withholding taxes. Licensee shall assist Institut Pasteur to prevent any double taxation and shall provide Institut Pasteur on request with any document necessary to that end.

7.6. The royalties and other payments set forth in this Agreement shall, if overdue, bear interest until paid at a per annum rate of [***]. The payment of such interest shall not foreclose Institut Pasteur from exercising any other rights or actions it may have as a consequence of the lateness of any payment.

Article 8. Accounts

8.1. Licensee shall simultaneously with payments of royalties deliver to Institut Pasteur a report reflecting its accounts and sub-licenses accounts, pertaining to royalties calculated, on Net Sales, including:

- [***];
- [***]; and
- [***].

Such report maybe delivered by email to the following email address (which address may be updated by written notice from Institut Pasteur to Licensee): Service de Transfert de Technologie, [***].

8.2. When no royalty is payable, a report so attesting shall be submitted to Institut Pasteur. The aforesaid reports shall be treated as Confidential Information of Licensee.

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Such report maybe delivered by email to the following email address (which address may be updated by written notice from Institut Pasteur to Licensee): Service de Transfert de Technologie, [***].

8.3. Licensee shall keep complete and accurate records of all Net Sales, allowing a computation and checking of the royalty amount due to Institut Pasteur hereunder. Once a year and upon prior notice to Licensee and/or Affiliates, Institut Pasteur shall, throughout the term of this Agreement, and for a period of three (3) years following the end of this Agreement, be entitled to have at its own expense and during regular business hours Licensee's records pertaining to this Agreement checked by an independent certified public accountant chosen by Institut Pasteur and reasonably acceptable to Licensee, which accountant shall enter into a confidentiality agreement with Licensee. Such accountant shall be appointed for the sole purpose of determining the amount of royalties due to Institut Pasteur hereunder, covering a period not to exceed the past three (3) years, provided that [***] such accountant shall report to Institut Pasteur only as to the accuracy of royalty statements and payments and that such reported information shall be considered to be Confidential Information of Licensee.

8.4. If, as a result of such audit, an adjustment is determined to be made in favor of Institut Pasteur, the accountant's fees and expenses shall be borne by Licensee, if the sums underpaid by Licensee exceed [***] of what was actually paid by Licensee to Institut Pasteur; otherwise such fees and expenses shall be paid by Institut Pasteur. Licensee shall pay any underpaid royalties to Institut Pasteur.

Article 9. Confidentiality

9.1. Confidential Information does not include information for which it is evidenced that:

- is publicly known and made generally available in the public domain prior to the time of disclosure by the providing Party,
- becomes publicly known and made generally available after disclosure by the providing Party to the receiving Party through no action or inaction of the receiving Party,
- is already in the possession of the receiving Party at the time of disclosure by the providing Party as shown by the receiving Party's documentary evidence,
- is obtained by the receiving Party from a Third Party without breach of such Third Party's obligations of confidentiality, as shown by the receiving Party's documentary evidence,
- is required by law to be disclosed by the receiving Party.

9.2. In the event that the receiving Party is notified of a requirement to disclose the providing Party's Confidential Information, the receiving Party shall notify the providing Party immediately upon receipt of such notice and not release the Confidential Information until such time as the providing Party has taken reasonable steps to seek an order of a court of competent jurisdiction to prevent the disclosure, or limit the extent of disclosure, of the providing Party's Confidential Information.

9.3. During the term of this Agreement and five (5) years thereafter, the receiving Party agrees to keep confidential and cause its employees, consultants or students to keep confidential, all Confidential Information of the providing Party that is disclosed to it, or to any of its employees, consultants or students under or in connection with this Agreement.

9.4. Neither the receiving Party nor any of its respective employees, consultants or students, shall use Confidential Information for any other purpose whatsoever except as expressly permitted by this Agreement.

9.5. The receiving Party may not disclose providing Party's Confidential Information to a Third Party without the prior written consent of the providing Party, other than for Licensee and/or Affiliates in connection with a proposed or actual sublicense or transaction permitted by Article 13.7 or for other reasonable business purposes, subject to the confidentiality protections stated above, for the purpose of this Agreement.

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9.6. Following expiration or termination of this Agreement, the receiving Party shall return all the Confidential Information to the providing Party, or destroy such Confidential Information at the providing Party request, with the exception that (1) one copy of the Confidential Information that may be retained by the receiving Party's legal counsel for the purpose of verifying its obligations under this Agreement.

Article 10. Representations and Warranties

10.1. At the Effective Date, each Party represents and warrants to the other Party that it has the right to enter into this Agreement.

10.2. Licensee agrees that all Confidential Information or any other information or data communicated or provided by Institut Pasteur under this Agreement are communicated "as is", without any warranty, expressed or implied, regarding accuracy, completeness, merchantability, fitness, patentability and/or performance. Any hazards, costs and risks that may be incurred by Licensee in connection with the use of all or part of the Products, resulting, in particular, from possible defects or from the eviction risk, are the sole responsibility of Licensee. Institut Pasteur shall not be liable for any consequential, indirect or punitive damages or lost profits of Licensee.

10.3. Institut Pasteur gives no warranty whatsoever express or implied, in respect of the Patents, in particular as regards of its usefulness, safety or fitness for a particular purpose. Institut Pasteur does not, either expressly or tacitly warrant that the use of the Patents granted under this Agreement shall allow the production of Product, as well as the manufacture, sale, use, importation, exportation and holding of Products shall not infringe a Third Party's intellectual proprietary rights or violate any rights in particular license rights, already granted to a Third Party. Licensee undertakes not to enforce any remedy, including a claim under any guarantee against Institut Pasteur, for compensation of whatever damage which might arise out of or in connection with the use or non use of the Patents.

10.4. Nothing in the Agreement shall be construed as: (a) a warranty or representation by Institut Pasteur as to the validity or scope of any Patents; (b) a warranty or representation by Institut Pasteur that the practice under the Patents is or will be free from infringement of patents of any Third Party or rights granted to Third Party; (c) except as expressly set forth herein, an obligation to Institut Pasteur to sue Third Party for infringement; or (d) conferring by implication, estoppels or otherwise any license, immunity or right under any patent owned by or licensed to Institut Pasteur other than the Patents.

10.5. Institut Pasteur shall under no circumstances be held liable to Licensee, whether expressly or impliedly, for any direct, indirect, consequential or special damages in relation to the use or sale of Patents and/or Products by Licensee. Licensee shall indemnify and hold Institut Pasteur harmless from all costs and expenses of any kind, arising from or resulting of any Third Party claim against Institut Pasteur relating to the use, handling or storage by Licensee of the Patents or Confidential Information, as well as the manufacture, sale, use, importation, exportation and holding of Product, except where such claims arise from a finding of gross negligence or willful misconduct by Institut Pasteur only with respect to the Patents or Confidential Information, to the exclusion of Products. [***]

10.6. Institut Pasteur may terminate this Agreement with immediate effect in the event that Licensee, either directly or indirectly, or its Affiliates challenges the validity of any of the Patents.

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Article 11. Term and Termination

11.1. This Agreement shall be effective from the Effective Date.

11.2. Unless sooner terminated under the articles below, this Agreement shall be effective until the last Patents to expire in the Territory.

11.3. This Agreement may be terminated without any indemnification, by either Party at any time during this Agreement if the other Party is in substantial breach of its obligations hereunder and has not cured such breach within sixty (60) days after a registered letter notifying such substantial breach, without prejudice of any right to pursue an action for damages as a result of such breach.

11.4. Institut Pasteur may also terminate this Agreement without fault where collective proceedings – bankruptcy, suspension of proceedings – are opened against Licensee and not dismissed within sixty (60) days thereafter.

11.5. Licensee may terminate this Agreement by a written notice sent ninety (90) days in advance.

11.6. Termination of this Agreement for any reason shall not affect each Party's continuing obligations to the other Party under this Agreement or pursuing provisions. Upon termination of this Agreement, as long as there are always unexpired Patents under the Territory, this license shall automatically terminate and Licensee shall promptly cease any use of the Patents and shall cease manufacturing, importing, using and selling Products within [***] form the effective date of the termination.

11.7. Upon termination of this Agreement, Institut Pasteur shall have the right to retain any sums already paid by Licensee hereunder, and Licensee shall pay all sums accrued hereunder which are then due, including all sums generated during the three month period mentioned in Article 11.6 of this Agreement.

11.8. Articles 1, 3.3, 4.1 to 4.3, 7 to 10, 11.6, 11.7, 11.8 and 12 shall survive any termination or expiration of this Agreement.

Article 12. Litigation and governing law

12.1. This Agreement shall be construed and governed by the Laws of France. The language of this Agreement shall be English.

12.2. The Parties shall attempt to settle any dispute relating to this Agreement, its validity and/or its interpretation and/or its enforceability and/or its termination, in an amicable way. Should such attempts fails, the litigation will be held in the court of the competent jurisdiction in France.

Article 13. Miscellaneous

13.1. This Agreement contains the entire understanding and agreement between the Parties hereto with respect to its subject matter, and except where otherwise provided herein, supersedes any prior or contemporaneous written or oral agreement between them relating to the subject matter hereof.

13.2. The Parties agree to keep the existence and the terms and conditions of this Agreement strictly confidential, and shall not disclose the existence and the terms and conditions of this Agreement to any Third

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Party, except as required by law (including but not limited to in connection with a public securities offering) or by Licensee in connection with a proposed or actual sublicense or transaction permitted by Article 13.7 or for other reasonable business purposes. Moreover, nothing contained in this Agreement shall grant to Licensee a right to use for advertising, publicity or any promotional activity whatsoever Institut Pasteur's names, trademarks, logo or any other designations, including in contracted or abbreviated form or by imitation, subject to a prior express written consent of Institut Pasteur. Notwithstanding the foregoing, Licensee may disclose the existence of this Agreement and the fact that Institut Pasteur has granted an exclusive license under the Patents to Licensee.

13.3. This Agreement may be amended only by a written amendment signed by the Parties.

13.4. If any term, provision or condition of this Agreement shall be held by a court of competent jurisdiction to be invalid, unenforceable or void, the remainder of this Agreement shall remain in full force and effect.

13.5. Any notice required or permitted to be given under this Agreement shall be sufficient if sent by commercial courier or certified mail (return receipt requested), facsimile, or postage prepaid, addressed to the address mentioned in first page of this Agreement.

13.6. Neither Party shall be liable to the other for any default under this Agreement caused by war, riot, fire, flood, drought, act of God or any other cause which is beyond the reasonable control of the defaulting Party, as acknowledged by the court of competent jurisdiction.

13.7. This Agreement being entered into for the benefit of consideration of the Parties, shall not be assigned or transferred, whether in whole or in part, without the other Party's prior written consent; provided that Licensee may assign this Agreement to an Affiliate or in connection with the merger, consolidation, or sale of all or substantially all of its assets or that portion of its business pertaining to the subject matter of this Agreement, and the assignee shall notify Institut Pasteur of such assignment and shall agree in writing to be bound to the terms of this Agreement as "Licensee" hereunder.

13.8. The relationship created by this Agreement shall be that of independent contractors.

13.9. The failure or neglect of a Party at any time, to require performance of the other Party of any provision hereof, shall not in any way affect the right to require such performance at any time thereafter. The waiver by a Party of any breach of any provision hereof shall not be held to be a waiver of any subsequent breach of the same provision or of any other provisions hereof.

[remainder of this page intentionally left blank]

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IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by their authorized respective representative.

Made in Paris,
In duplicate.

Date: 08 SEP. 2011

/s/ Christophe Mauriet
INSTITUT PASTEUR
Christophe Mauriet
Senior Executive Vice-President

Date: 26/8/11

/s/ Jean Derégnaucourt
INSTITUT PASTEUR
Jean Derégnaucourt
Executive Vice-President Business Development

Date: 13-Sept 2011

/s/ Nick Leschly
BLUEBIRDBIO INC.
Nick Leschly
Chief Executive Officer

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Appendix 1

Patents

Invention	Priority/Filing date Extension/Filing date	Territories / Filing date Legal Status
[***]		

Institut Pasteur hereby confirms that the foregoing is a complete and accurate list of all the Patents as the Date of August 11,2011.

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AMENDMENT N°1 TO THE LICENSE AGREEMENT

Between

INSTITUT PASTEUR, a non profit private foundation organized under the laws of France with offices at 25-28 rue du Docteur Roux, 75 724 Paris Cedex 15, France, VAT FR 65 775 684 897, represented by M. Christophe Mauriet, Senior Executive Vice-President for Administration

Hereinafter referred to as "Institut Pasteur"

On one hand,

And

BLUEBIRDBIO INC., a company incorporated under the laws of Massachusetts, with offices at 840 Memorial Drive, Cambridge, MA 02139, United States, represented by Nick Leschly, Chief Executive Officer

Hereinafter referred to as "Licensee",

On the other hand,

Hereinafter mentioned as a Party or the Parties.

Recitals

1. The Parties have signed a license agreement on September 13, 2011 on a patented specific nucleotide sequence having a triplex structure, referred to as "DNA flap".

2. Institut Pasteur has granted several exclusive or non exclusive licenses on the DNA flap under several fields to companies, [***] .

3. Institut Pasteur has negotiated with a licensee to obtain rights for the Licensee in this field of services of production and commercialization of Good Manufacturing Practice (GMP) batches of lentiviral vectors for clinical trials, according to the terms and conditions of this Amendment n°1.

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Now, therefore, the Parties hereby agree as follow:

Article 1. Scope

The scope of this Amendment n°1 is to extend the Field of the Agreement and the license grants by Institut Pasteur.

Article 2. Modifications

2.1. The definition of the Field in the article 1 of the Agreement is replaced by the following definition as from the effective date of this Amendment n°1:

- "Field" shall mean ex vivo gene therapy for human disorders limited to adrenoleukodystophy (ALD) (including but not limited to AMN, CCALD, and all other variants of this disease caused by genetic mutations), beta hemoglobinopathies (including but not limited to beta-thalassemia and sickle cell anemia), [***] for [***] the "Field" includes in vivo as well as ex vivo gene therapy. [***]

2.2. The article 2.1 of the Agreement is modified as follow, as from the effective date of this Amendment n°1:

"2.1. Institut Pasteur hereby grants to Licensee, its Affiliates, that Licensee, its Affiliates accept at their own risk, a license under the Patents in the Field and in the Territory for research and development, and to manufacture, have manufactured, make, have made, use, have used, sell, have sold, offer for sale, have offered for sale, import or have imported the Products, to the exclusion of any other rights, the said license being:

- exclusive for Products containing human (HIV-1 and HIV-2) lentivirus vector;
- nonexclusive for Products containing non-human lentivirus vector.

In addition, Institut Pasteur hereby grants to Licensee, its Affiliates and sublicensees, that Licensee, its Affiliates and sublicensees accept at their own risk, a nonexclusive license under the Patents in the Field and in the Territory to make or to have made by a Thirty Party Good Manufacturing Practice (GMP) batches of lentiviral vectors for its/their own clinical trials on Products, provided that such Third Party makes Good Manufacturing Practice (GMP) batches of lentiviral vectors solely for the Licensee, its Affiliates and sublicensees clinical trials of Products above mentioned.

2.3. The article 10.5 of the Agreement is modified as follow, as from the effective date of this Amendment n° l: the last sentence of such article 10.5 is modified as follow: [***]

Article 3. Miscellaneous

3.1. All the other provisions of the Agreement remain unchanged and fully applicable between the Parties.

3.2. This Amendment n°1 is effective from the date of signature by the Parties.

3.3. This Amendment n°1 makes integral part of the Agreement.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by their authorized respective representative.

Made in Paris,
In duplicate.

Date: 27 AVR. 2012

/s/ Christophe Mauriet
INSTITUT PASTEUR
Christophe Mauriet
Senior Executive Vice-President

Date:

/s/ Nick Leschly
BLUEBIRDBIO INC.
Nick Leschly
Chief Executive Officer

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AMENDMENT N°2 TO THE LICENSE AGREEMENT

Between

INSTITUT PASTEUR, a non profit private foundation organized under the laws of France with offices at 25-28 rue du Docteur Roux, 75 724 Paris Cedex 15, France, VAT FR 65 775 684 897, represented by M. Christophe Mauriet, Senior Executive Vice-President for Administration

Hereinafter referred to as "Institut Pasteur"

On one hand,

And

BLUEBIRDBIO INC., a company incorporated under the laws of Delaware, with offices at 840 Memorial Drive, Cambridge, MA 02139, United States, represented by Nick Leschly, Chief Executive Officer

Hereinafter referred to as "Licensee",

On the other hand,

Hereinafter mentioned as a Party or the Parties.

Recitals

1. The Parties have signed a license agreement on September 13, 2011 on a patented specific nucleotide sequence having a triplex structure, referred to as "DNA flap", modified by an amendment n°1 dated April 27, 2012 (the "Agreement").

2. The Licensee has initiated a program to treat cancerous and/or pre-cancerous conditions by genetically modifying T cells to express antigen binding domain(s) on their surface that target tumor associated antigen(s).

3. Institut Pasteur agrees to extend the Field as follows, and the Parties agree to modify some definitions, according to the terms and conditions of this Amendment n°2.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

Now, therefore, the Parties hereby agree as follow:

Article 1. Scope

The scope of this Amendment n°2 is to extend the Field of the Agreement and the license granted by Institut Pasteur, and to make some modifications.

Article 2. Modifications

2.1. The following definitions shall replace the definitions of the Agreement:

- "Gene therapy" shall mean the use of a vector containing at least one DNA sequence that encodes at least one protein, in order to restore the functional activity of one or more resident non-functional gene copies, or provide for the introduction and expression of novel protein(s) not normally expressed in the cell type or expression of protein(s) that do not exist normally in nature. The introduced protein(s) are not intended to generate a prophylactic and/or therapeutic immune response against the protein encoded by the introduced DNA sequence of interest for use in Vaccination.
- "Ex vivo" shall mean that cells are extracted from a patient, corrected or otherwise modified by Gene Therapy, and transplanted or dosed back into patient.
- "Vaccination" shall mean the use of a vector containing at least one DNA sequence that encodes at least one protein with the intent to generate an immune response against the protein encoded by the DNA sequence of interest to cause a prophylactic or therapeutic effect in humans and other animals. The protein encoded by the DNA sequence of interest shall not restore an altered or non existing protein function or, modify existing protein function.
- "Field" shall mean ex vivo Gene therapy for human disorders limited to adrenoleukodystophy (ALD) (including but not limited to AMN, CCALD, and all other variants of this disease caused by genetic mutations), beta hemoglobinopathies (including but not limited to beta-thalassemia and sickle cell anemia), [***] leukemias, lymphomas, B-cell malignancies and solid tumors by producing chimeric antigen receptor T-cells [***] for [***] and [***] the "Field" includes in vivo as well as ex vivo Gene therapy. [***]

2.2. The following sentence is hereby added to the end of Article 2.1 of the Agreement: "At Licensee's request, the Parties agree to discuss in good faith about the [***]."

2.3. The following sentence is hereby added to the end of Article 4.4 of the Agreement: "Further, Licensee shall have the right to seek patent term extension according to the Drug Price Competition and Patent Term Restoration Act of 1984 (Hatch-Waxman) for any Patent based on Product(s) (in addition to an SPC(s) as provided in Article 4.4). Institut Pasteur will reasonably assist Licensee if Licensee elects to initiate to obtain any such patent term extension".

Article 3. Other Terms

3.1. Upon signature of this Amendment 2 by the Parties, Licensee shall pay Institut Pasteur [***] exclusive of taxes. This amount cannot be set-off against future royalties.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

Article 4. Miscellaneous

4.1. All the other provisions of the Agreement remain unchanged and fully applicable between the Parties.

4.2. This Amendment n°2 is effective from the date of signature by the Parties.

4.3. This Amendment n°2 makes integral part of the Agreement.

IN WITNESS WHEREOF, the Parties have caused this Agreement to be executed by their authorized respective representative.

Made in Paris,
In duplicate.

Date: 16 OCT. 2012

/s/ Christophe Mauriet

INSTITUT PASTEUR
Christophe Mauriet
Senior Executive Vice-President

Date: 16 OCT. 2012

/s/ Nick Leschly

BLUEBIRDBIO INC.
Nick Leschly
Chief Executive Officer

Exhibit 10.9

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

LICENSE AGREEMENT

BETWEEN

RESEARCH DEVELOPMENT FOUNDATION

AND

BLUEBIRD BIO, INC.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

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- Licensed Patents

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LICENSE AGREEMENT

This License Agreement (hereinafter referred to as "Agreement") is made and entered into as of the 7th day of December, 2011 (the "Effective Date" of this Agreement), by and between RESEARCH DEVELOPMENT FOUNDATION (hereinafter referred to as "Licensor"), a Nevada nonprofit corporation having its office at 402 North Division Street, Carson City, Nevada, 89703;

AND

BLUEBIRD BIO, INC., having an office at 840 Memorial Drive, Cambridge, Massachusetts, 02139 (hereinafter referred to as "Licensee").

WITNESSETH:

WHEREAS, Licensor is a nonprofit organization exempt from taxation under Section 501(c)(3) of the Internal Revenue Code of 1986;

WHEREAS, Licensor is the owner of "Licensed Patents" (as defined below);

WHEREAS, Licensor has determined that the grant of a license to Licensee is the only practicable manner in which the Licensed Patents can be utilized to benefit the public;

WHEREAS, Licensee desires to obtain a world-wide license from Licensor as described herein, and Licensor desires to grant such a license pursuant to the terms and conditions of this Agreement;

NOW, THEREFORE, in consideration of the above premises and the covenants herein, the parties agree as follows:

ARTICLE I

Definitions

As used in this Agreement, the following capitalized terms shall have the following respective meanings:

1.1 The term "Licensed Patents" shall mean the United States and foreign patent applications and issued patents listed in Exhibit 1, including all continuations, continuations-in-part, divisionals, patents of addition, reissues, renewals or extensions (including supplementary protection certificates) and all foreign counterparts of the foregoing.

1.2 The term "Licensed Product" shall mean any process, method, material, composition, drug, or other product or portion of a product within a Valid Claim of the Licensed Patents.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

1.3 The term "Make, Use or Sell" shall mean to develop, have developed, produce, have produced, make, have made, manufacture, have manufactured, use, have used, offer for sale, have offered for sale, sell, have sold, rent, have rented, lease, have leased, import or have imported a Licensed Product.

1.4 The term "Affiliate" shall mean any present or future companies, corporations, partnerships, joint ventures, business trusts or other business entities organized under the laws of any nation (a) with respect to which: (i) at least fifty percent (50%) in value of the total equity interests, (ii) at least fifty percent (50%) of the total combined voting power of all classes of shares entitled to vote, or (iii) at least fifty percent (50%) of the profits interest in the case of a partnership, joint venture or other non-stock entity, is directly or indirectly under the control of Licensee, or (b) with respect to which Licensee has effective control, directly or indirectly. "Control" shall mean the possession of the power to direct or cause the direction of the management and the policies of an entity, whether through an ownership interest or by contract or otherwise. The term "Licensee" wherever used herein shall include any Affiliate of Licensee.

1.5 The term "Net Sales" shall mean the gross amount received with respect to the sale or other transfer of Licensed Product, less the following deductions for amounts actually incurred related to such sale or other transfer and included in the gross invoiced amount: (a) normal, customary trade discounts (including volume discounts), credits and rebates, and allowances and adjustments for rejections, recalls, returns or retroactive price reductions; and (b) freight, insurance, sales, use, excise, value-added and similar taxes or duties imposed on the sale.

No other allowance or deduction shall be made by whatever name known. For the avoidance of doubt, transfers of a Licensed Product between any of Licensee, an Affiliate or a sublicensee for sale by the transferee shall not be considered Net Sales hereunder.

1.6 The terms "commercialize" and "commercialization" shall mean the Making, Using, or Selling, licensing or other use by Licensee (or a sublicensee) of the Licensed Product under such circumstances as may be permitted by applicable international, federal, and state laws and regulation.

1.7 The term "Valid Claim" shall mean, in the country of manufacture or sale, (a) a claim of any issued and unexpired patent within the Licensed Patents that (i) has not been permanently revoked, nor held unenforceable, unpatentable or invalid by a decision of a court or other governmental agency of competent jurisdiction that is unappealable or unappealed in the time allowed for appeal, (ii) has not been admitted to be invalid or unenforceable through reissue or disclaimer or otherwise, and (iii) has not been lost through an interference, reexamination, post-grant review or reissue proceeding; or (b) a pending claim of a pending patent application included in the Licensed Patents that was filed and has been prosecuted in good faith and has not been (i) cancelled, withdrawn, abandoned or finally disallowed without the possibility of appeal or refiling of such application, or (ii) pending for more than [***] since such claim was first presented; provided, however, that such claim pending for more than [***] shall be a Valid Claim if and when it is issued as a claim of an issued and unexpired patent included within Licensed Patents, or if it is part of an opposition, interference, re-examination or other such administrative proceeding.

1.8 The term "Cover(s)" or "Covered" or "Covering" shall mean that a product, process, material, composition, drag, or other product or portion of a product would infringe a Valid Claim in a Licensed Patent (or in the case of a Valid Claim in a patent application within the Licensed Patents, would infringe such Valid Claim if it were in an issued patent) but for the exclusive license granted to Licensee hereunder.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

ARTICLE II

Grant of License

2.1 Scope of License. Licensor hereby grants and Licensee hereby accepts a worldwide, exclusive license under the Licensed Patents to Make, Use or Sell Licensed Products. Except as provided herein, no other, further, or different license is hereby granted, either expressly or by implication.

2.2 Right to Sublicense. Licensor hereby grants and Licensee hereby accepts the right to grant sublicenses through multiple tiers to third parties to all or any portion of Licensee's rights hereunder. Licensee shall, within thirty (30) days of the grant of each such sublicense, give written notice of such sublicenses to Licensor and provide Licensor with a copy thereof; provided that Licensee may redact those portions of such sublicenses that are not necessary for Licensor to determine whether Licensee is in compliance with its obligations under this Agreement. Licensee shall incorporate terms and conditions into its sublicense agreements sufficient to enable Licensee to comply with this Agreement. Upon termination of this Agreement for any reason, Licensor shall grant to a sublicensee that is not in material breach of its sublicense a direct license granting rights and terms equivalent to the sublicense rights and terms which Licensee previously granted to such sublicensee, provided that Licensor shall have no greater rights and obligations to any such sublicensee than Licensor has to Licensee under this Agreement.

2.3 Retained Rights. Licensor retains the right, on behalf of itself and other nonprofit academic research institutions, to practice and use the Licensed Patents for any academic, non-clinical research and educational purposes. Licensee agrees that, notwithstanding any other provision of this Agreement, it has no right to enforce the Licensed Patents against any such practice or use by any such institution.

2.4 Government Rights. If any invention described and claimed in the Licensed Patents is developed with the support of federal research funds, Title 35, Sections 200-212 of the United States Code (the "Bayh-Dole Act") shall apply. Among other things, the provisions of the Bayh-Dole Act provide the United States Government with non-exclusive rights in any inventions arising from the use of federal funds and also generally impose the obligation that any products embodying the subject invention or produced through the use of such invention be manufactured substantially in the United States. If and to the extent the Bayh-Dole Act is

applicable to any Licensed Patents, Licensee acknowledges and agrees that the rights granted under this Agreement are subject to the applicable terms and conditions of the Bayh-Dole Act and that Licensee will ensure that all relevant obligations under the Bayh-Dole Act provisions are met.

ARTICLE III

Patents

3.1 Patent Applications. Licensor represents that it has timely filed patent applications relating to the Licensed Patents in the countries listed on Exhibit 1 hereto.

3.2 Patent Prosecution and Maintenance. Licensor will control the conduct, preparation, filing and prosecution of such patent applications within the Licensed Patents and will maintain any patents issued thereon, but will provide Licensee with copies of all office actions and responses thereto and will consider and take into account in good faith Licensee's comments with respect thereto. Notwithstanding the foregoing sentence, in the event that Licensor within its sole judgment and discretion determines that prosecution or maintenance of a patent in a particular country is not economically viable or otherwise feasible, Licensor shall promptly notify Licensee of Licensor's intention to abandon such patent application or patent. Upon receipt of such notice, Licensee, in its sole discretion, may elect to assume responsibility (and to pay associated fees and expenses) with respect to a patent application or patent which Licensor intends to abandon. Licensee may, in its sole discretion, abandon any patent application or patent for which it has previously assumed responsibility and will not be liable to Licensor in any way for such abandonment.

3.3 Patent Costs. Licensee shall reimburse Licensor for [***] for filing, prosecuting and maintaining the Licensed Patents. Licensor shall invoice Licensee for such patent costs quarterly, and undisputed payments shall be made by Licensee within thirty (30) days after receipt of each invoice.

ARTICLE IV

Royalties and Other Consideration

4.1 License Fee. Licensee shall pay Licensor an up-front non-refundable license fee of [***] within ten (10) business days after the execution of this Agreement by the parties.

4.2 Royalty. Licensee shall pay Licensor an earned royalty of [***] on Net Sales of Licensed Product, on a Licensed Product-by-Licensed Product and country-by-country basis, where there is at least one Valid Claim of a Licensed Patent Covering such Licensed Product in such country at the time of first marketing approval. Such royalty shall continue until the longer of: (a) expiry or end of the last Valid Claim within a Licensed Patent that Covers a Licensed Product in such country, or (b) ten (10) years from the first marketing approval; provided that the royalty shall be reduced by [***] if payable under this clause (b) after the last Valid Claim

expires or ends during such ten (10) year period. For clarity, no royalty shall be owed on any Licensed Product not Covered by a Valid Claim under a Licensed Patent at the time of first marketing approval in the country in question, and further, under no circumstances shall any royalty be owed (during the term of this Agreement or thereafter) if all the Valid Claim(s) that Cover a Licensed Product in a country are held not valid, unenforceable or otherwise unpatentable. For clarity, in such event, royalties already paid by Licensee shall not be refunded by Licensor. Only one (1) royalty shall be payable on a Licensed Product, regardless of the number of Valid Claims or the number of patent applications and patents within the Licensed Patents under which such Licensed Product has been Made, Used or Sold.

4.3 Basis of Royalty Obligation. Royalty payments to be paid at the applicable rate(s) hereunder shall be paid on a Licensed Product by Licensed Product and country-by-country basis.

4.4 Limitation on Deductions from Royalty Payments. Wherever this Agreement provides that Licensee may deduct expenses, payments or other amounts from royalties payable to Licensor, such deduction shall be prorated over such time as is necessary to assure that the royalties payable to Licensor in any period shall not be reduced by more than [***].

4.5 Milestone Payments. In addition to the up-front license fee and royalties required under this Article IV, Licensee shall make milestone payments to Licensor as set forth in Exhibit 2 hereto. Such cash payments shall be delivered to Licensor within forty-five (45) days after the end of the calendar quarter in which each of the milestone payment events indicated on such exhibit occurs.

4.6 Marketing Arrangements. Where Licensed Products are sold by a third party other than Licensee or sublicensee under any type of commercial arrangement between Licensee (or sublicensee) and such third party (including, without limitation, a joint venture, distributorship, or collaboration agreement), Net Sales for earned royalty purposes shall be calculated based on the gross sales of Licensed Products by such third party.

ARTICLE V

Reports and Payments

5.1 Progress Reports. Licensee agrees to make an annual report to Licensor each March covering Licensee's (and its sublicensees', if applicable) progress during the previous calendar year toward research, development, commercialization and out-licensing of Licensed Products. Email communication shall suffice for the purpose of this reporting requirement.

5.2 Notice of Commercial Sale. Licensee shall notify Licensor, in writing, within thirty (30) days of the date of the first commercial sale of a Licensed Product to a third party by Licensee or a sublicensee.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

5.3 Royalty Reports and Payments. Licensee agrees that Licensor shall, if applicable, receive within forty-five (45) days after the end of each quarter of each calendar year:

(a) a complete and accurate royalty report showing the information and basis on which such amounts have been calculated, including disclosure of at least the following information:

i. [***];

ii. [***];

iii. [***];

iv. [***]; and

(b) payment of amounts due to Licensor pursuant to this Agreement, including, but not limited to, amounts pursuant to Articles IV and VI.

5.4 U.S. Dollars. All amounts payable by Licensee shall be paid in U.S. Dollars. Conversion from currencies other than U.S. Dollars shall be at the rate of exchange used by Licensee for its general accounting purposes, consistent with generally accepted accounting principles.

5.5 Report on Termination. Licensee also agrees to make a written report to Licensor within ninety (90) days after the expiration or termination of this Agreement, stating in such report the amounts payable hereunder and the basis therefor not previously reported to Licensor. In the event of a termination prior to expiration of the Term, Licensee shall also continue to make annual reports pursuant to the provisions of this Agreement covering sales, uses, or production and the applicable earned royalties and other amounts payable hereunder for Licensed Products made during the Term, but not used or sold until after termination thereof, until such time as all such makings, uses or sales shall have terminated. Concurrent with the submittal of such post-expiration or post-termination report, Licensee shall pay Licensor all applicable royalties and other amounts payable hereunder.

5.6 Books and Records. Licensee shall keep full, true, clear and accurate records and books of account with respect to the Licensed Products subject to royalty or other payments hereunder. Said records and books of account shall be kept by Licensee at the usual places where its like records and books are kept and shall be retained for a period of three (3) years following the end of the calendar year to which they pertain. Licensor shall have the right through an independent public accountant selected by Licensor and reasonably acceptable to Licensee to examine and inspect during normal business hours all such records and books of account and such other records and accounts as may under recognized accounting practices contain information reasonably bearing upon the amounts payable to it under this Agreement. Prompt adjustment shall be made by the proper party to compensate for any errors or omissions disclosed by such examination or inspection. In the event the examination or inspection results

in a discrepancy in the correctness of the payments due under this Agreement in an amount in excess of [***] of the payments due Licensor for any single quarter audited, Licensee shall reimburse Licensor for all reasonable out-of-pocket costs and fees associated with such examination or inspection, and all reasonable out-of-pocket costs and expenses required to collect the amount underpaid, including (but not limited to) reasonable attorneys' fees incurred in connection therewith. Neither such right to examine and inspect nor the right to receive such adjustment shall be affected by any statement to the contrary appearing on checks or otherwise, unless such statements appear in a letter, signed by the party having such right and delivered to the other party, expressly waiving such right. Notwithstanding the foregoing, Licensor may require Licensee to furnish any other information reasonably requested to enable Licensor to evaluate Licensee's performance in accordance with this Agreement.

5.7 Delinquent Payments. Payments provided for in this Agreement shall, when overdue, bear interest [***] per annum until paid, but in no event shall such interest exceed the usury limit, if any, as may exist from time to time in the State of Nevada. Each such payment when made shall be accompanied by all interest so accrued. Said interest and the payment and acceptance thereof shall not negate or waive the right of Licensor to seek any other remedy, legal or equitable, to which it may be entitled because of the delinquency of any payment or any other breach of this Agreement by Licensee.

ARTICLE VI

Diligence; Minimum Royalties

Licensee shall undertake to use commercially reasonable and diligent efforts for a company of Licensee's size and resources, directly or through a sublicensee, to develop or commercialize one or more Licensed Products, including its first Licensed Product by 2016 and a second Licensed Product by 2018. Licensee will be considered not to have utilized reasonable commercial efforts unless it (or a sublicensee) makes the following minimum annual royalty payments to Licensor:

(a) [***];

(b) [***]; and

(c) [***].

Such payments will be creditable against earned royalties otherwise due to Licensor for a given calendar year.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

ARTICLE VII

Protection of Patents

7.1 Protection. Each party agrees to cooperate fully in any action under this Article VII which is controlled by the other party, including by joining as a party to any proceeding if required by applicable law; provided that the controlling party reimburses the cooperating party promptly for any reasonable costs and expenses incurred by the cooperating party in connection with providing such assistance. [***]

7.2 Notice of Infringement; Licensor Enforcement of Third Party Infringement . Licensor and Licensee shall each give prompt written notice to the other of any infringement of a Licensed Patent by any third party as may come to its knowledge. [***]

7.3 Notice of Infringement; Claim of Licensee Infringement . Licensee shall promptly advise Licensor in writing of any notice or claim of any infringement and of the commencement against it of any suit or action for infringement of a third party patent made or brought against Licensee and based upon the use hereunder by Licensee of the Licensed Patents. [***]

(a) [***]

(b) [***]

7.4 Reasonable Assistance . [***]

7.5 Declaratory Judgment Actions . If a declaratory judgment action is brought naming Licensor or Licensee or any of its Affiliates or sublicensees as a defendant and alleging invalidity, unenforceability or non-infringement of any Licensed Patents, Licensee or Licensor, as the case may be, shall promptly notify the other party in writing. [***]

7.6 Patent Certifications. Each party shall notify and provide the other with copies of any allegations of alleged patent invalidity, unenforceability or non-infringement of a Licensed Patent pursuant to the FDA's Paragraph IV Patent Certification procedure by a third party filing an Abbreviated New Drug Application, an application under §505(b)(2) of the Federal Food, Drug and Cosmetics Act, or any other similar patent certification by a third party, and any foreign equivalent thereof. Such notification and copies shall be provided to the other party within five (5) business days after the party receives such certification.

ARTICLE VIII

Disclaimer of Liability and/or Warranty

8.1 No Warranty. Nothing in this Agreement shall be construed as:

(a) a warranty or representation by Licensor as to the validity or scope of any Licensed Patents; or

(b) a warranty or representation that anything Made, Used or Sold under any license granted in this Agreement is or will be free from infringement of patents, copyrights, and/or trademarks of third parties; or

(c) an express or implied warranty of merchantability or fitness for a particular purpose.

8.2 No Damages. Neither party shall be liable to the other party for indirect, special, consequential or punitive damages under any circumstances.

8.3 No Warranty of Quality or Usefulness. Licensor shall have no responsibility for the ability of Licensee to use such information, the quality or performance of any process or any Licensed Product produced by Licensee with the aid of such information, or with respect to claims of third parties arising from Licensee's use of such information.

8.4 Indemnification. Licensee shall assume all responsibility and liability for the sale, use, production, and/or commercialization of the Licensed Products, including, but not limited to, the safety, effectiveness, and reliability of the Licensed Products produced pursuant to this Agreement. Licensee further agrees to defend, indemnify, and hold harmless Licensor, its trustees, directors, officers, employees, agents, representatives, successors, assigns, affiliated entities and Other Corporations (as defined in Section 11.3 below) (collectively "Indemnitees'') from and against any and all liability, demands, damages, expenses and losses for death, personal injury, illness, or property damage, including the cost of defense against same, which may be asserted by third parties, or any third party claims which may arise from the sale, use, production, commercialization, or other disposition of Licensed Products pursuant to any right or license granted under this Agreement, except to the extent that such liability, demands, damages, expenses or losses relate to or arise out of Licensor's material breach of its representations, warranties and covenants under this Agreement, or Licensor's or Indemnitees' gross negligence or willful misconduct.

8.5 Insurance. Licensee agrees to purchase and/or maintain insurance coverage sufficient, taking into account its other assets, to establish the ability of Licensee to honor the indemnity made herein, and Licensor shall be listed as an additional named insured on any such insurance coverage. Licensee shall furnish evidence satisfactory to Licensor of its insurance coverage upon request of Licensor. Upon Licensee's, or any of its sublicensees', Making, Use or Sale of Licensed Products commercially, the initial amount of insurance coverage required is in the face amount of [***].

ARTICLE IX

Term; Termination

9.1 Term. The Term of this Agreement ("Term") shall continue until its expiration upon the later of: (a) there being no more Valid Claims within the Licensed Patents, or (b) the expiration of Licensee's royalty obligations on Licensed Products that are subject to an earned royalty, if such earned royalty is based on the minimum ten (10) year royalty period described in Section 4.2(b) above; unless this Agreement is earlier terminated as herein provided.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

9.2 Termination for Cause; Insolvency. If Licensee shall determine that it intends to file for bankruptcy or reorganization, it shall give prompt written notice to Licensor. Failure to give such notice shall cause immediate termination of this Agreement, and all rights of Licensee in the Licensed Patents shall automatically revert to Licensor. If Licensee shall become bankrupt; if the business or any assets or property of Licensee shall be placed in the hands of a receiver, assignee or trustee, whether by the voluntary act of Licensee or otherwise; if Licensee institutes or suffers to be instituted any procedure in bankruptcy court for reorganization or rearrangement of its financial affairs; if Licensee makes a general assignment for the benefit of creditors; or if Licensee or an Affiliate or a sublicensee (with the assistance, consent, approval or cooperation of Licensee) institutes or suffers to be instituted any procedure, administratively or in a court, challenging validity or patentability of any patent or patent application within the Licensed Patents, this Agreement shall immediately terminate, and all rights of Licensee in the Licensed Patents shall automatically revert to Licensor. Upon occurrence of any of the foregoing events, Licensee shall give prompt written notice thereof to Licensor.

9.3 Default. Upon any breach or default under this Agreement by Licensee, Licensor may give written notice thereof to Licensee, and Licensee shall have ninety (90) days thereafter to cure such breach or default, except in the event of a breach or default by non-payment, in which case the cure period shall be thirty (30) days. If such breach or default is not cured within such period, Licensor shall have the right in its sole option to cancel and terminate this Agreement and the licenses granted by it by giving written notice thereof to Licensee. In such event, Licensor may also seek such other relief as may be provided by law or in equity in such circumstances.

9.4 Commercialization Rights Upon Termination. Upon termination hereof under Section 9.2 or 9.3, all rights of Licensee in the Licensed Patents shall revert to Licensor, and Licensee agrees to execute appropriate written releases and/or assignments of such rights to Licensor; and further, Licensee agrees to discontinue the commercialization of the Licensed Patents. Upon expiration of the Term and Licensee's payment of all amounts due Licensor hereunder, Licensee will continue to have commercialization rights with respect to the Licensed Products with no further royalty obligation to Licensor, and Licensor will not license or otherwise grant rights to any third party inconsistent with such rights remaining exclusively in Licensee.

9.5 Provisions Surviving Termination. Articles X and XIII and Sections 8.1, 8.2, 8.3, 8.4, 9.4 and 11.3 of this Agreement shall survive expiration or termination of this Agreement.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

ARTICLE X

Representations and Warranties

10.1 Warranty to Title. Licensor represents and warrants that it owns the Licensed Patents and has the legal power and authority to extend the rights granted to Licensee pursuant to this Agreement, and that it has not assigned, licensed, pledged or compromised the Licensed Patents or made any commitments or offers inconsistent with or in derogation of the rights created by this Agreement.

10.2 Power and Authority. Licensee represents and warrants that (a) it has full power and authority to enter into this Agreement and to carry out the transactions contemplated hereby; and (b) this Agreement constitutes the legal, valid and binding obligation of Licensee, enforceable against Licensee in accordance with its terms.

10.3 Compliance with Laws. Licensee represents and warrants that it will comply with all applicable laws and regulations, including without limitation, all United States laws and regulations controlling the export of commodities and technical data. Licensee will be solely responsible for any violation of such laws or regulations by Licensee, and it will defend and hold Licensor harmless in the event of any legal action of any nature occasioned by such violation.

10.4 No Knowledge of Infringement. Licensor represents that it has no knowledge of any infringement of the Licensed Patents by any third party.

ARTICLE XI

Agency/Partnership/Use of Name

11.1 No Agency. Neither party shall be deemed to be an agent of the other party as a result of any transaction under or related to this Agreement, and shall not in any way pledge the other party's credit or incur any obligations on behalf of the other party.

11.2 No Partnership. This Agreement shall not constitute either a partnership or a joint venture, and neither party may be bound by the other to any contract, arrangement or understanding except as specifically stated herein.

11.3 Prohibition Against Use of Name. Except to the extent required to comply with applicable laws and regulations, without prior written consent obtained from Licensor, Licensee (including any Affiliate or sublicensee of Licensee) shall not use for purposes of sales, advertising, marketing, marking of goods, promotion to investors, press releases or other publicity, etc.: (i) the name of (or any other information which would identify) Licensor or any corporation which is controlled by the same persons who control Licensor ("Other Corporation"); (ii) the names of trustees, directors, officers, or employees of Licensor or an Other Corporation; or (iii) any trademarks (or adaptations thereof) of Licensor or an Other Corporation. The foregoing notwithstanding, without the consent of Licensor, Licensee may

indicate other than in advertising that it is licensed by Licensor under the Licensed Patents and identify the inventors, their affiliation with Licensor, and their relationship to Licensor, and further, Licensee may comply with disclosure requirements of all applicable laws relating to its business, including, without limitation, United States and state securities laws.

ARTICLE XII

Marking

To the extent commercially feasible and consistent with prevailing business practices, Licensee agrees to apply or have applied to all articles and to all containers containing Licensed Products manufactured by it or any sublicensee(s) under this Agreement the number of each issued patent under the Patent Rights that applies to such Licensed Product.

ARTICLE XIII

Nondisclosure of Confidential Information

All confidential or proprietary business, scientific and technical information communicated by one party to the other party under this Agreement, including information contained in unpublished patent applications, shall be kept confidential by such other party. Notwithstanding the foregoing, either party shall be relieved of the confidentiality obligations herein and not be prevented by this Agreement from utilizing any information received by it from the other party if:

(a) the information, at the time of disclosure, is in the public domain or, after disclosure, becomes part of the public domain through no act or omission of the receiving party;

(b) the receiving party can show that the information was in its possession at the time of disclosure and was not acquired, directly or indirectly, from the disclosing party;

(c) the information is lawfully obtained or received on a non-confidential basis from a third party, other than the disclosing party, having the legal right to transmit same; or

(d) the disclosure of such information is essential for the commercial exploitation of the Licensed Patents under this Agreement, provided that such information is disclosed subject to a secrecy agreement.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

ARTICLE XIV

Miscellaneous

14.1 Captions. The captions herein are for convenience only and shall not be deemed to limit or otherwise affect the construction hereof.

14.2 Notices. Any notice or other communication hereunder must be given in writing and (a) delivered in person, (b) transmitted by telefax or other telecommunications mechanism, (c) mailed by certified or registered mail, postage prepaid, receipt requested, or (d) sent by overnight delivery with charges prepaid and receipt acknowledged, as follows:

If to Licensor, addressed to:

Research Development Foundation
402 North Division Street
Carson City, Nevada 89703
Attn: Andrew MacKenzie, Esq.
Phone: (775) 882-0202
Fax: (775) 882-7918

If to Licensee, addressed to:

bluebird bio, inc.
840 Memorial Drive
Cambridge, Massachusetts 02139
Attn: Head of Business Development
Phone: (617) 873-0900
Fax: (617) 576-2421

or to such other address or to such other person as the party shall have last designated by such notice to the other party. Each such notice or other communication shall be effective when actually received at such address.

14.3 Assignment. This Agreement, in whole or in part, shall not be assignable by either party without prior written consent of the other party (unless to a successor entity to such party by merger, acquisition, consolidation or other non-bankruptcy reorganization or sale of substantially all of its assets or that portion of its business to which this Agreement relates), and any attempted assignment without such consent shall be void.

14.4 No Waiver. The failure of either party to enforce at any time any of the provisions of this Agreement, or any rights in respect thereto, or to exercise any election herein provided, shall in no way be considered to be a waiver of such provisions, rights, or elections, or in any way to affect the validity of this Agreement. The exercise by either party of any of its rights herein or any of its elections under the terms or covenants herein shall not preclude either party from exercising the same or any other rights it may have under this Agreement, irrespective of any previous action or proceeding taken by either party hereunder.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

14.5 Choice of Law and Jurisdiction. This Agreement shall be governed and construed in accordance with the laws of the State of Nevada, U.S.A. applicable to contracts made in such State without regard to conflicts of law doctrines, and the parties agree that jurisdiction and venue for any dispute regarding this Agreement will be in such State.

14.6 Severability. If any provision of this Agreement is judicially determined to be void or unenforceable, such provision shall be construed to be severable from the other provisions of this Agreement, which shall retain full force and effect.

14.7 Further Acts. The parties hereto agree promptly to execute, forward, or otherwise provide all documents and material necessary or desirable to effectuate this Agreement.

14.8 Entire Agreement. This Agreement constitutes the entire agreement between the parties with respect to the subject matter hereof and shall supersede all previous communications, either oral or written, between the parties hereto with respect to the subject matter hereof. No agreement or understanding bearing on the same shall be binding upon either party hereto unless it shall be in writing and signed by the duly authorized officer or representative of each of the parties and shall expressly refer to this Agreement.

14.9 Successors and Assigns. This Agreement shall be binding on and shall inure to the benefit of the parties hereto, and their respective successors and assigns.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be duly executed in multiple originals by their duly authorized representatives.

RESEARCH DEVELOPMENT FOUNDATION

By: /s/ Andrew MacKenzie

Print Name: Andrew MacKenzie

Title: Vice President

BLUEBIRD BIO, INC.

By: /s/ Nick Leschly

Print Name: Nick Leschly

Title: CEO

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

EXHIBIT 1

Licensed Patents

[See attached insert from F&J Master Listings]

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FULBRIGHT & Jaworski L.L.P. Attorneys at Law

Research Development Foundation by Alias

Master Listing of Technologies

10/04/2011

CLFR: 010 TITLE: [***]
Summary: [***]

Client Reference No.: NULL

[***]

Country	Case	Status	Application No.	Filing Date	Patent No.	Granted
[***]						

CLFR: 011 TITLE: [***]
Summary: [***]

Client Reference No.: CLFR:011

[***]

Country	Case	Status	Application No.	Filing Date	Patent No.	Granted
[***]						

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FULBRIGHT & Jaworski L.L.P. Attorneys at Law

Research Development Foundation by Alias

Master Listing of Technologies

10/04/2011

CLFR: 014 TITLE: [***]
Summary: [***]

Client Reference No.: NULL

[***]

Country	Case	Status	Application No.	Filing Date	Patent No.	Granted
[***]						

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EXHIBIT 2

Milestone Payments

Except as provided herein, milestone payments in the following amounts shall be paid for each Licensed Product requiring marketing approval, payable on a product-by-product basis:

[***]

Each milestone shall be payable one time only, on a Licensed Product-by-Licensed Product basis.

In the event that a Licensed Product achieves the milestone on more than one occasion, only the first achievement of such shall be subject to milestone consideration. For example, [***].

Exhibit 10.10

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

NOVATION AGREEMENT

This Agreement between THE BOARD OF TRUSTEES OF THE LELAND STANFORD JUNIOR UNIVERSITY ("Stanford"), an institution of higher education having powers under the laws of the State of California, and bluebird bio, Inc., a corporation having a principal place of business at 840 Memorial Drive, Cambridge, MA 02139 is effective on the 2nd day of April, 2012 ("Effective Date").

1 BACKGROUND

Stanford has rights to biological material known as 293T Cell Line. It was developed in the laboratory of Dr. Michele Calos, and is described in Stanford Docket S97-079. The biological material was developed in the course of research supported by the National Institutes of Health. Stanford wants to have the biological material developed and marketed as soon as possible so that resulting products may be available for public use and benefit.

Stanford and BBB (formerly Genetix Pharmaceuticals Inc.) are parties to a previous agreement concerning the Biological Material dated July 11, 2002, hereafter "Prior Agreement". Stanford and BBB wish to amend and restate said Prior Agreement by this Novation Agreement ("Agreement"), beginning as of the Effective Date of this Agreement.

2 DEFINITIONS

2.1 "BBB" means bluebird bio, Inc. and its Affiliates. "Affiliates" any person, corporation, or other business entity which controls, is controlled by, or is under common control with BBB; and for this purpose, "control" of a corporation means the direct or indirect ownership of more than fifty percent (50%) of its voting stock, and "control" of any other business entity means the direct or indirect ownership of greater than a fifty percent (50%) interest in the income of such entity.

2.2 "Biological Material" means the 293T cell line previously provided to BBB under the Prior Agreement.

2.3 "Licensed Field of Use" means any commercial and/or non-commercial use of Biological Material for:

- research, and non-clinical and clinical development purposes; and
- human and animal gene therapy products.

2.4 "Licensed Product" means a product or part of a product in the Licensed Field of Use containing, derived from, or made using Biological Material.

2.5 "Licensed Territory" means worldwide.

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2.6 "Net Sales" means all gross revenue actually received by BBB, from the sale, transfer or disposition of Licensed Product to a third party. Net Sales excludes the following items (but only as they pertain to the making, using, importing or selling of Licensed Products, are included in gross revenue, and are separately billed):

(A) import, export, excise and sales taxes, and custom duties;

(B) costs of insurance, packing, and transportation from the place of manufacture to the customer's premises or point of installation;

(C) credit for returns, allowances, or trades; and

(D) cash, trade or quantity discounts actually granted to third parties.

For clarity, Net Sales does not include (i) any payments received by BBB, its affiliates, or sublicensees in consideration of a Sublicense; or (ii) transfers of a Licensed Product between any of BBB, an affiliate or a sublicensee for sale by the transferee.

2.7 "Stanford Indemnitees" means Stanford and Stanford Hospitals and Clinics, and their respective trustees, officers, employees, students, and agents.

3 GRANT

3.1 **Grant.** Subject to the terms and conditions of this Agreement, Stanford hereby grants BBB a license under the Biological Material in the Licensed Field of Use to make, have made, use, have used, import, have imported, offer to sell, have offered to sell, sell and have sold Licensed Product in the Licensed Territory.

3.2 **Nonexclusivity.** The license is nonexclusive in the Licensed Field of Use beginning on April 2, 2012 and expiring April 2, 2037. BBB may elect to extend the term of this Agreement for additional twenty five (25) year periods upon written notice to Stanford, without further consideration or amendment to this agreement; provided however, that i) such notice of extension must include verification by BBB that it has a commercial product on the market at that time, and ii) BBB is in material compliance with this Agreement at that time. If either of these conditions is not met, BBB and Stanford may elect to extend the term of this Agreement by mutual consent.

3.3 **Retained Rights.** Stanford retains title to all Biological Materials.

3.4 **Specific Exclusion.** Stanford does not:

(A) grant to BBB any other licenses, implied or otherwise, to any patents or other rights of Stanford regardless of whether the patents or other rights are required to exploit any Biological Material; and

(B) agree to furnish to BBB any technology or technological information other than the Biological Material or to provide BBB with any assistance.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

4 SUBLICENSING

4.1 **Permitted Sublicensing.** BBB may grant sublicenses to its rights under this Agreement in the Licensed Field of Use to third parties. Such Sublicensees may then grant further sublicenses to other third parties for the purpose of the development, manufacturing, marketing, selling, importing and distribution of Licensed Products; provided however that (i) Sublicensees shall first submit to Stanford the identity of such other third party, along with a summary of the purpose for such further sublicense and (ii) Stanford shall then provide Sublicensee its prompt, prior written consent, which shall not be unreasonable withheld or conditioned.

4.2 **Sublicense Requirements.** Any Sublicense:

(A) is subject to this Agreement;

(B) will expressly include the provisions of Articles 8, 9, and 10 for the benefit of Stanford; and

(C) will require the transfer of all the sublicensee's obligations to BBB specifically relating to the sublicense, including the payment of royalties related to the Biological Material specified in the sublicense, to Stanford or its designee, if this Agreement is terminated.

(D) BBB will submit to Stanford a copy of each sublicense promptly following execution.

4.3 **Sublicense Consideration.** BBB will pay Stanford a [***] payment in consideration of said sublicense, unless such sublicense is to a collaborating partner, contract manufacturer or contract research organization during the term of the agreement between BBB and such partner/contractor. If sublicensee already has a license for the research use of the Biological Material, said milestone payment will be reduced to [***]. If the sublicensee already has a license for the commercial use of the Biological Material, said milestone payment will not be due.

5 GOVERNMENT RIGHTS

This Agreement is subject to Title 35 Sections 200-204 of the United States Code. Among other things, these provisions provide the United States Government with nonexclusive rights to the Biological Material. BBB will ensure all obligations of these provisions are met.

6 ROYALTIES

6.1 **Issue Royalty.** BBB will pay to Stanford a noncreditable, nonrefundable license issue royalty of [***] within thirty (30) days after signing this Agreement. Upon receipt of payment, Stanford will send Biological Material to BBB.

6.2 **License Maintenance Fee**. Beginning April 2, 2013, and each April 2, thereafter, BBB will pay Stanford a yearly license maintenance fee based on the Net Sales of Licensed Products as follows:

[***];

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

[***]

[***]

[***]

Yearly maintenance payments are nonrefundable, but they are creditable each year as described in Section 6.4.

6.3 **Earned Royalty.** BBB will pay Stanford earned royalties on Net Sales as follows:

Licensed Products for Research Use [***] of Net Sales

Licensed Products for human and animal lentivirus based gene therapy products:

[***]

[***]

These percentages shall be reduced by [***] for each third party license that requires payment(s) by BBB with respect to a Licensed Products; provided however, the royalty owed to Stanford under this Section 6.3 shall not be less than [***] on this basis.

6.4 **Creditable Payments.** The license maintenance fee for a year may be offset against earned royalty payments due on Net Sales occurring in that year.

For example:

(A) if BBB pays Stanford a $10 maintenance payment for year Y, and according to Section 6.3 $15 in earned royalties are due Stanford for Net Sales in year Y, BBB will only need to pay Stanford an additional $5 for that year's earned royalties due on Net Sales.

(B) if BBB pays Stanford a $10 maintenance payment for year Y, and according to Section 6.3 $3 in earned royalties are due Stanford for Net Sales in year Y, BBB will not need to pay Stanford any earned royalty payment due on Net Sales for that year. BBB will not be able to offset the remaining $7 against a future year's earned royalties.

6.5 **No Escrow.** BBB shall not pay royalties into any escrow or other account.

6.6 **Currency.** BBB will calculate the royalty on sales in currencies other than U.S. Dollars using the appropriate foreign exchange rate for the currency quoted by the Bank of America (San Francisco) foreign exchange desk, on the close of business on the last banking day of each calendar quarter. BBB will make royalty payments to Stanford in U.S. Dollars.

6.7 **Non-U.S. Taxes.** BBB will pay all non-U.S. taxes related to royalty payments. These payments are not deductible from any payments due to Stanford.

6.8 **Interest.** Any payments not made when due will bear interest at the lower of (a) [***] or (b) the maximum rate permitted by law.

7 ROYALTY REPORTS, PAYMENTS, AND ACCOUNTING

7.1 **Earned Royalty Payment and Report.** Beginning with the first commercial sale of a Licensed Product to a third party, BBB will submit to Stanford a written report (even if there are no commercial sales) and an earned royalty payment within sixty (60) days after the end of each calendar year [***], and within sixty (60) days after the end of each calendar quarter thereafter. This report will be in the form of Appendix A and will state the number, description, and aggregate Net Sales of Licensed Product during the completed calendar quarter. With each report BBB will include any earned royalty payment due Stanford for the completed calendar quarter (as calculated under Section 6.3 and subject to Section 6.4.)

7.2 **Termination Report.** BBB will pay to Stanford all applicable royalties and submit to Stanford a written report within ninety (90) days after the license terminates. BBB will continue to submit earned royalty payments and reports to Stanford after the license terminates, until all Licensed Products made or imported under the license have been sold.

8 EXCLUSIONS AND NEGATION OF WARRANTIES

8.1 **Representation.** Stanford represents that it has the right to enter into this Agreement and grant the rights and licenses hereunder.

8.2 **Negation of Warranties.** Except as provided in Section 8.1, Stanford provides BBB the rights granted in this Agreement AS IS and WITH ALL FAULTS. Stanford makes no representations and extends no warranties of any kind, either express or implied. Among other things, Stanford disclaims any express or implied warranty:

(A) of merchantability, of fitness for a particular purpose,

(B) of non-infringement or

(C) arising out of any course of dealing.

8.3 **No Representation of Biological Material.** BBB also acknowledges that Stanford does not represent or warrant that the exploitation of Biological Material will be successful.

9 INDEMNITY

9.1 **Indemnification.** BBB will indemnify, hold harmless, and defend all Stanford Indemnitees against any third party claim of any kind arising out of or related to the exercise of any rights granted BBB under this Agreement or the breach of this Agreement by BBB.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

9.2 **No Indirect Liability.** Neither party will be liable to the other for any indirect, special, consequential, or other damages whatsoever, whether grounded in tort (including negligence), strict liability, contract, or otherwise arising out of or in connection with solely this Agreement under any theory of liability, provided, however, that the foregoing will not apply to any right of action for infringement, contributory infringement or inducement of infringement Stanford may have under any applicable law. Stanford will not have any responsibilities or liabilities whatsoever with respect to Licensed Product(s).

9.3 **Workers' Compensation.** BBB will comply with all statutory workers' compensation and employers' liability requirements for activities performed under this Agreement.

9.4 **Insurance.** During the term of this Agreement, BBB will maintain Comprehensive General Liability Insurance, including Product Liability Insurance, with a reputable and financially secure insurance carrier to cover the activities of BBB. The insurance will provide minimum limits of liability of [***]. Insurance must cover claims incurred, discovered, manifested, or made during or after the expiration of this Agreement and must be placed with carriers with ratings of at least A- as rated by A.M. Best. Within 15 days of the Effective Date of this Agreement, BBB will furnish a Certificate of Insurance evidencing primary coverage and additional insured requirements. BBB will provide to Stanford 30 days prior written notice of cancellation or material change to this insurance coverage. BBB will advise Stanford in writing that it maintains excess liability coverage (following form) over primary insurance for at least the minimum limits set forth above. All insurance of BBB will be primary coverage; insurance of Stanford and Stanford Hospitals and Clinics will be excess and noncontributory.

10 STANFORD NAMES AND MARKS

BBB will not identify Stanford in any promotional statement, or otherwise use the name of any Stanford faculty member, employee, or student, or any trademark, service mark, trade name, or symbol of Stanford or Stanford Hospitals and Clinics, including the Stanford name, unless BBB has received Stanford's prior written consent. Permission may be withheld at Stanford's sole discretion. Notwithstanding the foregoing, without the consent of Stanford, BBB may state to its actual and prospective investors, strategic partners and sublicensees that it is licensed under the Biological Material, and further BBB may comply with disclosure requirements of all applicable laws relating to its business, including, without limitation, United States and state securities laws.

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11 TERMINATION

11.1 **Termination by BBB.**

(A) BBB may terminate this Agreement by giving Stanford written notice at least 30 days in advance of the effective date of termination selected by BBB.

(B) As of the effective date of termination, BBB will:

(1) cease use and sale of Biological Material and any Licensed Products; and

(2) return to Stanford or destroy all Biological Material.

11.2 **Termination by Stanford**.

(A) Stanford may also terminate this Agreement if BBB:

(1) is delinquent on any report or payment;

(2) is not using commercially reasonable efforts to develop, manufacture and/or commercialize one or more Licensed Products or to enter into a partnering or collaboration agreement or corporate transaction with respect to Licensed Products;

(3) is in material breach of any provision; or

(4) provides any false report.

(B) Termination under this Section 11.2 will take effect 30 days after written notice by Stanford unless BBB remedies the problem in that 30-day period, except for Sections 11.2(A)(2), in which case termination will take place 120 days after written notice by Stanford unless BBB remedies the problem in that 120-day period.

(C) As of the effective date of termination, BBB will:

(1) cease use and sale of Biological Material and any Licensed Products; and

(2) return to Stanford or destroy all Biological Material.

11.3 **Surviving Provisions.** Surviving any termination or expiration are:

(A) BBB's obligation to pay royalties accrued or accruable;

(B) any claim of BBB or Stanford, accrued or to accrue, because of any breach or default by the other party; and

(C) the provisions of Articles 6.4, 7, 8, and 9, and any other provision that by its nature is intended to survive.

12 ASSIGNMENT

The rights and obligations of the parties under this Agreement may not be assigned or otherwise transferred without the written consent of Stanford and BBB; however, no consent is needed for an assignment to an entity which acquires a party (which

acquisition may be by merger, purchase of assets, or change of control), so long as the acquiring entity agrees in writing to be bound by the terms of this Agreement. In the event of any acquisition of BBB, Stanford agrees to execute whatever agreements are necessary, if any, to assure the transfer of the rights and obligations herein to the succeeding entity.

13 EXPORT

BBB and its affiliates and sublicensees shall comply with all United States laws and regulations controlling the export of licensed commodities and technical data. (For the purpose of this paragraph, "licensed commodities" means any article, material or supply but does not include information; and "technical data" means tangible or intangible technical information that is subject to US export regulations, including blueprints, plans, diagrams, models, formulae, tables, engineering designs and specifications, manuals and instructions.) These laws and regulations may include, but are not limited to, the Export Administration Regulations (15CFR 730-774), the International Traffic in Arms Regulations (22 CFR 120-130) and the various economic sanctions regulations administered by the US Department of the Treasury (31 CFR 500-600).

Among other things, these laws and regulations prohibit or require a license for the export or retransfer of certain commodities and technical data to specified countries, entities and persons. BBB hereby gives written assurance that it will comply with, and will cause its affiliates and sublicensees to comply with all United States export control laws and regulations, that it bears sole responsibility for any violation of such laws and regulations by itself or its affiliates or sublicensees, and that it will indemnify, defend and hold Stanford harmless for the consequences of any such violation.

14 ARBITRATION

Any dispute between the parties regarding any payments made or due under this Agreement will be settled by arbitration in accordance with the JAMS Arbitration Rules and Procedures. The parties are not obligated to settle any other dispute that may arise under this Agreement by arbitration.

15 NOTICES

All notices under this Agreement are deemed fully given when written, addressed, and sent as follows:

All general notices to BBB are mailed to:

Head of Business Development

Bluebird Bio, Inc.

840 Memorial Drive.

Cambridge, MA 02139

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All financial invoices to BBB (i.e., accounting contact) are e-mailed to:

[***]

With a copy to: [***]

All progress report invoices to BBB (i.e., technical contact) are e-mailed to:

[***]

All general notices to Stanford are e-mailed or mailed to:

Office of Technology Licensing

1705 El Camino Real

Palo Alto, CA 94306-1106

[***]

All payments to Stanford are mailed to:

Stanford University

Office of Technology Licensing

Department #44439

P.O. Box 44000

San Francisco, CA 94144-4439

All progress reports to Stanford are e-mailed or mailed to:

Office of Technology Licensing

1705 El Camino Real

Palo Alto, CA 94306-1106

[***]

Either party may change its address with written notice to the other party.

16 MISCELLANEOUS

16.1 **Waiver.** No term of this Agreement can be waived except by the written consent of the party waiving compliance.

16.2 **Choice of Law.** This Agreement and any dispute arising under it is governed by the laws of the State of California, United States of America, applicable to agreements negotiated, executed, and performed within California, without reference to its conflicts of laws principles.

16.3 **Exclusive Forum.** Subject to Section 14, the state and federal courts having jurisdiction over Stanford, California, United States of America, provide the

exclusive forum for any court action between the parties relating to this Agreement. BBB submits to the jurisdiction of such courts, and waives any claim that such a court lacks jurisdiction over BBB or constitutes an inconvenient or improper forum.

16.4 **Headings.** No headings in this Agreement affect its interpretation.

16.5 **Electronic Copy.** The parties to this document agree that a copy of the original signature (including an electronic copy) may be used for any and all purposes for which the original signature may have been used. The parties further waive any right to challenge the admissibility or authenticity of this document in a court of law based solely on the absence of an original signature.

The parties execute this Agreement in duplicate originals by their duly authorized officers or representatives.

THE BOARD OF TRUSTEES OF THE LELAND STANFORD JUNIOR UNIVERSITY

Signature: /s/ Katharine Ku

Name: Katharine Ku

Title: Director, Technology Licensing

Date: April 12, 2012

BLUEBIRD BIO

Signature: /s/ Nick Leschly

Name: Nick Leschly

Title: Chief Executive Officer

Date: 4/2/12

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APPENDIX A

SAMPLE REPORTING FORM

Stanford Docket No. S97-079

This report is provided pursuant to the license agreement between Stanford University and bluebird bio, Inc.
License Agreement Effective Date: April 2, 2012

Report Covering Period	
Yearly Maintenance Fee	$
Net Sales	$
Royalty Calculation	
Royalty Subtotal	$
Credit	$
Royalty Due	$

Comments:

Exhibit 10.11

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Master Collaboration Agreement

by and between

bluebird bio, Inc.

and

Celgene Corporation

March 19, 2013

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List of Exhibits

Exhibit A	License Agreement
Exhibit B	Co-Development, Co-Promote and Profit Share Agreement
Exhibit C	Pre-Existing In-Licenses
Exhibit D	Collaboration Plan
Exhibit E	Bluebird Collaboration In-Licenses
Exhibit F	Additional Celgene Option Information
[***]	
Exhibit H	Redacted Master Collaboration Agreement
Exhibit I	Press Release
Exhibit J	Bluebird Patents
Exhibit K	Bluebird Agreements
Exhibit L	Call Option

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Master Collaboration Agreement

This Master Collaboration Agreement (this "Agreement"), dated as of March 19, 2013, 2013 (the "Effective Date"), is made by and between bluebird bio, Inc., a Delaware corporation ("Bluebird"), and Celgene Corporation, a Delaware corporation ("Celgene"). Each of Bluebird and Celgene may be referred to herein as a "Party" or together as the "Parties."

WHEREAS, Bluebird has developed and owns or has rights to certain Patents and technology relating to developing innovative gene therapies for genetic disorders;

WHEREAS, Celgene is a biopharmaceutical company focused on acquiring, Developing and Commercializing innovative anti-cancer agents; and

WHEREAS, the Parties are interested in collaborating together to research, develop and commercialize therapeutic products in the Field, all in accordance with the terms and conditions set forth below;

NOW, THEREFORE, in consideration of the mutual covenants contained herein, and for other good and valuable consideration, the amount and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

1. Definitions.

The following terms and their correlatives will have the following meanings:

1.1 "Affiliate" of a Person means any other Person which (directly or indirectly) is controlled by, controls or is under common control with such Person. A Person will be deemed to "control" another Person if it: (a) with respect to such other Person that is a corporation, owns, directly or indirectly, beneficially or legally, at least fifty percent (50%) of the outstanding voting securities or capital stock (or such lesser percentage which is the maximum allowed to be owned by such Person in a particular jurisdiction) of such other Person, or, with respect to such other Person that is not a corporation, has other comparable ownership interest; or (b) has the power, whether pursuant to contract, ownership of securities or otherwise, to direct the management and policies of such other Person.

1.2 "Baylor" means Baylor College of Medicine.

1.3 "Baylor Agreements" means (i) the Research and Collaboration Agreement (dated as of the date hereof) by and between Baylor and Celgene (" Baylor Research Agreement"), (ii) the Platform Technology License Agreement (dated as of the date hereof) by and between Baylor and Celgene (" Baylor Platform License"), and (iii) any Product License Agreement (" Baylor Product License"), in each case ((i) – (iii)) as may be amended or restated.

1.4 "Biologics License Application" or "BLA" means, with respect to a country or extra-national territory, a request for permission to introduce, distribute, sell or market a biologic product in such country or some or all of such extra-national territory, including pursuant to 21 CFR 601.2 in the U.S.

1.5 "Bluebird In-Licensed IP" means all Patents, Materials and Know-How in-licensed by Bluebird or its Affiliates during the Collaboration Program Term pursuant to Bluebird In-Licenses that are necessary or useful to perform the Collaboration Program.

1.6 "Bluebird In-Licenses" means Pre-Existing In-Licenses and Bluebird Collaboration In-Licenses.

1.7 "Bluebird IP" means (i) Collaboration IP solely owned by Bluebird pursuant to Section 2.1(f), (ii) Bluebird In-Licensed IP and (iii) all Patents, Materials and Know-How Controlled by Bluebird or its Affiliates (other than Bluebird In-Licensed IP), in each case that is necessary or useful to perform the Collaboration Program. For avoidance of doubt, Collaboration IP jointly owned by the Parties pursuant to Section 2.1(f) will not be deemed Bluebird IP.

1.8 "Bluebird New In-License" means a New In-License between Bluebird or any of its Affiliates and a Third Party.

1.9 "Business Combination" means with respect to a Party, any of the following events: (i) any Third Party (or group of Third Parties acting in concert as a "group" within the meaning of Section 13(d) of the Exchange Act) acquires (including by way of a tender or exchange offer or issuance by such Party), directly or indirectly, beneficial ownership or a right to acquire beneficial ownership of shares of such Party representing fifty percent (50%) or more of the voting shares (where voting refers to being entitled to vote for the election of directors) then outstanding of such Party, but excluding for such purposes any transaction or series of transactions with Financial Investors made for bona fide equity financing purposes in which cash is received by Bluebird or indebtedness of Bluebird is cancelled or converted or a combination thereof; (ii) such Party consolidates with or merges into another corporation or entity which is a Third Party, or any corporation or entity which is a Third Party consolidates with or merges into such Party, in either event pursuant to a transaction in which more than fifty percent (50%) of the voting shares of the acquiring or resulting entity outstanding immediately after such consolidation or merger is not held by the holders of the outstanding voting shares of such Party immediately preceding such consolidation or merger; or (iii) such Party sells, transfers, leases or otherwise disposes of all or substantially all of its assets to a Third Party. " Financial Investor" means any investor or series of Affiliated investors whose primary business is the investment of capital for financial gain (including venture capital funds, private equity funds, pension funds and so-called "angel investors"), but in all cases excluding so-called "strategic investors" such as biotechnology companies, specialty pharmaceutical companies, pharmaceutical companies, generic pharmaceutical companies, and medical device companies and their Affiliates such as strategic venture arms.

1.10 "CAR" means chimeric antigen receptor.

1.11 "Celgene In-Licensed IP" means all Patents, Materials and Know-How in-licensed by Celgene or its Affiliates during the Collaboration Program Term pursuant to Applicable Celgene In-Licenses that are necessary or useful for the research, Development or Manufacture of Product Candidates in the Field.

1.12 "Celgene In-Licenses" means the (i) Celgene Pre-Existing In-Licenses and (ii) Celgene New In-Licenses. For clarity, the Baylor Agreements will not be considered a Celgene In-License hereunder.

1.13 "Celgene IP" means, collectively:

(a) "Celgene Know-How," which means Know-How and Materials that (i) are Controlled by Celgene or any of its Affiliates (other than pursuant to a Celgene In-License) as of the Effective Date or thereafter during the Term, (ii) arise outside of the Collaboration Program, (iii) are provided by Celgene to the Collaboration Program pursuant to Section 2.1(i) for the Parties' research, Development or Manufacture of Product Candidates in the Field and (iv) are necessary or useful for the research, Development or Manufacture of Product Candidates in the Field; and

(b) "Celgene Patents," which means Patents Controlled by Celgene or any of its Affiliates (other than pursuant to a Celgene In-License) as of the Effective Date or thereafter during the Term that Cover Celgene Know-How that are provided by Celgene to the Collaboration Program pursuant to Section 2.1(i);

(c) Any Celgene In-Licensed IP; and

(d) Any Collaboration IP solely owned by Celgene pursuant to Section 2.1(f).

For avoidance of doubt, Collaboration IP jointly owned by the Parties pursuant to Section 2.1(f) will not be deemed Celgene IP.

1.14 "Celgene New In-License" means a New In-License between Celgene or any of its Affiliates and a Third Party.

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1.15 "Celgene Pre-Existing In-Licenses" means any agreement between Celgene or any of its Affiliates and a Third Party executed prior to the Effective Date pursuant to which Celgene or any of its Affiliates in-licenses any Know-How, Materials or Patents that is necessary or useful for the research, Development, Manufacture or commercialization of Product Candidates in the Field. For clarity, the Baylor Agreements and Celgene New In-Licenses will not be considered Celgene Pre-Existing In-Licenses hereunder.

1.16 "cGMP" means all applicable standards relating to manufacturing practices for pharmaceutical products, including (a) all applicable requirements detailed in the FDA's current Good Manufacturing Practices regulations, 21 CFR Parts 210 and 211 and The Rules Governing Medicinal Products in the European Community, Volume IV, Good Manufacturing Practice for Medicinal Products, as each may be amended from time to time, and (b) all applicable Laws promulgated by any governmental authority having jurisdiction over the Manufacture of a Compound, Licensed Compound or Licensed Product, as applicable.

1.17 "Collaboration IP" means all Collaboration Know-How and Patents arising therefrom that Cover the Collaboration Know-How.

1.18 "Collaboration Know-How" means all Know-How and Materials discovered, created, conceived, developed or reduced to practice in the course of performing activities under the Collaboration Program (whether solely by one Party or jointly by the Parties, in each case with their Affiliates or any Third Parties or any employees, consultants or agents of any of the foregoing which perform activities under the Collaboration Program).

1.19 "Collaboration Program" means the program of research and Development in the Field that is engaged in by or on behalf of the Parties under this Agreement during the Collaboration Program Term.

1.20 "Commercially Reasonable Efforts" means, with respect to the research and Development of Product Candidates, that level of efforts and resources that such Party would normally devote to the research or Development, as the case may be, of a product owned by it or to which it has rights of the type it has hereunder, which is of a similar commercial potential at a similar stage in its lifecycle, in each case taking into account issues of safety and efficacy, product profile, the proprietary position, the then current competitive environment for such product and the likely timing of such product's entry into the market, the pricing and launching strategy for the respective product, the regulatory environment and status of such product, and other relevant scientific, technical and commercial factors.

1.21 "Control" or "Controlled" means, with respect to any Know-How, Material or Patent, the possession (whether by ownership or license or sublicense) by a Party of the ability to use or practice such Know-How, Material, Patent, Regulatory Data, Regulatory Filings or Regulatory Approvals to perform the Collaboration Program or otherwise to grant to the other Party a license or access as provided herein to such item, without violating the terms of any agreement or other arrangement with any Third Party or, other than under the Bluebird In-Licenses, being obligated to pay any royalties or other consideration therefor ("Additional Payments"). For clarity, Bluebird New In-Licenses are not "Controlled" for purposes of this Agreement, unless and only after such Bluebird New In-License is converted into a Bluebird Collaboration In-License pursuant to Sections 4.1(b) or 4.1(d) and all required payments thereunder have been made by Celgene to Bluebird. For clarity, Celgene In-Licenses are not "Controlled" for purposes of this Agreement, unless and only after the Parties mutually agree to include such Celgene In-License in the Collaboration Program pursuant to Section 4.1(c). Notwithstanding the foregoing, if on or after the Effective Date and for such time as the other Party agrees to pay and does in fact pay all

Additional Payments with respect to such Party's access or license to such Know-How, Material, Patent, Regulatory Data, Regulatory Filings and Regulatory Approvals (other than that in-licensed by Bluebird pursuant to a Bluebird In-License), such Know-How, Material, Patent, Regulatory Data, Regulatory Filings and Regulatory Approvals will be deemed to be included in the definition of "Control".

1.22 "Covers", with reference to (i) a Patent, means that the making, using, selling, offering for sale or importing of a product or practice of a method would infringe a Valid Claim of such Patent in the country in which such activity occurs, and (ii) Materials or Know-How, means that the Manufacture, Development or Commercialization of a product incorporates, embodies or otherwise makes use of such Know-How.

1.23 "Declined Product Candidate Study" means (i) a Phase 3 Study that is intended by Bluebird (consistent with industry practice) to be submitted (together with any other registration trials that are prospectively planned when such Phase 3 Study is initiated) for Regulatory Approval of a Declined Product Candidate in the U.S. or the EU, (ii) a Phase 2/3 Study that is intended by Bluebird (consistent with industry practice) to be submitted (together with any other registration trials that are prospectively planned when such Phase 2/3 Study is initiated) for Regulatory Approval of a Declined Product Candidate in the U.S. or the EU, at such time when Bluebird obtains data from the Phase 2 portion of such Phase 2/3 Study and commences the Phase 3 portion of such Phase 2/3 Study, or (iii) any other clinical study that is designed to establish that a pharmaceutical product is safe and efficacious for its intended use, and to determine warnings, precautions, and adverse reactions that are associated with such pharmaceutical product in the dosage range to be prescribed, which clinical study is a registration trial intended to be sufficient for filing an application for a Regulatory Approval for the Declined Product Candidate in the U.S. or another country or some or all of an extra-national territory, as evidenced by the acceptance for filing for a Regulatory Approval for such product after completion of such study. For purposes of this Agreement, "completion of a Declined Product Candidate Study" means the date on which a final and complete clinical study report for the Declined Product Candidate Study, based on the complete and cleaned dataset from such Declined Product Candidate Study, which dataset includes a minimum of three (3) months follow-up of all patients in such Declined Product Candidate Study, is provided to Celgene.

1.24 "Declined Product Candidate Development Costs" means, with respect to a Declined Product Candidate, Bluebird's FTE Costs and out-of-pocket costs directly identifiable or allocable to the Development of such Declined Product Candidate by Bluebird, its Affiliates or others working on their behalf, as applicable, following the date of Bluebird's delivery of a Bluebird Development Notice for such Declined Product Candidate. Such costs will be calculated and allocated in accordance with methodologies based on Bluebird's then current internal accounting systems, consistently applied, and in accordance with U.S. generally accepted accounting principles or International Financial Reporting Standards, consistently applied. For clarity, Declined Product Candidate Development Costs will include amounts paid by Bluebird to Celgene with respect to payments due under any Applicable Celgene In-License attributable to Bluebird as a sublicensee thereunder with respect to the Development of such Declined Product Candidate.

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1.25 "Development" means preclinical and clinical drug development activities, including: test method development and stability testing, toxicology, formulation, process development, qualification and validation, Manufacture scale-up, development-stage Manufacturing, quality assurance/quality control, clinical studies, statistical analysis and report writing, the preparation and submission of BLAs and MAAs, regulatory affairs with respect to the foregoing and all other activities necessary or useful or otherwise requested or required by a Regulatory Authority as a condition or in support of obtaining or maintaining a Regulatory Approval.

1.26 "Development & Commercialization Agreements" means the License Agreement attached hereto as Exhibit A and the Co-Development, Co-Promote and Profit Share Agreement attached hereto as Exhibit B.

1.27 "EMA" means the Regulatory Authority known as either the European Medicines Agency or the European Agency for the Evaluation of Medicinal Products and any successor agency thereto.

1.28 "FDA" means the United States Food and Drug Administration and any successor agency thereto.

1.29 "Field" means the use of (i) T-Cells expressing a CAR (with or without other engineering to enhance functionality and/or safety), including virus specific genetically modified T-Cells expressing a synthetic CAR, and (ii) T-Cells expressing native-virus antigen receptors or tumor-specific antigen receptors in which the T-Cells are genetically modified to enhance their performance, persistence or safety, in each case under (i) and (ii) for the treatment, modulation, palliation or prevention of cancer in humans.

1.30 "FTE" means a full-time scientific or technical person, or in the case of less than a full-time scientific or technical person, a full-time equivalent scientific or technical person year, carried out by an appropriately qualified employee of Bluebird or its Affiliates, based on 1,920 person-hours or greater per year.

1.31 "FTE Costs" means the actual FTEs employed by Bluebird or its Affiliates in the conduct of Development activities multiplied by the FTE Rate.

1.32 "FTE Rate" means [***]

1.33 "IND" means an investigational new drug application filed with the FDA for authorization to commence clinical studies, and its equivalent in a foreign country.

1.34 "IND Product Candidate" means any Product Candidate for which an IND has been filed but for which an initial Phase 1 Study has not been completed as of the effective date of any termination or expiration of the Collaboration Program Term. For clarity, "IND Product Candidates" excludes Optioned Candidates.

1.35 "Know-How" means all commercial, technical, scientific and other know-how and information, 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 (including biological, chemical, pharmacological, toxicological, pharmaceutical, physical and analytical, preclinical, clinical, safety, manufacturing and quality control data and know-how, including

Regulatory Data, study designs and protocols), in all cases, whether or not confidential, proprietary, patented or patentable, in written, electronic or any other form now known or hereafter developed.

1.36 "Knowledge" means the actual knowledge or good faith understanding of the vice presidents, senior vice presidents, president or chief executive officer of a Party of the facts and information then in their possession.

1.37 "Law" or "Laws" means all laws, statutes, rules, regulations, orders, judgments, or ordinances having the effect of law of any federal, national, multinational, state, provincial, county, city or other political subdivision.

1.38 "license" means license or sublicense, as applicable.

1.39 "Manufacturing" means the production, manufacture, processing, filling, finishing, packaging, labeling, shipping and holding of product or any intermediate thereof, including process development, process qualification and validation, scale-up, commercial manufacture and analytic development, product characterization, stability testing, quality assurance and quality control. With reference to any Product Candidate, Manufacturing includes Vector and associated Payload supply.

1.40 "Materials" means any tangible chemical or biological material, including any compounds, DNA, RNA, clones, Vectors, Payloads, cells, and any expression product, progeny, derivative or other improvement thereto, along with any tangible chemical or biological material embodying any Know-How.

1.41 "MAA" means an application for the authorization to market a product in any country or group of countries outside the United States, as defined in the applicable Laws and filed with the Regulatory Authority of a given country or group of countries.

1.42 [***]

1.43 "Option Fees" means the Initial Option Fee and the Additional Option Fee.

1.44 "Optioned Candidate" means a Product Candidate for which Celgene has exercised its option pursuant to Sections 5.1 or 5.7.

1.45 "Other In-Licenses" means Bluebird Collaboration In-Licenses that Celgene does not elect to include within the definition of Applicable New In-Licenses in an applicable Development & Commercialization Agreement in accordance with Section 5.8.

1.46 "Patent" means a patent or a patent application, including any additions, divisions, continuations, continuations-in-part, invention certificates, substitutions, reissues, reexaminations, extensions, registrations, supplementary protection certificates and renewals, including all U.S. and foreign counterparts thereof, but not including any rights that give rise to regulatory exclusivity periods (other than supplementary protection certificates, which will be treated as "Patents" hereunder).

1.47 "Patent Costs" means the out-of-pocket costs and expenses paid to outside legal counsel and other Third Parties (including to any licensor pursuant to any in-license), and filing and maintenance expenses, incurred in Prosecuting and Maintaining Patents and enforcing and defending them.

1.48 "Payload" means [***]

1.49 "Person" means any individual, partnership, joint venture, limited liability company, corporation, firm, trust, association, unincorporated organization, governmental authority or agency, or any other entity not specifically listed herein.

1.50 "Phase 1 Study" means a clinical trial of a product, the principal purpose of which is preliminary determination of safety in healthy individuals or patients as described under 21 C.F.R. §312.21(a) (as amended or any replacement thereof), or a similar clinical study prescribed by the Regulatory Authorities in a foreign country. For purposes of this Agreement, "completion of Phase 1 Study" means the date on which a final and complete clinical study report for the Phase 1 Study, based on an Initial Primary Analysis, is provided to Celgene. "Initial Primary Analysis" means, with respect to a Phase 1 Study, an analysis performed on the complete and cleaned dataset from such Phase 1 Study, which dataset includes a minimum of three (3) months follow-up of all patients in such Phase 1 Study.

1.51 "Phase 2/3 Study" means a clinical trial of a product that is (i) initiated to determine the safety and efficacy in the target patient population, as described in 21 C.F.R. 312.21(b) (as amended or any replacement thereof), or a similar clinical study prescribed by the Regulatory Authorities in a foreign country and (ii) converted to a Phase 3 Study following an interim analysis of safety and efficacy data generated from the initial patents enrolled in such clinical trial.

1.52 "Phase 3 Study" means a clinical trial of a product on a sufficient number of subjects that is designed to establish that a pharmaceutical product is safe and efficacious for its intended use, and to determine warnings, precautions, and adverse reactions that are associated with such pharmaceutical product in the dosage range to be prescribed, which trial is intended to support Regulatory Approval of such product, as described in 21 C.F.R. 312.21(c) (as amended or any replacement thereof), or a similar clinical study prescribed by the Regulatory Authorities in a foreign country. For purposes of this Agreement and the Development & Commercialization Agreements, (i) "commencement of Phase 3 Study" for a product means (a) the first dosing of such product in a human patient in a Phase 3 Study, or (b) the date on which the sponsor elects to continue enrollment of patients in a Phase 2/3 Study following an interim analysis of safety and efficacy data generated from the initial patents enrolled in such Phase 2/3 Study, and (ii) "completion of Phase 3 Study" means the final dosing of the last patient to be dosed in such Phase 3 Study.

1.53 "Pre-Existing In-Licenses" means the agreements listed in Exhibit C.

1.54 "Product Candidate" means a therapeutic candidate designed, discovered or developed as part of the Collaboration Program that comprises a T-Cell transduced with recombinant viral agent(s) encoding CAR(s) with targeting domain(s) that specifically target Target Antigen(s) and optionally encoding additional protein(s) that may modulate the efficacy and safety of such therapeutic candidate.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

1.55 "Prosecution and Maintenance" means, with regard to a particular Patent, the preparation, filing, prosecution and maintenance of such Patent, as well as re-examinations, reissues and the like with respect to that Patent, together with the conduct of interferences, the defense of oppositions and other similar proceedings with respect to that Patent.

1.56 "Regulatory Approval" means, with respect to a country or extra-national territory, any and all approvals (including BLAs and MAAs), licenses, registrations or authorizations of any Regulatory Authority necessary in order to commercially distribute, sell or market a product in such country or some or all of such extra-national territory, excluding any pricing or reimbursement approvals.

1.57 "Regulatory Authority" means any national (*e.g.*, the FDA), supra-national (*e.g.*, the EMA), regional, state or local regulatory agency, department, bureau, commission, council or other governmental authority, in any jurisdiction in the world, involved in the granting of Regulatory Approval.

1.58 "Regulatory Data" means all information with respect to a product made, collected or otherwise generated under or in connection with clinical studies and such other tests and studies in patients that are (i) required by applicable Law, or otherwise recommended by Regulatory Authorities, to obtain or maintain Regulatory Approvals, or (ii) conducted solely in support of pricing or reimbursement for such product or are not otherwise strictly required in order to obtain or maintain Regulatory Approval for such product (including epidemiological studies, modeling and pharmacoeconomic studies, post-marketing surveillance studies, investigator sponsored studies and health economics studies).

1.59 "Regulatory Filings" means any submission to a Regulatory Authority of any appropriate regulatory application together with any related correspondence and documentation, and will include any submission to a regulatory advisory board, marketing authorization application, and any supplement or amendment thereto. For the avoidance of doubt, Regulatory Filings will include any IND, BLA, MAA or the corresponding application in any other country or group of countries.

1.60 "Target Antigen" means any and all oncology associated antigens.

1.61 "T-Cell" means any of the lymphocytes that mature in the thymus and have the ability to recognize specific peptide antigens presented by major histocompatibility complex antigens through the receptors on their cell surface.

1.62 "Third Party" means any Person other than Bluebird, Celgene and their respective Affiliates.

1.63 [***]

1.64 [***]

1.65 "United States" or "U.S." means the United States of America, including its territories and possessions, the District of Columbia and Puerto Rico.

1.66 "Vector" means [***]

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Definitions for each of the following terms are found in the body of this Agreement as indicated below:

Defined Term	***Location***
Additional Option Fee	Section 8.5
Agreement	Preamble
Applicable Celgene In-License	Section 4.1(c)(iii)
Baylor Field	Section 2.1(f)(ii)
Baylor-Only Candidate	Section 5.5
Baylor Platform License	Section 1.3
Baylor Product License	Section 1.3
Baylor Research Agreement	Section 1.3
Bluebird	Preamble
Bluebird Acquisition	Section 2.1(e)(i)
Bluebird Business Program	Section 2.1(e)(i)
Bluebird Cash Cap Amount	Section 4.1(e)(ii)(A)
Bluebird Collaboration In-License	Section 4.1(b)
Bluebird Development Notice	Section 5.7(a)
Bluebird Indemnitees	Section 11.6(a)
Bluebird Option Notice	Section 5.3
Bluebird Program Director	Section 3.1
Call Option	Section 6.9
Celgene	Preamble
Celgene Acquisition	Section 2.1(e)(ii)
Celgene Business Program	Section 2.1(e)(ii)
Celgene Indemnitees	Section 11.6(b)
Celgene New In-License	Section 1.14
Celgene Option Notice	Section 5.1
Celgene Option Period	Section 5.1
Celgene Program Director	Section 3.1
Collaboration Plan	Section 2.1(a)
Collaboration Program Advisory Committee	Section 3.2(c)(xi)
Collaboration Program Term	Section 2.1(d)
Common Stock	Section 7.1
Confidential Information	Section 10.1(a)
Corporate Event	Section 6.8
Corporate Event Notice	Section 6.1
Corporate Event Opportunity	Section 6.1
Declined Product Candidate	Section 5.7(a)
Disclosing Party	Section 10.1(a)
Effective Date	Preamble
Election Period	Section 6.2
Financial Investor	Section 1.9

Defined Term	***Location***
First Collaboration Extension Term	Section 2.1(d)
Follow-On Product Candidate	Section 5.6
HSR Act	Section 5.9(a)
HSR Clearance Date	Section 5.9(a)
HSR Filing	Section 5.9(a)
Implementation Date	Section 5.9(a)
Indemnification Claim Notice	Section 11.6(c)
Indemnified Party	Section 11.6(c)
Industry Transaction	Section 13.3
Initial Collaboration Term	Section 2.1(d)
Initial Option Fee	Section 8.4
[***]	
Issuing Party	Section 10.3(b)
JSC	Section 3.2(a)
Litigation Conditions	Section 11.6(d)(i)
Losses	Section 11.6(a)
[***]	
[***]	
New In-Licenses	Section 4.1(a)
[***]	
Party	Preamble
Patent Liaisons	Section 3.3(a)
Patent Committee	Section 3.3(a)
Phase 1 Study Data	Section 5.1
Pre-IND Product Candidate	Section 12.4(c)
Product Candidate In-License	Section 4.2
Program Directors	Section 3.1
Public Offering Submission	Section 6.6
Receiving Party	Section 10.1(a)
Release	Section 10.3(b)
[***]	
Reviewing Party	Section 10.3(b)
Second Collaboration Extension Term	Section 2.1(d)
Securities Act	Section 6.6
[***]	
Sub-Committees	Section 3.2(c)(xi)
Term	Section 12.1
Third Party Claims	Section 11.6(a)

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2. Collaboration Program.

2.1 Collaboration Program.

(a) *General*. During the Collaboration Program Term, the Parties will conduct the Collaboration Program on the terms and conditions set forth in this Agreement to identify, research and Develop Product Candidates. [***] Under the Collaboration Program, Bluebird will be responsible for all research and Development activities performed through completion of the initial Phase 1 Study with respect to each Product Candidate, and Celgene will be a critical advisor for oncology drug development, ex vivo human cell processing, assay development and release testing. Bluebird will keep Celgene reasonably informed of Bluebird's research and Development activities and will reasonably consult with Celgene and reasonably consider Celgene's comments and advice with respect to all material decisions relating to such activities. Research and Development activities of the Parties with respect to the Collaboration Program will be described in a "Collaboration Plan," an initial version of which is attached hereto as Exhibit D. Any modifications or amendments to the Collaboration Plan that are proposed by either Party will be subject to review by the JSC pursuant to and in accordance with the terms of Section 3.2(d) and to the prior written approval of both Parties. The specific Target Antigens that will be the focus of the Collaboration Program will be defined as soon as practicable [***], and will be set forth in a Collaboration Plan amendment. The selection of Product Candidates for additional work under the Collaboration Program will be subject to the oversight and supervision of the JSC, provided that if the JSC is unable to unanimously agree with respect to the selection of a Product Candidate for additional work under the Collaboration Program, either Party may, by written notice to the other Party, have such dispute referred to the Bluebird CEO and the Celgene CEO or in either case his or her designee (who will be a senior executive), who will attempt in good faith to resolve such dispute by negotiation and consultation [***], and if not so resolved, Bluebird will have the tie-breaking vote, provided that if a Business Combination has occurred with respect to Bluebird, Celgene will have the tie-breaking vote.

(b) *Obligations Under the Collaboration Plan*. Each Party will use Commercially Reasonable Efforts to perform (itself or through its Affiliates or by permitted subcontracting pursuant to Section 2.4) its respective obligations under the Collaboration Plan, and will cooperate with and provide reasonable support to the other Party in such other Party's performance of its responsibilities under the Collaboration Plan. The Collaboration Plan will not assign to Celgene, and Bluebird will not request that Celgene perform, any research or Development activity that would require a sublicense under any Bluebird In-License. If, notwithstanding the foregoing, the Collaboration Plan assigns to Celgene, or Bluebird requests that Celgene perform, any such research or Development activity, Bluebird will be responsible for any and all obligations to its licensors under any Bluebird In-License that arise out of such research or Development. The Parties acknowledge and agree, however, that no outcome or success is or can be assured and that failure to achieve desired results will not in and of itself constitute a breach or default of any obligation in this Agreement (notwithstanding the focus of the Collaboration Program described above).

(c) *Celgene Manufacturing*. In the event the Parties mutually agree that, as a part of the Collaboration Program, Celgene will build and operate a cGMP suite for the processing of Product Candidates which incorporate Vectors and associated Payloads supplied by Bluebird, the

Parties will enter into such additional agreements as may be necessary for Celgene to do so, including a Vector and Payload supply agreement. Prior to or during initial proof of concept studies, Celgene and Bluebird will mutually assess the capability for sole supply manufacture of Vector Supply, and agree to provisions to ensure the Manufacture and distribution, of Vector Supplies, in adequate quantities, of adequate quality, and in acceptable timeframes so as to not delay clinical Development and Commercialization of Product Candidates. Multiple sites may be required to supply and store inventories of Vector Supplies.

(d) *Collaboration Program Term*. Unless terminated or extended pursuant to the terms hereof, the term of the Collaboration Program will commence on the Effective Date and continue for an initial period of three (3) years (the " Initial Collaboration Term"). Celgene may elect to extend the Collaboration Program for (i) first, one additional two (2) year term (the " First Collaboration Extension Term") and (ii) then next for one additional [***] term (the "Second Collaboration Extension Term", and together with the Initial Collaboration Term and the First Collaboration Extension Term, if any, the "Collaboration Program Term") by providing written notice to Bluebird of such election at least [***] prior to the expiration of the Initial Collaboration Term or First Collaboration Extension Term, as applicable, and payment of the applicable extension fees set forth in Section 8. Absent further agreement of the Parties, the maximum Collaboration Program Term (assuming Celgene elects both of the foregoing extensions) is [***].

(e) *Relationship*.

(i) During the Collaboration Program Term, neither Bluebird nor its Affiliates (nor any others on behalf of or with, or under license (including a covenant not to sue) or sublicense from, Bluebird or any its Affiliates) will research, Develop, Manufacture or commercialize any actual or potential products (including Vectors and associated Payloads) to be used in the Field other than as a part of the Collaboration Program, and other than with respect to Declined Product Candidates in accordance with Section 5.7. Notwithstanding this Section 2.1(e)(i), if (i) a Business Combination occurs with respect to Bluebird with a Third Party or (ii) Bluebird acquires a Third Party (including by a merger or consolidation) so that such Third Party becomes an Affiliate over which Bluebird has control (as defined in Section 1.1), or (iii) Bluebird acquires all or substantially all of the assets of a Third Party (including any subsidiaries or divisions thereof) (each of (i), (ii) and (iii), a " Bluebird Acquisition"), and, in each case, the Third Party (or any of such Third Party's Affiliates or any successors or assigns of such Third Party or such Third Party's Affiliates, other than Bluebird and its Affiliates as of the Bluebird Acquisition) (1) already has, or the acquired assets contain, as applicable, a program that existed prior to, or was planned prior to and is demonstrably to be implemented shortly after, the Bluebird Acquisition or (2) initiates and pursues a new program following such Bluebird Acquisition, in each case that would otherwise violate this Section 2.1(e)(i) (a " Bluebird Business Program"), then such Third Party (or any of such Third Party's Affiliates or any successors or assigns of such Third Party or such Third Party's Affiliates, other than Bluebird and its Affiliates as of the Bluebird Acquisition), as applicable, will be permitted to initiate, pursue and continue such Bluebird Business Program after such Bluebird Acquisition and such initiation, pursuit and continuation will not constitute a violation of this Section 2.1(e)(i); provided that (A) none of the Collaboration IP or other Patents, Materials or Know-How

Controlled by the other Party and, in each case, licensed to Bluebird will be used in the Bluebird Business Program, and (B) the research or Development activities required under this Agreement will be conducted separately from any research or Development activities directed to such Bluebird Business Program, including the maintenance of separate lab notebooks and records (password-protected to the extent kept on a computer network) and separate personnel working on each of the activities under this Agreement and the activities covered under such Bluebird Business Program.

(ii) [***]

(f) *Collaboration Know-How and IP*.

(i) Each Party will promptly (and at least on a calendar quarterly basis) disclose to the other Party any Collaboration Know-How discovered, created, conceived, developed or reduced to practice by or on behalf of such Party, and will provide the other Party such documentation regarding the same as the other Party may reasonably request.

(ii) Except as set forth in this Section 2.1(f)(ii) and in Section 2.1(f)(iv) below, each Party will solely own all right, title and interest in and to all Collaboration IP that is discovered, created, conceived, developed or reduced to practice solely by or on behalf of such Party, and all right, title and interest in and to all Collaboration IP will automatically vest solely in such Party. The Parties acknowledge and agree that (A) subject to Section 2.1(f)(iv) with respect to improvements to, or modifications or derivative works of, Bluebird IP that is directed to Vectors, the Parties will jointly own all right, title and interest in and to all Know-How and Materials, and Patents arising therefrom, that are discovered, created, conceived, developed or reduced to practice by or on behalf of the Parties (whether solely by or on behalf of a Party or jointly by or on behalf of both Parties) in the course of performing activities as a part of the "Project Research" (as defined in the Baylor Research Agreement), (B) as between Celgene and Bluebird, Know-How and Materials, and Patents arising therefrom, discovered, created, conceived, developed or reduced to practice by Dr. Malcolm K. Brenner during the Term in connection with his participation on the Collaboration Program Advisory Committee that relate to "Project Research" will be subject to the terms of the Baylor Agreements and (C) as between Celgene and Bluebird, Know-How and Materials, and Patents arising therefrom, that are discovered, created, conceived, developed or reduced to practice by Dr. Malcolm K. Brenner during the Term in connection with his participation on the Collaboration Program Advisory Committee that do not relate to "Project Research" and (1) are within the Baylor Field will be jointly owned by the Parties and (2) are outside the Baylor Field will be solely owned by the Party with which Dr. Malcolm K. Brenner discovered, created, conceived, developed or reduced to practice the subject Know-How and Materials, or will be jointly owned by the Parties if Dr. Malcolm K. Brenner discovered, created, conceived, developed or reduced to practice the subject Know-How and Materials with both Parties, subject, in each case of clauses (C)(1) and (C)(2) above, to Section 2.1(f)(iv) with respect to improvements to, or modifications or derivative works of, Bluebird IP that is directed to Vectors. Each Party agrees to execute such written assignments and confirmations as are necessary to effect the allocation of ownership of Patents, Know-How and Materials as provided in the immediately preceding sentence, and any Patents, Know-How and Materials addressed by the immediately preceding sentence (other than clause (C)(2)) shall be considered Collaboration IP. [***]

(iii) Except as set forth in Section 2.1(f)(iv) below, the Parties will jointly own any and all Collaboration IP that is discovered, created, conceived, developed or reduced to practice jointly by or on behalf of the Parties. Each Party will have an undivided one-half interest in and to such jointly-owned Collaboration IP. Each Party will exercise its ownership rights in and to such jointly-owned Collaboration IP, including the right to license and sublicense or otherwise to exploit, transfer or encumber its ownership interest, without an accounting or obligation to, or consent required from, the other Party, but subject to the licenses hereunder and the other terms and conditions of this Agreement, including Section 2.1(e). At the reasonable written request of a Party, the other Party will in writing grant such consents and confirm that no such accounting is required to effect the foregoing regarding jointly-owned Collaboration IP. Each Party, for itself and on behalf of its Affiliates, licensees and sublicensees, and employees, subcontractors (subject to Section 2.4), consultants and agents of any of the foregoing, hereby assigns (and to the extent such assignment can only be made in the future hereby agrees to assign), to the other Party a joint and undivided interest in and to all jointly-owned Collaboration IP.

(iv) Notwithstanding the first sentence of Section 2.1(f)(ii) and notwithstanding Section 2.1(f)(iii), but subject to the second sentence of Section 2.1(f)(ii), (A) Celgene will solely own any Collaboration IP that is an improvement to, or modification or derivative work of, any Celgene IP, and Bluebird, for itself and on behalf of its Affiliates, licensees and sublicensees, and employees, subcontractors (subject to Section 2.4), consultants

and agents of any of the foregoing, hereby assigns (and to the extent such assignment can only be made in the future hereby agrees to assign), all of its rights, title and interest in such Collaboration IP to Celgene, and (B) Bluebird will solely own any Collaboration IP that is an improvement to, or modification or derivative work of, any Bluebird IP, and Celgene, for itself and on behalf of its Affiliates, licensees and sublicensees, and employees, subcontractors (subject to Section 2.4), consultants and agents of any of the foregoing, hereby assigns (and to the extent such assignment can only be made in the future hereby agrees to assign), all of its rights, title and interest in such Collaboration IP to Bluebird. To the extent that a particular item of Collaboration IP constitutes an improvement to, or modification or derivative work of, both Celgene IP and Bluebird IP, the Parties will jointly own such particular item of Collaboration IP pursuant to Section 2.1(f)(iii).

(v) Inventorship determination for all Patents worldwide arising from any Know-How or Material discovered, created, conceived, developed or reduced to practice by or on behalf of the Parties under or in connection with this Agreement and thus the ownership thereof will be made in accordance with applicable United States patent laws.

(g) *Regulatory*. Bluebird will exclusively own the INDs for the Development of Product Candidates and will, after reasonable consultation with Celgene under the oversight of the JSC: (i) determine the regulatory plans and strategies for Product Candidates, (ii) prepare and file all Regulatory Filings with respect to Product Candidates, and (iii) be responsible for conducting all meetings with Regulatory Authorities in connection with the Development of Product Candidates, in each case unless and until such time that such Product Candidate becomes an Optioned Candidate. Bluebird will provide Celgene with reasonable prior notice of all such meetings with Regulatory Authorities, and Celgene will have the right to participate in such meetings.

(h) *Licenses*.

(i) During the Term, Bluebird hereby grants to Celgene the co-exclusive (with Bluebird and its Affiliates), worldwide, royalty-free right and license in the Field, without the right to grant sublicenses (other than to permitted subcontractors under Section 2.4), under Collaboration IP solely owned by Bluebird pursuant to Section 2.1(f) and Bluebird's interest in jointly owned Collaboration IP, in each case solely to conduct research and Development under the Collaboration Plan as part of the Collaboration Program in accordance with the terms of this Agreement. Except as set forth in Section 12.4(c) or as may be permitted under an applicable Development & Commercialization Agreement, Celgene will not practice or otherwise use any Collaboration IP solely owned by Bluebird pursuant to Section 2.1(f) other than in accordance with the license granted in this Section 2.1(h)(i).

(ii) Subject to the terms and conditions of this Agreement, during the Term and thereafter, Celgene hereby grants to Bluebird a worldwide, fully paid-up, non-exclusive license, with the right to sublicense through multiple tiers, under (A) Collaboration IP solely owned by Celgene pursuant to Section 2.1(f), (B) all improvements to, or modifications or derivative works of, any Bluebird IP that are discovered, created, conceived, developed or reduced to practice by or on behalf of Celgene or its Affiliates during the Collaboration Program Term in the course of Developing an Optioned Candidate under a Development &

Commercialization Agreement, and [***], in each case of (A) through (C), that are related to the Manufacture of Vectors, solely to research, Develop, Manufacture and commercialize Vectors, provided that (w) the foregoing license does not include any Patents and Know-How for Manufacturing (other than Manufacturing of Vectors), (x) [***] (y) during the Term and the term of any applicable Development & Commercialization Agreement, the foregoing license does not include the right to research, Develop, Manufacture or commercialize any Vectors that are used in connection with Optioned Candidates or Elected Candidates or Licensed Products under such Development & Commercialization Agreement, other than with and for Celgene, and (z) [***]. Further, the Parties acknowledge and agree that, upon written notice to Celgene, Bluebird may decline the taking of or terminate such sublicense from Celgene with respect to any Patents, Know-How or Materials that are in-licensed by Celgene pursuant to a Celgene New In-License that is an Applicable Celgene In-License. If any royalty, milestone or other payment, [***] becomes due under any Celgene New In-License that is attributable to Bluebird as a sublicensee thereunder with respect to such research, Development, Manufacture or commercialization of Vectors, Celgene will pay same, provided that Bluebird will reimburse Celgene for any such payment within thirty (30) days of Bluebird's receipt of Celgene's written invoice therefor, and Bluebird's failure to pay such reimbursement within such time period will entitle Celgene to terminate Bluebird's sublicense under the applicable Celgene New In-License upon thirty (30) days written notice. Upon Bluebird's request, Celgene agrees to provide Bluebird with a copy of any Celgene New In-License that is an Applicable Celgene In-License under which Bluebird is granted a sublicense under this Section 2.1(h)(ii), which Celgene may reasonably redact (other than with respect to provisions applicable to the determination of Bluebird's reimbursement obligations under this Section 2.1(h)(ii)).

(i) *Celgene IP*. If either Party desires that Celgene make available any Patents, Know-How or Material Controlled by Celgene or its Affiliates (other than pursuant to a Celgene In-License, which is governed by Section 4.1(c), and other than Collaboration IP) for use in the Collaboration Program, such Party will notify the JSC and the JSC will discuss whether or not such Patents, Know-How or Materials would be useful for the Collaboration Program. If the JSC concludes that such Patents, Know-How or Materials would be useful for the Collaboration Program, the JSC will invite Celgene to make such intellectual property available to the Collaboration Program. Celgene will have sole discretion whether or not to make such intellectual property available to the Collaboration Program, and if Celgene so elects it will make such intellectual property available by providing the JSC with written notice specifying the Patents, Know-How and/or Materials that will be made available to the Collaboration Program as "Celgene IP". Except by such written notice provided to the JSC, no Patents, Know-How or Materials Controlled by Celgene or its Affiliates (other than pursuant to a Celgene In-License, which is governed by Section 4.1(c) and other than Collaboration IP) will be made available for, or used in, the Collaboration Program, and no such Patents, Know-How or Materials shall be considered "Celgene IP".

2.2 Collaboration Program Expenses. Except for any amounts that may be payable by Celgene under a Vector and associated Payload supply agreement described in Section 2.1(c), each of Bluebird and Celgene is and will remain solely responsible for all of its internal costs and expenses that are incurred by or on its behalf in connection with the performance of the Collaboration Plan. Subject to Sections 4.1, 4.2, 8.6 and 9.2, and except for any amounts that may be payable by Celgene under a Vector and associated Payload supply agreement described in Section 2.1(c) or a Celgene In-License, Bluebird will be responsible for all out-of-pocket costs and expenses payable to Third Parties in connection with the performance of the Collaboration Plan.

2.3 Collaboration Program Records, Reports and Materials.

(a) *Records*. Each Party will maintain, or cause to be maintained, records of its activities under the Collaboration Program in sufficient detail and in good scientific manner appropriate for scientific, Patent and regulatory purposes, that will properly reflect all work included in the Collaboration Program, for a period of at least ten (10) years after the creation of such records, but in no event less than required by applicable Laws. Each Party will have the right to request and receive a copy of any such records.

(b) *Collaboration Program Reports*. Each Party will furnish to the JSC a high-level summary written report within thirty (30) days after each June 30th and December 31st occurring during the Collaboration Program Term, describing its progress under the Collaboration Plan as part of the Collaboration Program during the previous six (6) month period. Each Party agrees that it will promptly respond to the other Party's reasonable questions regarding any of such Party's reports.

(c) *Materials*.

(i) Each Party will, during the Collaboration Program Term, as a matter of course as described in the Collaboration Plan or upon the other Party's reasonable written request, furnish to each other samples of Materials that are in such Party's Control and are necessary for the other Party to carry out its responsibilities under the Collaboration Plan, provided that, prior to Celgene providing any Materials to Bluebird, Celgene will notify Bluebird of the cost of such Materials and Bluebird may elect whether or not to receive such Materials from Celgene. Subject to the foregoing, after Celgene has provided Materials costing more than [***], Bluebird will reimburse Celgene for the costs of any additional Materials.

(ii) Each Party will use such Materials only in accordance with the Collaboration Plan and otherwise in accordance with the terms and conditions of this Agreement and any instructions provided by the Party furnishing the Materials. Except with the prior written consent of the supplying Party (such consent not to be unreasonably withheld, delayed or conditioned), the Party receiving any Materials will not distribute or otherwise allow the release of Materials to any Affiliate (other than wholly-owned subsidiaries) or Third Party, except for subcontracting as permitted hereunder. All Materials delivered to the receiving Party will remain the sole property of the supplying Party and will be used in compliance with all applicable Law. The Materials supplied under this Agreement will be used with prudence and appropriate caution in any experimental work because not all of their characteristics may be known.

2.4 Permitted Subcontracting. Each Party may subcontract any of its activities to be performed under the Collaboration Plan to an Affiliate or Third Party, provided that any such Affiliate or Third Party will have entered into a written agreement with such Party that includes terms and conditions protecting and limiting use and disclosure of Confidential Information and Materials and Know-How at least to the same extent as under this Agreement, and requiring such Affiliate or Third Party and its personnel to assign to such Party all right, title and interest in and to any Patents, Know-How and Materials created, conceived or developed in connection with the performance of subcontracted activities to the extent required to research, Develop, Manufacture and commercialize Product Candidates, provided that with respect to Third Parties that are academic or other non-commercial Persons, a Party will be required only to use commercially reasonable efforts to obtain such assignment, and in the absence of such assignment, the Parties will mutually agree on the rights (*e.g.*, a license or option to license) to be obtained from such academic or non-commercial Persons. Any such subcontracting activities will be described in the reports for the Collaboration Program required by Section 2.3(b).

3. Governance.

3.1 Management. Management of the Collaboration Program activities will be under the responsibility of one person to be designated by Celgene (the "Celgene Program Director") and one person to be designated by Bluebird (the " Bluebird Program Director," and together with the Celgene Program Director, the "Program Directors").

3.2 Joint Steering Committee.

(a) *Steering Committee*. As soon as practicable (but not later than sixty (60) days) following the Effective Date, the Parties will establish a Joint Steering Committee, comprised of three (3) representatives of Bluebird and three (3) representatives of Celgene (the " JSC"). Each Party may replace its representatives on the JSC or its Program Director at any time upon written notice to the other Party. With the consent of the other Party (such consent not to be unreasonably withheld, delayed or conditioned), each Party may invite non-voting employees and consultants to attend meetings of the JSC, subject to their agreement to be bound to the same extent as a permitted subcontractor under Section 2.4.

(b) *Meetings*. While in existence, the JSC will meet each calendar quarter and, at a minimum, two (2) of such meetings each calendar year starting in 2013 will be in person (which in-person meeting will be held at locations mutually agreed by the Parties). Meetings of the JSC will be effective only if at least one (1) representative of each Party is present or participating. Each Party will be responsible for all of its own expenses of participating in the meetings. The Parties will endeavor to schedule meetings of the JSC at least six (6) months in advance. Bluebird will prepare and circulate a meeting agenda prior to each such meeting. The Parties will alternate in preparing written minutes of such meeting, and the preparing Party will circulate such minutes within fifteen (15) days after such meeting. The Parties will agree on the minutes of each meeting promptly, but in no event later than the next meeting of the JSC.

(c) *Responsibilities*. The JSC will oversee and supervise the overall performance of the Collaboration Plan and within such scope will:

(i) Periodically review the Parties' efforts and progress under the Collaboration Plan;

(ii) Review the Collaboration Program;

(iii) Review any proposed modifications or amendments to the Collaboration Plan and the Collaboration Program;

(iv) Prioritize and oversee execution of specific activities to be performed under the Collaboration Plan and the Collaboration Program;

(v) Review Patent Committee advice with regard to scientific activities to be performed under the Collaboration Plan and the Collaboration Program;

(vi) Review Collaboration Program Advisory Committee advice with regard to scientific activities to be performed under the Collaboration Plan and the Collaboration Program;

(vii) Review and select Product Candidates for additional work as part of the Collaboration Program;

(viii) Review and evaluate Product Candidates for which Development work should be performed as part of the Collaboration Program;

(ix) Review and approve of the regulatory plans and strategies for Product Candidates;

(x) Review all Regulatory Filings with respect to Product Candidates;

(xi) Form such other committees ("Sub-Committees") as the JSC may deem appropriate. As soon as practicable (but not later than sixty (60) days) after the Effective Date, the Parties will establish a Sub-Committee comprised of three (3) representatives of Celgene, three (3) representatives of Bluebird, and Dr. Malcolm K. Brenner (the "Collaboration Program Advisory Committee"). The Collaboration Program Advisory Committee will monitor and advise the Parties on the conduct and progress of the Collaboration Program. Each Party may replace its representatives on the Collaboration Program Advisory Committee at any time upon written notice to the other Party. Any such Sub-Committee (including the Collaboration Program Advisory Committee) may make recommendations to the JSC but may not be delegated JSC decision-making authority;

(xii) Address such other matters relating to the activities of the Parties under this Agreement as either Party may bring before the JSC, including any matters that are expressly for the JSC to decide as provided in this Agreement; and

(xiii) Attempt to resolve any disputes on an informal basis.

(d) *Decision-making*. The three (3) JSC representatives of each Party will collectively have one (1) vote, and the JSC will make decisions only by unanimous consent in the sole discretion of each Party with respect to its vote. [***]

(e) *Limits on JSC Authority*. Each Party will retain the rights, powers and discretion granted to it under this Agreement and no such rights, powers, or discretion will be delegated to or vested in the JSC unless such delegation or vesting of rights is expressly provided for in this Agreement or the Parties expressly so agree in writing. The JSC will not have the power to, nor will the Party having the tie-breaking vote in the JSC have the power to (i) amend, modify or waive compliance with this Agreement (other than as expressly permitted hereunder), (ii) alter, increase or expand the Parties' rights or obligations under this Agreement, (iii) determine that a Party has fulfilled any obligations under this Agreement or that a Party has breached any obligation under this Agreement, (iv) make a decision that is expressly stated to require the mutual agreement of the Parties, (v) amend or modify the Collaboration Plan, (vi) change the Collaboration Program in any manner that would alter the fundamental objectives of the Collaboration Program as generally described in Section 2.1(a), or (vi) determine that milestone events required for the payment of milestone payments have or have not occurred.

(f) *Term.* The JSC and any subcommittees thereof will cease to exist three (3) months after the end of the Collaboration Program Term.

3.3 Patent Committee.

(a) Promptly (but no later than sixty (60) days) after the Effective Date, the Parties will (i) each designate representative(s) to consult with the other Party's representative(s) with

respect to Patent ownership, Prosecution and Maintenance, enforcement and defense matters (the " Patent Liaisons"), and (ii) establish a patent committee (the "Patent Committee"). The purpose of the Patent Committee is to determine ownership of intellectual property, and facilitate the discussion and coordination of Prosecution and Maintenance, enforcement and defense matters, in accordance with and subject to the terms of this Agreement. The Patent Liaisons will be the primary point of contact for the Parties regarding the foregoing activities and will facilitate all such activities hereunder, including preparing and finalizing minutes of the Patent Committee and will be responsible for assisting the Patent Committee in performing its oversight responsibilities.

(b) Decisions. All decisions of the Patent Committee will be made by consensus, with each Party having one vote. If the Patent Committee cannot agree on a matter within the Patent Committee's authority within five (5) days after it has met and attempted to reach such decision, then, either Party may, by written notice to the other, have such issue referred to the Program Directors for resolution. The Parties' respective Program Directors will meet within five (5) days after such matter is referred to them, and will negotiate in good faith to resolve the matter. If the Program Directors are unable to resolve the matter within five (5) days after the matter is referred to them, then the decision will be resolved as set forth below:

(i) *IP Ownership*. The Patent Committee will determine ownership of Collaboration IP in accordance with and subject to the terms of Section 2.1(f); provided that the Patent Committee may allocate ownership of a particular item of intellectual property to improve the prospects of obtaining patent protection with respect to such item of intellectual property, even if such allocation is not in accordance with the terms of Section 2.1(f), so long as the Parties mutually agree to such allocation. In the event the Patent Committee cannot agree on a matter regarding ownership of an item of intellectual property, and the Program Directors are unable to resolve such matter, then such dispute will be resolved by a Third Party patent counsel selected by the Patent Committee who (and whose firm) is not, and was not at any time during the five (5) years prior to such dispute, an employee, consultant, legal advisor, officer, director or stockholder of, and does not have any conflict of interest with respect to, either Party. Such patent counsel will determine ownership of such intellectual property in accordance with U.S. patent law and Section 2.1(f). Expenses of the patent counsel will be shared equally by the Parties.

(ii) *Patent Prosecution*. The Patent Committee will discuss material issues and provide input to each other regarding the Prosecution and Maintenance, enforcement and defense of Bluebird IP, Celgene IP and jointly owned Collaboration IP. The Patent Liaisons will be responsible for coordinating the implementation of each Party's strategies for the protection of the foregoing intellectual property rights related to Product Candidates. All final decisions related to the Prosecution and Maintenance, enforcement or defense of any Bluebird IP, Celgene IP and jointly-owned Collaboration IP will be made by the Party with the right to control such Prosecution and Maintenance, enforcement or defense, as applicable, as set forth in Section 9.

4. Third Party Licenses.

4.1 New Licenses.

(a) *Identification*. [***]

(b) *Bluebird Contribution to the Collaboration*. [***]

(e) *Celgene Applicable/New In-Licenses*. With respect to each Applicable Celgene In-License that is a Celgene New In-License:

(i) Celgene will be solely responsible for any upfront payment payable to the licensor under such Applicable Celgene In-License.

(ii) Except as provided in Sections 2.1(h)(ii), 5.7 and 12.4, Celgene and Bluebird will each be responsible for [***] any other payments required to be paid to the licensor under such Applicable Celgene In-License in respect of Collaboration Program activities or the research, Development, Manufacture or commercialization of Product Candidates, but excluding any payments that are (a) triggered by the grant of a sublicense under the Applicable Celgene In-License (other than sublicenses granted by Bluebird or its sublicensees), (b) annual fees paid to maintain the Applicable Celgene In-License in effect, (c) Patent Costs, (d) any payments that are royalty payments (including sales-based milestone payments), and (e) payments resulting from Celgene's breach of the Applicable Celgene In-License not attributable to Bluebird or its contract Third Parties or sublicensees, which excluded payments will be the sole responsibility of Celgene; provided that Bluebird's [***] share of such payments will become due and payable upon the execution of the first Development & Commercialization Agreement, and will be paid as follows: [***]

(iii) Any payments that are royalties payable by Celgene or its Affiliates under the Applicable Celgene In-License will be subject to Section 4.3(d) of such License Agreement or Section 11.3(d) of any Co-Development, Co-Promote and Profit Share Agreement, as applicable.

(f) *Celgene Pre-Existing/Applicable In-Licenses*. With respect to any Applicable Celgene In-License that is a Celgene Pre-Existing In-License, except as provided in Sections 2.1(h)(ii), 5.7 and 12.4, Celgene will be solely responsible for all payments required to be paid to the licensor under such Applicable Celgene In-License, and any payments that are royalties payable by Celgene or its Affiliates under the Applicable Celgene In-License will be subject to Section 4.3(d) of such License Agreement or Section 11.3(d) of any Co-Development, Co-Promote and Profit Share Agreement, as applicable.

4.2 Product Candidate In-Licenses. Other than with respect to Baylor as contemplated by the Baylor Agreements, which are governed by Sections 4.5 and 5.5 hereof, in the event that the Parties desire to enter into an agreement with any Third Party to obtain rights to Patents, Know-How or Materials that would constitute solely a new Product Candidate (if developed pursuant to this Agreement) in the Field, as opposed to only being necessary or useful for supporting research, Development or Commercialization of existing Product Candidates (a " Product Candidate In-License"), the Parties will jointly determine a strategy for endeavoring to procure rights under such Patents, Know-How or Materials, including with respect to allocation of the Parties' responsibilities for any payments that may become due during the Collaboration Program Term under such Product Candidate In-License. Any such Product Candidate

In-License addressing any such new Product Candidate will require the prior written approval of both Parties, will be with both Parties and will be committed to the Collaboration Program (and not the Parties on an individual basis). Accordingly, any product candidate in-licensed pursuant to a Product Candidate In-License will be a "Product Candidate" hereunder, and will only be Developed or commercialized by either Party as a part of the Collaboration Program or under an executed Development and Commercialization Agreement, unless and until such Product Candidate becomes a Declined Product Candidate in accordance with Section 5.7. If the Parties agree that any Patents, Know-How or Materials in-licensed under a Product Candidate In-License will be used to Develop and commercialize a Product Candidate under a Development and Commercialization Agreement, the Parties will discuss in good faith and agree on the allocation of the Parties' applicable rights and obligations thereto, including with respect to amounts payable under such Product Candidate In-License (other than a Baylor Product License), which terms will be set forth in such Development and Commercialization Agreement. If an in-license from a Third Party of rights to Patents, Materials or Know-How that would constitute a new Product Candidate also includes other rights that potentially have broader applicability (e.g., that may be useful for supporting research, Development or commercialization of Product Candidates that are against Target Antigens different than the Target Antigen in the Product Candidate in such Third Party in-license), such in-license will be treated as a "Product Candidate In-License" hereunder and the Parties will discuss in good faith the allocation of such other rights and obligations, along with costs, in accordance with the principles set forth in Section 4.1 and this Section 4.2. The Parties acknowledge that the terms of this Section 4.2 may need to be discussed and modified with respect to any particular Product Candidate In-License (other than a Baylor Product License) depending on the then existing facts and circumstances relating to such Product Candidate In-License.

4.3 Maintenance of Bluebird In-Licenses. Bluebird (i) will duly perform and observe all of its obligations under the Bluebird In-Licenses in all material respects and maintain in full force and effect the Bluebird In-Licenses, and (ii) will not, without Celgene's prior written consent (such consent not to be unreasonably withheld, conditioned or delayed), (a) amend, modify, restate, cancel, supplement or waive any provision of any Bluebird In-License, or grant any consent thereunder, or agree to do any of the foregoing, or (a) exercise any right to terminate any Bluebird In-License, in each case ((a) and (b)) that would reasonably be expected to adversely affect in any respect the rights of Celgene under this Agreement or any potential or executed Development & Commercialization Agreement. Bluebird will provide Celgene with written notice as promptly as practicable (and in any event within five (5) business days) after becoming aware of any of the following: (1) any material breach or default by Bluebird or any of its Affiliates of any covenant, agreement or other provision of any Bluebird In-License, (2) any notice or claim from the counterparty to any Bluebird In-License terminating or providing notice of termination of any Bluebird In-License, (3) any notice or claim alleging any breach of default under any Bluebird In-License, or (4) the existence of any facts, circumstances or events which alone or together with other facts, circumstances or events would reasonably be expected (with or without the giving of notice or passage of time or both) to give rise to a breach of or default under or right to terminate any Bluebird In-License. If Bluebird fails to pay any amounts due under any Bluebird In-License and if such nonpayment would permit the counterparty to such Bluebird In-License to terminate or suspend the same or any rights thereunder, Celgene will have

the right, but not the obligation, in its sole discretion, to pay such amounts on Bluebird's behalf, and any amounts so paid by Celgene may be taken by Celgene as a credit against any amounts payable to Bluebird under this Agreement or any Development & Commercialization Agreement.

4.4 Maintenance of Celgene In-Licenses. Celgene **[***]** will duly perform and observe all of its obligations under the Applicable Celgene In-Licenses in all material respects and maintain in full force and effect the Applicable Celgene In-Licenses in the Field **[***].** Celgene will provide Bluebird with written notice as promptly as practicable (and in any event within **[***]** business days) after becoming aware of any of the following: (1) any material breach or default by Celgene or any of its Affiliates of any covenant, agreement or other provision of any Applicable Celgene In-License, (2) any notice or claim from the counterparty to any Applicable Celgene In-License terminating or providing notice of termination of any Applicable Celgene In-License, (3) any notice or claim alleging any breach of default under any Applicable Celgene In-License, or (4) the existence of any facts, circumstances or events which alone or together with other facts, circumstances or events would reasonably be expected (with or without the giving of notice or passage of time or both) to give rise to a breach of or default under or right to terminate any Applicable Celgene In-License. **[***]** If Celgene fails to pay any amounts due under any Applicable Celgene In-License and if such nonpayment would permit the counterparty to such Applicable Celgene In-License to terminate or suspend the same or any rights thereunder, Bluebird will have the right, but not the obligation, in its sole discretion, to pay such amounts on Celgene's behalf, and Celgene will reimburse Bluebird for any such payments within **[***]** days of Celgene's receipt of Bluebird's written invoice therefor.

4.5 Baylor Agreements.

(a) *Maintenance*. Celgene **[***]** will duly perform and observe all of its obligations under the Baylor Agreements in all material respects **[***]**

(b) *Notices*. Each Party will provide the other Party with written notice as promptly as practicable (and in any event within **[***]** business days) after becoming aware of any of the following: (i) any material breach or default by such Party or any of its Affiliates of any covenant, agreement or other provision of any Baylor Agreement, (ii) any notice or claim from the counterparty to any Baylor Agreement terminating or providing notice of termination of any Baylor Agreement, (iii) any notice or claim alleging any breach of default under any Baylor Agreement, or (iv) the existence of any facts, circumstances or events which alone or together with other facts, circumstances or events would reasonably be expected (with or without the giving of notice or passage of time or both) to give rise to a breach of or default under or right to terminate any Baylor Agreement. If Celgene fails to pay any amounts due under any Baylor Agreement and if such nonpayment would permit Baylor to terminate or suspend the same or any rights thereunder, Bluebird will have the right, but not the obligation, to pay such amounts on Celgene's behalf, and Celgene will reimburse Bluebird for any such payments within thirty (30) days of Celgene's receipt of Bluebird's written invoice therefor.

(c) *Exercise of Rights*. **[***]** Celgene will not exercise any rights under any of the Baylor Agreements without first consulting with Bluebird and obtaining Bluebird's prior consent (such consent not to be unreasonably withheld, delayed or conditioned), provided that no such consent will be required (1) for Celgene to enter into a Baylor Product License, (2) to terminate any Baylor Agreement other than a Baylor Product License, (3) after consultation with Bluebird, to terminate any Baylor Product License provided Celgene either (i) intends to maintain in force the corresponding Development & Commercialization Agreement or (ii) if such Development & Commercialization Agreement is not intended to remain in effect, offers to assign such Baylor Product License to Bluebird before initiating termination of same, (4) for Celgene to exercise any licenses or other similar license rights (such as the right to sublicense) granted to Celgene under any Baylor Agreement, (5) for Celgene to exercise any rights under the Platform License Agreement that do not require Bluebird's consent under the sublicense agreement between Celgene and Bluebird under the Baylor Platform License, and (6) for Celgene to extend or not extend the term of any Baylor Agreement, **[***]** In addition, Bluebird may exercise its third-party beneficiary rights under any of the Baylor Agreements and Celgene will not interfere with any such exercise by Bluebird. For avoidance of doubt, Celgene's election to not exercise a right, such as an election to not provide research or development funding to Baylor, will not be deemed "an exercise of rights" under the Baylor Agreements for purposes of this Section 4.5(c). The foregoing will apply, without limitation, to the Prosecution and Maintenance, and enforcement and defense, of all Patents, Know-How and Materials licensed under any of the Baylor Agreements, provided that Celgene will not require Bluebird's consent to terminate Prosecution and Maintenance, or to commence, conduct or terminate the enforcement and defense of, any Patents, Know-How and Materials licensed under any of the Baylor Agreements so long as Celgene provides Bluebird with written notice thereof and, if permitted by the Baylor Agreements (including as a third-party beneficiary thereunder), affords Bluebird the right to take such actions, which if taken by Bluebird will be at Bluebird's sole expense, provided that in such an event under the Baylor Platform License, (x) Celgene will agree in writing with Bluebird not to exercise (or grant others the right to exercise) any rights to any such Patent for which Prosecution or Maintenance has been terminated or a defense has not been commenced or conducted or has been

terminated, and (y) Bluebird will solely control and not share any recoveries from any such enforcement, in all such cases subject to the Baylor License Agreements. Notwithstanding the foregoing in this Section 4.5(c), if Celgene determines in good faith that any action or inaction under any of the Baylor Agreements is legally required of Celgene (under any of the Baylor Agreements or otherwise) or is required to maintain any rights under the Baylor Agreements (including with respect to confidentiality and indemnification), or if Bluebird does not promptly respond to Celgene's request after prior written notice to Bluebird, Celgene will have the right to take such action, or refrain from taking such action, but will remain subject to the terms of the Baylor Agreements, this Agreement and any Development & Commercialization Agreements.

(d) *Other Agreements*. During the Term, other than as permitted by the Baylor Agreements and pursuant to Section 2.1(f)(ii), neither Party nor its Affiliates will enter into any agreements with Baylor regarding the Baylor Field, nor collaborate with Baylor in the Baylor Field, nor have Baylor work or fund work by Baylor in the Baylor Field, without the prior written consent of the other Party (such consent not to be unreasonably withheld, delayed or conditioned). It is understood and agreed that references to "Baylor" in this Section 4.5(d) include all faculty members, scientists, employees and students working at Baylor. This Section 4.5(d) will not apply to any Bluebird Business Program or Celgene Business Program, subject to the requirements of the last provisos in each of Sections 2.1(e)(i) and 2.1(e)(ii).

(e) *Development & Commercialization Agreements*. Celgene will not enter into any Baylor Product License without also entering into the applicable Development & Commercialization Agreement. For clarity this obligation will apply to all product candidates subject to any option rights under the Baylor Research Agreement, even if this Agreement has terminated or expired.

(f) *Payments***.** Except as set forth below, Celgene will be responsible for one hundred percent (100%) of all amounts accrued and required to be paid under (i) the Baylor Research Agreement for as long as Celgene is the contracting party thereunder, (ii) the Baylor Platform License for as long as Celgene is the contracting party thereunder (save for those amounts for which Bluebird is responsible under the sublicense agreement between Celgene and Bluebird under the Baylor Platform License), and (iii) all Baylor Product Licenses that correspond to License Agreements between Celgene and Bluebird for as long as Celgene is the contracting party thereunder, provided that any royalties payable under such Baylor Product Licenses will be subject to Section 4.3(d) of such License Agreement, and provided further that the foregoing will not be interpreted to require Celgene to make any payments under the Baylor Agreements that are payments which Celgene has the option to pay or not pay under the terms of the Baylor Agreements. Bluebird will be responsible for one hundred percent (100%) of amounts required to be paid to Baylor to fund the research and Development of Product Candidates by Baylor through Phase 1 Study if Bluebird elects by written notice to Celgene to have Baylor work under the Collaboration Program and such Product Candidates are included in the Collaboration Plan; provided that Baylor-Only Candidates will not be included in this payment obligation. All amounts accrued and required to be paid under those Baylor Product Licenses arising from the applicable Co-Development, Co-Promote and Profit Share Agreements between Celgene and Bluebird will be treated as follows: (1) with respect to the Development and Commercialization of Elected Candidate and Licensed Product for U.S. Administration thereunder, such amounts will be treated as U.S. Development Expenses or Allowable Expenses thereunder, (2) with respect to the Development and Commercialization of Elected Candidate and Licensed Product for both U.S. Administration and ROW Administration thereunder, such amounts will allocated to and be treated as U.S. Development Expenses or Allowable Expenses thereunder in accordance with Section 4.3(b) thereunder, and (3) with respect to the Development and Commercialization of Elected Candidate and Licensed Product solely for ROW Administration thereunder (including the Manufacture of Vectors and associated Payloads therefor pursuant to Section 7.4 thereunder), Celgene will be responsible for one hundred percent (100%) of all such amounts, provided that any royalties payable under such Baylor Product License will be subject to Section 11.3(d) thereunder.

(g) *Recoveries*. All recoveries arising from any enforcement or defense of any "Licensed Intellectual Property" (as defined in the Baylor Agreements) licensed to Celgene under any of the Baylor Product Licenses will be, after deducting any amounts owed to Baylor thereunder, subject to the recovery provisions of the applicable Development & Commercialization Agreement.

(h) *Baylor Declined Product.* If Celgene receives any payments from Baylor pursuant to Section 4.8(b) of the Baylor Research Agreement with respect to the commercialization of a "Declined Product" (as defined in the Baylor Research Agreement), Celgene will pay to Bluebird (i) **[***]** percent **[***]** of any such payment paid to Celgene with respect to a Declined Product that is not a Baylor-Only Candidate, and (ii) **[***]** percent **[***]** of any such payment paid to Celgene with respect to a Declined Product that is a Baylor-Only Candidate, in each case ((i) and (ii)) within thirty (30) days of Celgene's receipt thereof.

(i) *Baylor Product License*. If any IND Product Candidate or Pre-IND Product Candidate for which Bluebird takes over responsibility pursuant to Section 12.4 is or would be subject to a Baylor Product License, then Celgene will, at Bluebird's written request, either (i) assign to Bluebird the applicable Baylor Product License if in effect in accordance with the terms of Section 13.5 thereof, provided that if such Baylor Product License applies to other products, Celgene will assign or sublicense to Bluebird that portion of the Baylor Product License that applies to the Licensed Product, and with the consequences therein stated (that is, Celgene will remain responsible for all payments accruing thereunder prior to such assignment, and Bluebird will be responsible for all payments accruing thereunder after such assignment), or (ii) have Baylor enter into a Baylor Product License for such IND Product Candidate or Pre-IND Product Candidate, with Bluebird being responsible for all payments accruing thereunder, provided, that, in each case ((i) and (ii)), if Celgene exercises its option with respect to a Pre-IND Candidate pursuant to Section 12.4(c)(iii) and such Pre-IND Candidate is or would be subject to a Baylor Product License assigned to Bluebird under clause (i) above or entered into pursuant to clause (ii) above, then Celgene will reimburse Bluebird for all payments paid by Bluebird under such Baylor Product License with respect to such Pre-IND Candidate, and upon Celgene's request Bluebird will assign to Celgene such Baylor Product License if in effect in accordance with the terms of Section 13.5 thereof, provided that if such Baylor Product License applies to other products, Bluebird will assign or sublicense to Celgene that portion of the Baylor Product License that applies to such Pre-IND Candidate, with Celgene being responsible for all payments accruing thereunder after such assignment.

(j) *Survival*. This Section 4.5 will survive any termination or expiration of this Agreement. Celgene will, at Bluebird's written request, make the representation set forth in Section 11.6(d)(i) under the Baylor Platform License, unless Celgene reasonably concludes that Celgene is unable to make such representation in good faith.

4.6 No Implied Rights. No license, sublicense or other right is or will be created or granted hereunder by implication, estoppel or otherwise. Any licenses, sublicenses or rights will be granted only as expressly provided in this Agreement or any executed Development & Commercialization Agreement.

5. Option for Licensed Candidates.

5.1 Option Period. Bluebird will provide Celgene with all safety and efficacy data generated with respect to a Product Candidate in an initial Phase 1 Study and all correspondence to and from any Regulatory Authority regarding such Product Candidate (collectively, " Phase 1 Study Data"), as soon as reasonably practicable following Bluebird's receipt of same. From the period commencing at the Effective Date and ending, on a Product Candidate-by-Product Candidate basis, [***] following the completion of an initial Phase 1 Study with respect to such Product Candidate (the " Celgene Option Period"), Celgene will have the exclusive option to take a license to each Product Candidate, provided that if Celgene reasonably requests any additional data or information for such Product Candidate within the Celgene Option Period set forth above, the Celgene Option Period will be extended for an additional [***] after Celgene's receipt of such additional data or information. Bluebird shall deliver to Celgene no later than [***] following the completion of an initial Phase 1 Study with respect to such Product Candidate, the Schedule referred to in Section 16.2 of the Co-Development, Co-Promote and Profit Share Agreement or Section 9.2 of the License Agreement. Celgene may exercise such option by providing to Bluebird, prior to the expiration of the Celgene Option Period, (i) written notice that a Product Candidate is selected by Celgene to be an Optioned Candidate hereunder, and (ii) the additional information set forth in Exhibit F (collectively, the "Celgene Option Notice"). A separate Celgene Option Notice and Initial Option Fee will be required for each Product Candidate optioned by Celgene pursuant to this Section 5.1, and Celgene will pay to Bluebird the Initial Option Fee for each such Optioned Candidate as set forth in Section 8.4. Subject to Section 5.7 and Section 12.4, if not exercised prior to the expiration of the Celgene Option Period, the option and other rights granted to Celgene under this Section 5 with respect to a Product Candidate will terminate in full and will no longer be exercisable.

5.2 Celgene's Exercise of Option. Within [***] of Celgene's delivery of a Celgene Option Notice to Bluebird, Celgene (or an Affiliate designated by Celgene) and Bluebird will enter into a License Agreement in the form attached hereto as Exhibit A with respect to such Optioned Candidate (updating the appendices thereto), modified, if appropriate, as provided in Sections 4.2 or 5.5, and subject to Section 5.9. Upon execution of such License Agreement, such Optioned Candidate will be an "Elected Candidate" thereunder.

5.3 Co-Promotion/Co-Development Option Exercise . Within [***] following Celgene's delivery of a Celgene Option Notice to Bluebird, and subject to Section 5.9, Bluebird may exercise an option, by delivery of written notice to Celgene (the " Bluebird Option Notice") to

co-promote and co-Develop the Optioned Candidate in the U.S. as set forth in the Co-Development, Co-Promote and Profit Share Agreement attached hereto as Exhibit B, provided that with respect to a Baylor-Only Candidate for which Celgene has delivered a Celgene Option Notice, such option will end on the earlier of (i) [***] following Celgene's commencement of a Pivotal Study (as defined in the License Agreement) for such Baylor-Only Candidate, and (ii) the date that Bluebird delivers written notice to Celgene that Bluebird is declining to exercise such option. Prior to the expiration of such option for a Baylor-Only Candidate, upon Bluebird's written request, Celgene will provide Bluebird with (a) a reasonably detailed accounting of any payments made or other actions taken by Celgene pursuant to the License Agreement executed pursuant to Section 5.2 that would be the responsibility of Bluebird under the Co-Development, Co-Promote and Profit Share Agreement, including, for avoidance of doubt, costs incurred by Celgene in Developing such Baylor-Only Candidate through and including the Pivotal Study for such Baylor-Only Candidate, and (b) all safety and efficacy data in Celgene's possession as of the date of such request generated with respect to such Baylor-Only Candidate in all clinical studies conducted by Celgene for such Baylor-Only Candidate, all correspondence to and from any Regulatory Authority in Celgene's possession as of the date of such request regarding such Baylor-Only Candidate, and any other information relating to such Baylor-Only Candidate reasonably requested by Bluebird and in Celgene's possession as of the date of such request. In the event that Bluebird exercises such option, the Parties will promptly, but in any event within [***], terminate the License Agreement executed pursuant to Section 5.2 with respect to such Optioned Candidate, and enter into a Co-Development, Co-Promote and Profit Share Agreement in the form attached hereto as Exhibit B with respect to such Optioned Candidate, with appropriate amendments to reflect and reimburse Celgene for any payments made or other actions taken by Celgene pursuant to the License Agreement executed pursuant to Section 5.2 that are the responsibility of Bluebird under the Co-Development, Co-Promote and Profit Share Agreement, including, for avoidance of doubt, costs incurred by Celgene in Developing a Baylor-Only Candidate through and including the Pivotal Study for the Baylor-Only Candidate. Upon execution of such Co-Development, Co-Promote and Profit Share Agreement, such Optioned Candidate will be an "Elected Candidate" thereunder. [***]

5.4 Non-Co-Promotion/Co-Development Option Exercise. If during the [***] following Celgene's delivery of a Celgene Option Notice to Bluebird, Bluebird notifies Celgene in writing that Bluebird will not exercise the option set forth above in Section 5.3, or Bluebird does not deliver a Bluebird Option Notice to Celgene prior to the expiration of the [***] period following Celgene's delivery of a Celgene Option Notice to Bluebird, Celgene will pay to Bluebird the Additional Option Fee as set forth in Section 8.5, subject to Section 5.5.

5.5 Baylor-Only Candidate Royalty & Milestone Payments. In the event that any Optioned Candidate is also a Baylor-Only Candidate (as reasonably determined by the Parties), (i) the Initial Option Fee and the Additional Option Fee will each be reduced [***], and (ii) any royalties or milestone payments payable under the applicable Development & Commercialization Agreement with respect to such Optioned Candidate will be reduced [***]. All such payments will become due and payable only upon the commencement of a Pivotal Study (as defined in the applicable Development & Commercialization Agreement) for such Optioned Candidate. At such time that the Optioned Candidate no longer satisfies all of the requirements of the definition of Baylor-Only Candidate as set forth below in this Section 5.5, all

future milestone and royalty payments thereunder will be payable in the original amounts thereunder [***]. For clarity, such [***] reduction will only apply to royalties and milestone payments and no other payments under the applicable Development & Commercialization Agreement (and for clarity, in the Co-Development, Co-Promote and Profit Share Agreement attached hereto as Exhibit B, the profit share/loss will be unaffected). [***]

5.6 Follow-On Product Candidates. The Parties acknowledge and agree that the Collaboration Program may include the Development and evaluation of multiple Product Candidates targeting the same Target Antigen. If Celgene exercises its option pursuant to Section 5.1 to take a license to a Product Candidate that targets the same Target Antigen as an existing Optioned Candidate (a "Follow-On Product Candidate"), then the Parties will enter into a new License Agreement in the form attached hereto as Exhibit A with respect to such Follow-On Product Candidate, unless (i) Bluebird has exercised or does exercise its option to co-promote and co-Develop such existing Optioned Candidate in the U.S. as set forth in Section 5.3, and (ii) this Agreement has not been terminated by Celgene pursuant to Section 12.3(a), in which case the Parties will enter into a Co-Development, Co-Promote and Profit Share Agreement with respect to such Follow-On Product Candidate, provided that no [***] will be payable under any such Development & Commercialization Agreement. If the Parties enter into Co-Development, Co-Promote and Profit Share Agreement with respect to such Follow-On Product Candidate, Bluebird will have the option of paying [***] Bluebird's allowable expenses thereunder by [***]. If the Parties enter into a License Agreement pursuant to this Section 5.6 with respect to a Follow-On Product Candidate, Celgene will pay to Bluebird (a) the Initial Option Fee in accordance with Section 8.4, and (b) the Additional Option Fee in accordance with Section 8.5 (but excluding subsections (i) and (ii) of such Section 8.5). If the Parties enter into a Co-Development, Co-Promote and Profit Share Agreement pursuant to this Section 5.6 with respect to a Follow-On Product Candidate, Celgene will pay to Bluebird the Initial Option Fee in accordance with Section 8.4 but no Additional Option Fee.

5.7 Declined Product Candidates.

(a) *Bluebird Development*. If Celgene does not exercise its option with respect to a Product Candidate as set forth in Section 5.1, such Product Candidate or IND Product Candidate, as applicable, will become a " Declined Product Candidate" hereunder. Bluebird will have the option, exercisable upon written notice to Celgene (a "Bluebird Development Notice"), to Develop such Declined Product Candidate outside of the scope of the Collaboration Program, and Celgene hereby grants to Bluebird an exclusive, worldwide, royalty-free right and license, with the right to grant sublicenses, under the Celgene IP and Celgene's interest in jointly owned Collaboration IP, solely to Develop such Declined Product Candidate. If any royalty, milestone or other payment, [***] becomes due under any Applicable Celgene In-License that is attributable to Bluebird as a sublicensee thereunder with respect to such Development work, Celgene will pay same, provided that Bluebird will reimburse Celgene for any such payment within thirty (30) days of Bluebird's receipt of Celgene's written invoice therefor, and Bluebird's failure to pay such reimbursement within such time period will entitle Celgene to terminate Bluebird's sublicense under the Applicable Celgene In-License upon thirty (30) days written notice. In connection with any such Development activities, Bluebird will (i) maintain, or cause to be maintained, records of its activities with respect to the Development of such Declined Product Candidate in sufficient detail and in good scientific manner appropriate for scientific, Patent and regulatory purposes, for a period of at least ten (10) years after the creation of such records, but in no event less than required by applicable Laws, and Celgene will have the right to request and receive a copy of any such records, and (ii) furnish Celgene with a copy of any safety and efficacy data generated by Bluebird or its Affiliates in connection with a clinical trial performed with respect to such Declined Product Candidate, and all correspondence to and from any Regulatory Authority regarding such Declined Product Candidate, at least thirty (30) days prior to initiating a Declined Product Candidate Study for such Declined Product Candidate.

(b) *Celgene Buy-In Rights*.

(i) At least thirty (30) days prior to initiating a Declined Product Candidate Study for a Declined Product Candidate, and no later than thirty (30) days after completing a Declined Product Candidate Study for a Declined Product Candidate, Bluebird will provide Celgene with written notice of same. Celgene will have the option, exercisable on a Declined Product Candidate-by-Declined Product Candidate basis at any time prior to [***] completion of a Declined Product Candidate Study for such Declined Product Candidate, to designate such Declined Product Candidate as an Optioned Candidate. [***] prior to the initiation of a Declined Product Candidate Study for a Declined Product Candidate, Bluebird will provide to Celgene (1) all safety and efficacy data in Bluebird's possession as of the date of such disclosure generated with respect to such Declined Product Candidate in all clinical studies conducted prior to the Declined Product Candidate Study for such Declined Product Candidate, and (2) all correspondence to and from any Regulatory Authority regarding such Declined Product Candidate as of the date of such disclosure. Following such disclosure, Bluebird will provide Celgene with (x) any additional data and correspondence described in subsections (1) and (2) that comes into Bluebird's possession during such [***] period, and (y) any other information relating to such Declined Product Candidate reasonably requested by Celgene. Within [***] after the completion of a Declined Product Candidate Study for a Declined Product Candidate, Bluebird will provide Celgene with all safety and efficacy data generated with respect to such Declined Product Candidate in such Declined Product Candidate Study, all correspondence to and from any Regulatory Authority regarding such Declined Product Candidate, and any other information relating to such Declined Product Candidate reasonably requested by Celgene.

(ii) Such option is exercisable by Celgene by providing Bluebird with a Celgene Option Notice, and if Celgene so elects, (1) such Declined Product Candidate will be an Optioned Candidate for all purposes hereunder (other than Section 5.1), and (2) Celgene will pay to Bluebird (in lieu of any Option Fees) an amount equal to:

(A) if the option is exercised by Celgene prior to the initiation of the Declined Product Candidate Study, the greater of [***]; or

(B) if the option is exercised by Celgene after the initiation of the Declined Product Candidate Study, the greater of [***].

(iii) If Celgene does not exercise its option with respect to a Declined Product Candidate as set forth above, (A) the Development license granted by Celgene to Bluebird under Section 5.7(a) will also include the rights to Manufacture and commercialize such Declined Product Candidate, provided that such license shall be limited to the Celgene IP and jointly owned Collaboration IP as it exists at the time Celgene's option to the Declined Product Candidate has expired or been terminated (including in each case any additions, divisions, continuations, continuations-in-part, invention certificates, substitutions, reissues, reexaminations, extensions, registrations, supplementary protection certificates and renewals of such Celgene IP and Joint Collaboration IP), (B) such Declined Product Candidate will continue to be excluded from the scope of the Collaboration Program, (C) Bluebird will reimburse

Celgene within ten (10) days of the expiration of Celgene's option for the Declined Product Candidate for any royalty, milestone or other payments made by Celgene under the Applicable Celgene In-License (other than any upfront payment) in respect of such Declined Product Candidate; (D) if any royalty, milestone or other payment becomes due under any Applicable Celgene In-License that is attributable to Bluebird as a sublicensee (together with its licensees and their respective Affiliates) thereunder with respect to such Development, Manufacture or commercialization of the Declined Product Candidate, Celgene will pay same, provided that Bluebird will reimburse Celgene for any such payment within thirty (30) days of Bluebird's receipt of Celgene's written invoice therefor, and Bluebird's failure to pay such reimbursement within such time period will entitle Celgene to terminate Bluebird's sublicense under the Applicable Celgene In-License upon thirty (30) days written notice; and (E) subject to the exclusivity restrictions set forth in Section 2.1(e), Section 3.5 of the License Agreement (if applicable) or Section 10.4 of the Co-Development, Co-Promote and Profit Share Agreement (if applicable), Bluebird will be free to research, Develop, Manufacture and commercialize such Declined Product Candidate alone or with others with no further obligation to Celgene other than with respect to any payment that may become due under any Applicable Celgene In-License that is attributable to Bluebird as a sublicensee (together with its licensees and their respective Affiliates) thereunder with respect to such Development, Manufacture and commercialization.

5.8 Bluebird In-Licenses. Any Pre-Existing In-Licenses that are necessary or useful for a Product Candidate under a Development & Commercialization Agreement will automatically be included within the definition of Applicable Pre-Existing In-Licenses in such Development & Commercialization Agreement, and any Bluebird Collaboration In-Licenses that Celgene elects to include within the definition of Applicable New In-Licenses in such Development & Commercialization Agreement will be so included. Any Bluebird Collaboration In-Licenses that Celgene does not elect to include in such Development & Commercialization Agreement will be an Other In-License with respect to such Development & Commercialization Agreement unless and until Celgene elects to convert such Other In-License to an Applicable New In-License in accordance with the terms of the applicable Development & Commercialization Agreement. Promptly following Celgene's delivery of a Celgene Option Notice with respect to a Product Candidate, the Parties will mutually update the applicable Appendices to the Development & Commercialization Agreement. If the Parties cannot agree on such update, Celgene will have the right to make the final decision with respect to such update. For clarity, if, (1) during the Collaboration Program Term or (2) at the time Celgene takes rights to an IND Candidate or Pre-IND Candidate under Section 12.4, Celgene elects to convert a Bluebird New In-License into a Bluebird Collaboration In-License pursuant to Section 4.1(d), such Collaboration In-License will be an "Other In-License" with respect to any Development & Commercialization Agreement in effect or to be entered into under Section 12.4 at the time of such election, and Celgene may elect to convert such Other In-License to an Applicable New In-License in accordance with the terms of such applicable Development & Commercialization Agreement.

5.9 Government Approvals.

(a) Each of Celgene and Bluebird shall use its commercially reasonable good faith efforts to eliminate any concern on the part of any court or government authority regarding the

legality of any proposed Development & Commercialization Agreement (including with respect to IND Candidates and Pre-IND Candidates under Section 12.4), including, if required by federal or state antitrust authorities, promptly taking all steps to secure government antitrust clearance, including cooperating in good faith with any government investigation including the prompt production of documents and information demanded by a second request for documents and of witnesses if requested. Notwithstanding anything to the contrary in this Agreement, this Section 5.9 and the term "commercially reasonable good faith efforts" do not require that either Party (i) offer, negotiate, commit to or effect, by consent decree, hold separate order, trust or otherwise, the sale, divestiture, license or other disposition of any capital stock, assets, rights, products or businesses of Celgene, Bluebird or their respective Affiliates, (ii) agree to any restrictions on the businesses of Celgene, Bluebird or their respective Affiliates, or (iii) pay any material amount or take any other action to prevent, effect the dissolution of, vacate, or lift any decree, order, judgment, injunction, temporary restraining order, or other order in any suit or proceeding that would otherwise have the effect of preventing or delaying the transactions contemplated by any proposed Development and Commercialization Agreement.

(b) Each of Celgene and Bluebird shall, within ten (10) business days after the execution of a Development & Commercialization Agreement (or such later time as may be agreed to in writing by the Parties) file with the United States of America Federal Trade Commission (" FTC") and the Antitrust Division of the United States of America Department of Justice (" DOJ") any HSR Filing required of it under the HSR Act in the reasonable opinion of either Party with respect to the transactions contemplated by such Development and Commercialization Agreement. The Parties shall cooperate with one another to the extent necessary in the preparation of any such HSR Filing. [***] In the event that the Parties make an HSR Filing under this Section 5.9, the relevant Development & Commercialization Agreement shall terminate (i) at the election of either Party, immediately upon notice to the other Party, in the event that the United States of America Federal Trade Commission or the United States of America Department of Justice obtains a preliminary injunction under the HSR Act against the Parties to enjoin the transactions contemplated by such Development & Commercialization Agreement or (ii) at the election of either Party, immediately upon notice to the other Party, in the event that the HSR Clearance Date shall not have occurred on or prior to one hundred eighty (180) days after the effective date of the HSR Filing. Notwithstanding anything to the contrary contained herein, except for the terms and conditions of this Section 5.9, none of the terms and conditions contained in a Development and Commercialization Agreement shall be effective until the " Implementation Date," which is agreed and understood to mean the later of (1) the execution date of the Development & Commercialization Agreement, (2) if a determination is made pursuant to this Section 5.9 that a notification of this Agreement is not required to be made under the HSR Act, the date of such determination, or (3) if notification of this Agreement is required to be made under the HSR Act, the HSR Clearance Date. As used herein: (x) " HSR Act" means the Hart-Scott-Rodino Antitrust Improvements Act of 1976, as amended, and the rules and regulations promulgated thereunder; (y) " HSR Clearance Date" means the earliest date on which the Parties have actual knowledge that all applicable waiting periods under the HSR Act with respect to the transactions contemplated by a Development & Commercialization Agreement have expired or have been terminated; and (z) " HSR Filing" means a filing by Celgene and Bluebird with the United States of America Federal Trade Commission and the

Antitrust Division of the United States of America Department of Justice of a Notification and Report Form for Certain Mergers and Acquisitions (as that term is defined in the HSR Act) with respect to the matters set forth in this Agreement, together with all required documentary attachments thereto.

(c) Each of Celgene and Bluebird shall, in connection with any HSR Filing, (i) reasonably cooperate with each other in connection with any communication, filing or submission and in connection with any investigation or other inquiry, including any proceeding initiated by a private party; (ii) keep the other Party and/or its counsel informed of any communication received by such Party from, or given by such Party to, the FTC, the DOJ or any other U.S. or other governmental authority and of any communication received or given in connection with any proceeding by a private party, in each case regarding the transactions contemplated by any proposed Development & Commercialization Agreement; (iii) consult with each other in advance of any meeting or conference with the FTC, the DOJ or any other governmental authority or, in connection with any proceeding by a private party, with any other person, and to the extent permitted by the FTC, the DOJ or such other governmental authority or other person, give the other Parties and/or their counsel the opportunity to attend and participate in such meetings and conferences; and (iv) permit the other Parties and/or their counsel to review in advance any submission, filing or communication (and documents submitted therewith) intended to be given by it to the FTC, the DOJ or any other governmental authority; provided, that materials may be redacted to remove references concerning the valuation of the business of Bluebird. Bluebird and Celgene, as each deems advisable and necessary, may reasonably designate any competitively sensitive material to be provided to the other under this Section 5.9(c) as "Antitrust Counsel Only Material." Such materials and the information contained therein shall be given only to the outside antitrust counsel of the recipient and will not be disclosed by such outside counsel to employees, officers or directors of the recipient unless express permission is obtained in advance from the source of the materials (Celgene or Bluebird, as the case may be) or its legal counsel.

(d) Celgene and Bluebird shall cooperate and use respectively all reasonable efforts to make all other registrations, filings and applications, to give all notices and to obtain as soon as practicable all governmental or other consents, transfers, approvals, orders, qualifications authorizations, permits and waivers, if any, and to do all other things necessary or desirable for the consummation of the transactions as contemplated hereby. Neither Party shall be required, however, to divest or out-license products or assets or materially change its business if doing so is a condition of obtaining approval of the transactions contemplated by this Agreement.

(e) If a Development & Commercialization Agreement is terminated pursuant to this Section 5.9, then, notwithstanding any provision in this Agreement to the contrary, neither Party shall have any further obligation to the other Party with respect to the subject matter of such Development & Commercialization Agreement.

5.10 Section 365(n) of the Bankruptcy Code. All rights and licenses granted pursuant to any section of this Agreement are, and will be deemed to be, rights and licenses to "intellectual property" (as defined in Section 101(35A) of title 11 of the United States Code and of any similar provisions of applicable Laws under any other jurisdiction (the "Bankruptcy Code")). Each Party agrees that the other Party, as a licensee of rights and licenses under this Agreement,

will retain and may fully exercise all of its rights and elections under the Bankruptcy Code. The Parties further agree that, in the event of the commencement of a bankruptcy proceeding by or against a Party under the Bankruptcy Code or analogous provisions of applicable Law outside the United States, the other Party will be entitled to a complete duplicate of (or complete access to, as appropriate) any intellectual property licensed to such Party and all embodiments of such intellectual property, which, if not already in such Party's possession, will be promptly delivered to it (a) upon any such commencement of a bankruptcy proceeding upon such Party's written request therefor, unless the Party in the bankruptcy proceeding elects to continue to perform all of its obligations under this Agreement or (b) if not delivered under clause (a), following the rejection of this Agreement by the Party in the bankruptcy proceeding upon written request therefor by the other Party.

6. [***]

6.8 Definitions. For purposes of this Section 6,

(a) A "Corporate Event" means a Business Combination involving Bluebird; it being understood and agreed that, solely for purposes of this Section 6, references to "Third Party" and "Third Parties" in the definition of "Business Combination" shall be deemed to include Celgene and, therefore, a "Corporate Event" may involve Bluebird and Celgene.

(b) [***]

6.9 Call Option. Bluebird grants to Celgene the rights set forth in Exhibit L (the "Call Option").

7. [***]

8. Payments.

8.1 Up-Front Payment. Celgene will pay to Bluebird, within ten (10) days after the Effective Date, a one-time payment of seventy-five million dollars (U.S. $75,000,000) in consideration for the research and Development work to be performed by or on behalf of Bluebird as a part of the Collaboration Program, which will be non-refundable and non-creditable and not subject to set-off.

8.2 First Collaboration Extension Term Fee. In consideration for the research and Development work to be performed by or on behalf of Bluebird as a part of the Collaboration Program, Celgene will pay to Bluebird a one-time payment of [***] within [***] after the date of the delivery to Bluebird of written notice electing to extend the Collaboration Program for the First Collaboration Program Extension Term in accordance with Section 2.1(d), which will, except as otherwise set forth in Sections 4.3 and 12.6 hereof, Section 10.6 of the License Agreement (if applicable) or Section 17.6 of the Co-Development, Co-Promote and Profit Share Agreement (if applicable), be non-refundable and non-creditable and not subject to set-off.

8.3 Second Collaboration Extension Term Fee. In consideration for the research and Development work to be performed by or on behalf of Bluebird as a part of the Collaboration Program, Celgene will pay to Bluebird a one-time payment of [***] within [***] after the date of the delivery to Bluebird of written notice electing to extend the Collaboration Program for the Second Collaboration Program Extension Term in accordance with Section 2.1(d), which will, except as otherwise set forth in Sections 4.3 and 12.6 hereof, Section 10.6 of the License Agreement (if applicable) or Section 17.6 of the Co-Development, Co-Promote and Profit Share Agreement (if applicable), be non-refundable and non-creditable and not subject to set-off.

8.4 Initial Option Fee. Subject to Sections 5.5 and 5.6, Celgene will pay to Bluebird [***] (an " Initial Option Fee") within [***] after the Implementation Date for each Development & Commercialization Agreement, which Initial Option Fee will, except as otherwise set forth in Sections 4.1(e), 4.3 and 12.6 hereof, Section 10.6 of the License Agreement (if applicable) or Section 17.6 of the Co-Development, Co-Promote and Profit Share Agreement (if applicable), be non-refundable and non-creditable and not subject to set-off.

8.5 Additional Option Fee. Subject to Sections 5.5 and 5.6, Celgene will pay to Bluebird [***] (the " Additional Option Fee") within [***] after the later to occur of (i) Bluebird's written notice to Celgene that Bluebird will not exercise the option set forth above in Section 5.2, (ii) Bluebird does not deliver a Bluebird Option Notice to Celgene prior to the expiration of the [***] period following Celgene's delivery of a Celgene Option Notice to Bluebird, and (iii) the Implementation Date, which Additional Option Fee will, except as otherwise set forth in Sections 4.1(e), 4.3 and 12.6 hereof, Section 10.6 of the License Agreement (if applicable) or Section 17.6 of the Co-Development, Co-Promote and Profit Share Agreement (if applicable), be non-refundable and non-creditable and not subject to set-off.

8.6 In-Licenses; New Celgene In-Licenses.

(a) *Pre-Existing In-Licenses*. If any payments become due during the Term under any Pre-Existing In-License, Bluebird will be solely responsible for such payments, other than as expressly provided in Section 9.2 and, provided such payment obligation is not specifically attributable to any executed Development & Commercialization Agreement, which will be addressed thereunder. [***] Bluebird will not use any Patents, Know-How or Materials in-licensed pursuant to a Pre-Existing In-License in the Collaboration Program if Bluebird does not have the right under such Pre-Existing In-License to use such Patents, Know-How or Materials in the Field.

(b) *Bluebird Collaboration In-Licenses*. If any payments become due during the Term under any Bluebird Collaboration In-License, Bluebird will be solely responsible for such payments, other than as expressly provided in Section 9.2, provided that [***]

(c) *Celgene In-Licenses*. Except as otherwise provided in Sections 2.1(h)(ii), 5.7 and 12.4, Payments that become due under any Applicable Celgene In-License will be paid as set forth in Section 4.1(e), and any royalties payable under such Applicable Product In-License will be paid by Celgene and will be subject to Section 4.3(d) of any License Agreement or Section 11.3(d) of any Co-Development, Co-Promote and Profit Share Agreement, as applicable.

8.7 Taxes. [***]

9. Patent Prosecution and Maintenance.

9.1 Generally. Subject to Sections 9.2 and 9.3, Bluebird will have the sole right to Prosecute and Maintain Patents within the Bluebird IP, Celgene will have the sole right to Prosecute and Maintain Patents with the Celgene IP, and the Parties will jointly control the Prosecution and Maintenance of any Patents within jointly-owned Collaboration IP.

9.2 Celgene Input; Expenses. Bluebird will regularly provide Celgene with copies of all applications for Patents within the Bluebird IP, and all other material submissions and correspondence with any patent authorities regarding such Patents, in sufficient time to allow for review and comment by Celgene. In addition, Bluebird will provide Celgene and its counsel with an opportunity to consult with Bluebird and its counsel regarding Prosecution and Maintenance of any such Patents in the Field, and Bluebird will consider in good faith all comments timely made by Celgene and its counsel. In the event of any disagreement between any of Bluebird or Celgene, Bluebird will have the final decision-making authority with respect to the matter involved as long as Bluebird acts in good faith, provided that if Celgene requests that Bluebird Prosecute and Maintain Patents in a particular jurisdiction, Bluebird will comply with such request, and provided further that Bluebird will not abandon Prosecution and Maintenance of any Patents within the Bluebird IP without Celgene's prior written consent (such consent not to be unreasonably withheld, delayed or conditioned). In addition, for each Product Candidate, the Parties shall cooperate to develop a mutually acceptable patent strategy designed to obtain Patents that include only claims Covering the Product Candidate, pharmaceutical compositions comprising the Product Candidate, or their manufacture or use, and no other product (or its manufacture or use), and Bluebird shall, to the extent permitted under applicable Law, use its reasonable best efforts to implement such strategy. [***]

9.3 Bluebird Input; Expenses. Celgene will regularly provide Bluebird with copies of all applications for Patents (i) within Collaboration IP solely owned by Celgene pursuant to Section 2.1(f) and (ii) within the Celgene IP that are in-licensed by Celgene pursuant to an Applicable Celgene New In-License (other than those sublicensed to Bluebird on a non-exclusive basis), and all other material submissions and correspondence with any patent authorities regarding such Patents, in sufficient time to allow for review and comment by Bluebird. In addition, Celgene will provide Bluebird and its counsel with an opportunity to consult with Celgene and its counsel regarding Prosecution and Maintenance of any such Patents in the Field, and Celgene will consider in good faith all comments timely made by Bluebird and its counsel. In the event of any disagreement between any of Bluebird or Celgene, Celgene will have the final decision-making authority with respect to the matter involved as long as Celgene acts in good faith. During the Term, Celgene will be solely responsible for all Patent Costs incurred in connection with the Prosecution and Maintenance of Patents within the Celgene IP.

9.4 Jointly Owned Collaboration IP. The Prosecution and Maintenance and the enforcement and defense of any Patents within jointly-owned Collaboration IP will be jointly managed by the Parties on mutually agreeable terms to be entered into by the Parties at the time any such Patents are first filed, provided that (i) absent further agreement, the enforcement and defense of any Patents within jointly-owned Collaboration IP will be governed by, and all recoveries and Patent Costs arising from the enforcement or defense of any Patents within jointly-owned Collaboration IP will be retained or borne, as applicable, in accordance with the principles set forth in Section 2.1(f)(iii) (i.e., U.S. patent law for joint ownership of Patents will apply), and (ii) Patent Costs incurred in connection with the Prosecution and Maintenance of Patents within jointly-owned Collaboration IP will be apportioned as set forth in Section 9.2, for the purposes of which, such Patents will be treated as Patents within the Bluebird IP, provided that in each case ((i) and (ii)), if either Party elects not to pay any such Patent Costs for any such Patent, the Parties will meet and agree upon an equitable way to treat such Patent.

9.5 Third Party Rights.

(a) To the extent that a Third Party licensor of Bluebird has retained any right to Prosecute or Maintain any Patent within the Bluebird IP licensed to Bluebird pursuant to a Bluebird In-License, or otherwise be involved in such activities, Bluebird will use commercially reasonable efforts to cause such Third Party licensor to take the actions specified by Section 9. in a manner consistent with the Bluebird In-Licenses applicable thereto, but Bluebird will not be deemed to be in breach of its obligations under Section 9 if, after using such commercially reasonable efforts, it is unable to comply with such obligations because of actions taken or not taken by such Third Party licensor.

(b) To the extent that a Third Party licensor of Celgene has retained any right to Prosecute or Maintain any Patent within the Celgene In-Licensed IP licensed to Celgene pursuant to an Applicable Celgene In-License, or otherwise be involved in such activities, Celgene will use commercially reasonable efforts to cause such Third Party licensor to take the actions specified by Section 9 in a manner consistent with the Applicable Celgene In-Licenses applicable thereto, but Celgene will not be deemed to be in breach of its obligations under Section 9 if, after using such commercially reasonable efforts, it is unable to comply with such obligations because of actions taken or not taken by such Third Party licensor.

9.6 Common Interest Disclosures. With regard to any information or opinions disclosed pursuant to this Agreement by one Party to the other Party regarding Prosecution and Maintenance of Patent within the Bluebird IP, Celgene IP or Collaboration IP or enforcement or defense of intellectual property and/or technology by or against Third Parties, Bluebird and Celgene agree that they have a common legal interest in determining the ownership, scope, validity and/or enforcement of the Bluebird IP, Celgene IP or Collaboration IP, and whether, and to what extent, Third Party intellectual property rights may affect the conduct of the Development and commercialization of any Product Candidate, and have a further common legal interest in defending against any actual or prospective Third Party claims based on allegations of misuse or infringement of intellectual property rights relating to the Development or commercialization of any Product Candidate. Accordingly, the Parties agree that all such information and materials obtained by the Parties from each other will be used solely for purposes of the Parties' common legal interests with respect to the conduct of the Agreement and otherwise for each Party to exercise its rights and perform its obligations hereunder. All such information and materials will be treated as protected by the attorney-client privilege, the work product privilege, and any other privilege or immunity that may otherwise be applicable. By sharing any such information and materials, neither Party intends to waive or limit any privilege or immunity that may apply to the shared information and materials. Neither Party will have the authority to waive any privilege or immunity on behalf of the other Party without such other Party's prior written consent, nor will the waiver of privilege or immunity resulting from the conduct of one Party be deemed to apply against any other Party. This Section 9.6 will be subject to any right granted by Bluebird to any Third Party or by Celgene to any Third Party, provided that the grant of such right to such Third Party does not conflict with the other Party's rights or a Party's obligations under this Agreement.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

10. Confidentiality.

10.1 Confidential Information.

(a) *Confidential Information*. Each Party ("Disclosing Party") may have disclosed or will disclose to the other Party (" Receiving Party"), and Receiving Party may acquire during the course and conduct of activities under this Agreement or any executed Development & Commercialization Agreement, certain proprietary or confidential information of Disclosing Party. The term " Confidential Information" means (i) all Materials and (ii) all ideas and information of any kind, whether in written, oral, graphical, machine-readable or other form, whether or not marked as confidential or proprietary, which are transferred, disclosed or made available by Disclosing Party or at the request of Receiving Party, including any of the foregoing of Third Parties. Without limiting the foregoing, Collaboration IP solely owned by Bluebird will be considered Confidential Information of Bluebird, Collaboration IP solely owned by Celgene will be considered Confidential Information of Celgene, and Collaboration IP jointly owned by the Parties will be considered Confidential Information of both Parties.

(b) *Restrictions*. During the Term and for ten (10) years thereafter, Receiving Party will keep all Disclosing Party's Confidential Information in confidence with the same degree of care with which Receiving Party holds its own confidential information, provided that the foregoing obligation will apply to any Confidential Information that constitutes a trade secret for so long as such Confidential Information is afforded trade secret protection under applicable Law. Receiving Party will not use Disclosing Party's Confidential Information except for in connection with the performance of its obligations and exercise of its rights under this Agreement or any executed Development & Commercialization Agreement. Receiving Party has the right to disclose Disclosing Party's Confidential Information without Disclosing Party's prior written consent (such consent not to be unreasonably withheld, delayed or conditioned), to the extent and only to the extent reasonably necessary, to Receiving Party's Affiliates and their employees, subcontractors, sublicensees, consultants or agents who have a need to know such Confidential Information in order to perform its obligations and exercise its rights under this Agreement or any executed Development & Commercialization Agreement and who are required to comply with restrictions on use and disclosure similarly restrictive as those in this Section 10.1(b). Receiving Party will use diligent efforts to cause those entities and persons to comply with such restrictions on use and disclosure. Receiving Party assumes responsibility for those entities and persons maintaining Disclosing Party's Confidential Information in confidence and using same only for the purposes described herein.

(c) *Exceptions*. Receiving Party's obligation of nondisclosure and the limitations upon the right to use the Disclosing Party's Confidential Information will not apply to the extent that Receiving Party can demonstrate that the Disclosing Party's Confidential Information: (i) was known to Receiving Party or any of its Affiliates prior to the time of disclosure; (ii) is or becomes public knowledge through no fault or omission of Receiving Party or any of its Affiliates; (iii) is obtained by Receiving Party or any of its Affiliates from a Third Party under no obligation of confidentiality to Disclosing Party; or (iv) has been independently developed by employees, subcontractors, consultants or agents of Receiving Party or any of its Affiliates without the aid, application or use of Disclosing Party's Confidential Information, as evidenced by contemporaneous written records.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

(d) *Permitted Disclosures*. Receiving Party may disclose Disclosing Party's Confidential Information to the extent (and only to the extent) such disclosure is reasonably necessary in the following instances:

(i) in order to comply with applicable Law (including any securities law or regulation or the rules of a securities exchange) or with a legal or administrative proceeding;

(ii) in connection with prosecuting or defending litigation, Regulatory Approvals and other regulatory filings and communications, and filing, prosecuting and enforcing Patents in connection with Receiving Party's rights and obligations pursuant to this Agreement or any executed Development & Commercialization Agreement; and

(iii) in connection with performing its obligations or exercising its rights hereunder or any executed Development & Commercialization Agreement, to its Affiliates; and subject to Section 10.3(a), to potential and future collaborators, licensees, sublicensees and permitted acquirers or assignees, and investment bankers, investors and lenders;

provided that (1) with respect to Sections 10.1(d)(i) or 10.1(d)(ii), where reasonably possible, Receiving Party will notify Disclosing Party of Receiving Party's intent to make any disclosure pursuant thereto sufficiently prior to making such disclosure so as to allow Disclosing Party adequate time to take whatever action it may deem appropriate to protect the confidentiality of the information to be disclosed, and (2) with respect to Section 10.1(d)(iii), each of those named people and entities are required to comply with restrictions on use and disclosure at least as restrictive as those in Section 10.1(b) (other than investment bankers, investors and lenders, which must be bound prior to disclosure by commercially reasonable obligations of confidentiality).

10.2 Publications. The Parties may desire to publish in scientific journals and present at scientific conferences the results of the Collaboration Program, subject to the following process. Notwithstanding anything to the contrary herein, either Party may propose publication of the results of the Collaboration Program following scientific review by the JSC (if in force) and subsequent written approval by Bluebird's and Celgene's management, which approval will not be unreasonably withheld, delayed or conditioned. After receipt of the proposed publication by both Celgene's and Bluebird's managements, such written approval or disapproval will be provided within thirty (30) days. Both Parties understand that a reasonable commercial strategy may require delay of publication of information or filing of Patent applications, therefore the Parties agree to review and consider delay of publication and filing of Patent applications under certain circumstances for a reasonably limited period of time. Once publications have been reviewed by each Party and have been approved for publication, the same publications do not have to be provided again to the other Party for review for a later submission for publication. Expedited reviews for abstracts or poster presentations may be arranged if mutually agreeable to the Parties. Each Party will acknowledge the other Party's technical, non-financial contributions in any such publication. For the avoidance of doubt, the foregoing requirements and restrictions will not apply with respect to either Party's proposed publication of results of any work performed (i) following the expiration or termination of the Collaboration Program, or (ii) with respect to any Declined Product Candidate, in each case except as such results specifically relate to any Optioned Candidate or to any Product Candidate for which Celgene has an option

hereunder (unless such option expires without Celgene having exercised such option), in which case Bluebird may not publish or present such results without Celgene's prior written approval, which will not be unreasonably withheld, delayed or conditioned.

10.3 Terms of this Agreement; Publicity.

(a) *Restrictions*. The Parties agree that the terms of this Agreement (including, for clarity, for this Section 10.3(a), the Exhibits hereto) and any executed Development & Commercialization Agreement will be treated as Confidential Information of both Parties, and thus may be disclosed only as permitted by Section 10.1(d). Each Party shall also be permitted to disclose the terms of this Agreement, in each case under appropriate confidentiality provisions at least as protective as those contained in this Agreement, on a need to know basis, to a bona fide potential or future permitted acquirer or assignee, investment banker, investor, licensee, sublicensee, collaborator or lender with whom a Party has entered into good faith negotiations regarding a proposed transaction, provided that (i) such disclosure is solely in the form of the redacted version of (A) this Agreement attached hereto as Exhibit H or (B) the redacted version of such executed Development & Commercialization Agreement attached as an Appendix thereto and (ii) a corresponding summary of financial terms for each such agreement also attached as an Exhibit or Appendix (as applicable) thereto. Only after negotiations with any such Third Party have progressed so that such Party reasonably and in good faith believes it will execute a definitive agreement with such Third Party with respect to the proposed transaction within the following fifteen (15) business days may such Party provide an unredacted version of this Agreement and any executed Development & Commercialization Agreement to such Third Party. In addition to the foregoing, (1) Bluebird may provide an unredacted version of this Agreement and any executed Development & Commercialization Agreement to its investment bankers and other advisors, and (2) if Bluebird desires to enter into any such proposed transaction through an auction process, Bluebird may disclose the redacted form of this Agreement and any executed Development & Commercialization Agreement as part of that process, along with the financial summary, and may provide an unredacted version of this Agreement and any executed Development & Commercialization Agreement to those Third Parties that make a bona fide bid as part of such process, provided that Bluebird may not rely on this clause (2) until after the end of the Call Option Period. Except as required by Law, each Party agrees not to issue any press release or public statement disclosing information relating to this Agreement, any executed Development & Commercialization Agreement, the transactions contemplated hereby or thereby or any of the terms hereof or thereof without the prior written consent of the other Party (such consent not to be unreasonably withheld, delayed or conditioned), or as such consent may be obtained in accordance with Section 10.3(b), or as permitted by Section 10.3(d).

(b) *Review*. In the event either Party (the "Issuing Party") desires to issue a press release or other public statement disclosing information relating to this Agreement, any executed Development & Commercialization Agreement, the transactions contemplated hereby or thereby or the terms hereof or thereof, the Issuing Party will provide the other Party (the "Reviewing Party") with a copy of the proposed press release or public statement (the "Release"). The Issuing Party will specify with each such Release, taking into account the urgency of the matter being disclosed, a reasonable period of time within which the Reviewing Party may provide any

comments on such Release and if the Reviewing Party fails to provide any comments during the response period called for by the Issuing Party, the Reviewing Party will be deemed to have consented to the issuance of such Release. If the Reviewing Party provides any comments, the Parties will consult on such Release and work in good faith to prepare a mutually acceptable Release. If the Reviewing Party does not provide its consent, not to be unreasonably withheld, conditioned or delayed, to the issuance of the Release, the Issuing Party will not issue the Release except as required by Law. Either Party may subsequently publicly disclose any information previously contained in any Release so consented to. Bluebird may issue a Release upon the payment by Celgene of a fee under Section 8.2 or 8.3 to extend the Collaboration Program Term, subject to Celgene's prior review and approval (such approval not to be unreasonably withheld, delayed or conditioned).

(c) *Joint Press Release*. The Parties agree to issue the joint press release on Exhibit I.

(d) *Securities Filings*. Each Party acknowledges and agrees that the other Party may submit this Agreement (including, for clarity, the Exhibits hereto) and any executed Development & Commercialization Agreement to the United States Securities and Exchange Commission (the " SEC") and if a Party does submit this Agreement or any executed Development & Commercialization Agreement to the SEC, such Party agrees to consult with the other Party with respect to the preparation and submission of, a confidential treatment request for this Agreement or such executed Development & Commercialization Agreement. If a Party is required by Law to make a disclosure of the terms of this Agreement or any executed Development & Commercialization Agreement in a filing with or other submission to the SEC, and (i) such Party has provided copies of the disclosure to the other Party as far in advance of such filing or other disclosure as is reasonably practicable under the circumstances, (ii) such Party has promptly notified the other Party in writing of such requirement and any respective timing constraints, and (iii) such Party has given the other Party a reasonable time under the circumstances from the date of notice by such Party of the required disclosure to comment upon, request confidential treatment or approve such disclosure, then such Party will have the right to make such public disclosure at the time and in the manner reasonably determined by its counsel to be required by Law. Notwithstanding anything to the contrary herein, it is hereby understood and agreed that if a Party seeking to make a disclosure to the SEC as set forth in this Section 10.3(d), and the other Party provides comments within the respective time periods or constraints specified herein or within the respective notice, the Party seeking to make such disclosure or its counsel, as the case may be, will in good faith (A) consider incorporating such comments and (B) use reasonable efforts to incorporate such comments, limit disclosure or obtain confidential treatment to the extent reasonably requested by the other Party.

10.4 Relationship to the Confidentiality Agreement. This Agreement supersedes that certain "Mutual Confidentiality Agreement" between the Parties dated May 21, 2012; provided that all "Confidential Information" disclosed or received by the Parties thereunder will be deemed "Confidential Information" hereunder and will be subject to the terms and conditions of this Agreement.

11. Warranties; Limitations of Liability; Indemnification.

11.1 Representations and Warranties. Each Party represents and warrants to the other as of the Effective Date that it has the legal right and power to enter into this Agreement, to extend the rights granted or to be granted to the other in this Agreement, and to fully perform its obligations hereunder.

11.2 Additional Representations and Warranties of Bluebird. Bluebird represents and warrants to Celgene as of the Effective Date that:

(a) Except for the Pre-Existing In-Licenses, neither Bluebird nor any of its Affiliates is a party to any license, sublicense or other agreement pursuant to which Bluebird or such Affiliate has received a license or other rights relating to the Collaboration Program or the Field.

(b) The Pre-Existing In-Licenses in effect as of the Effective Date are valid and binding obligations of Bluebird and, to the Knowledge of Bluebird, the applicable licensor, enforceable against Bluebird and, to the Knowledge of Bluebird, the applicable licensor, in accordance with their terms, except as may be limited by general principles of equity (regardless of whether considered in a proceeding at law or in equity) and by applicable bankruptcy, insolvency, moratorium and other similar Laws of general application relating to or affecting creditors' rights generally. Neither Bluebird nor any of its Affiliates has received any notice of any counterparty's intention to terminate any Pre-Existing In-Licenses in whole or in part or any notice requesting any amendment, alteration or modification of such Pre-Existing In-License or any sublicense or assignment thereunder. There is no breach or default, or event which upon notice or the passage of time, or both, would give rise to any breach or default, in the performance of any Pre-Existing In-License by Bluebird or any of its Affiliates or, to the Knowledge of Bluebird, the counterparty thereto, and Bluebird has not received any notice of any such breach, default or event. All Patents and Know-How licensed to Bluebird under the Pre-Existing In-Licenses are Controlled by Bluebird for purposes of the licenses granted to Celgene under this Agreement and under any Development & Commercialization Agreement.

(c) Neither Bluebird nor any of its Affiliates has entered into any agreement or otherwise licensed, granted, assigned, transferred, conveyed or otherwise encumbered or disposed of any right, title or interest in or to any of its assets, including any intellectual property rights, that would in any way conflict with or impair the scope of any rights or licenses granted to Celgene hereunder (including the rights granted under Section 6 and under [***]) or that would be granted to Celgene under any Development & Commercialization Agreement, including under any of the agreements which Bluebird has identified to Celgene prior to the Effective Date.

(d) Exhibit J sets forth a complete and accurate list of all Patents included in the Bluebird IP, indicating the owner, licensor and/or co-owner(s), if applicable. Bluebird Controls the Patents listed on Exhibit J and the Know-How within the Bluebird IP, and is entitled to grant the licenses specified herein. To Bluebird's Knowledge, the Patents listed on Exhibit J have been procured or are being procured from the respective patent offices in accordance with applicable Law. None of the Patents included in the Bluebird IP is or has been involved in any opposition, cancellation, interference, reissue or reexamination proceeding, and no Bluebird IP is the subject of any judicial, administrative or arbitral order, award, decree, injunction, lawsuit,

proceeding or stipulation. Neither Bluebird nor any of its Affiliates has received any notice alleging that the Patents in the Bluebird IP are invalid or unenforceable, or challenging Bluebird's ownership of or right to use any such rights.

(e) Exhibit K sets forth a complete and accurate list of all agreements relating to the licensing, sublicensing or other granting of rights by Bluebird to any Person with respect to the Bluebird IP and the Field, and Bluebird has provided complete and accurate copies of all such agreements to Celgene. Except for the Pre-Existing In-Licenses, Bluebird and its Affiliates are not subject to any payment obligations to Third Parties as a result of the execution or performance of this Agreement. Neither Bluebird nor any of its Affiliates has granted any liens or security interests on the Bluebird IP and the Bluebird IP is free and clear of any mortgage, pledge, claim, security interest, covenant, easement, encumbrance, lien or charge of any kind.

(f) The execution, delivery and performance by Bluebird of this Agreement and the consummation of the transactions contemplated hereby will not result in any violation of, conflict with, result in a breach of or constitute a default under any understanding, contract or agreement to which Bluebird is a party or by which it is bound, including each of the agreements which Bluebird has identified to Celgene prior to the Effective Date.

(g) There is no action, suit, proceeding or investigation pending or, to the Knowledge of Bluebird, currently threatened in writing against or affecting Bluebird that questions the validity of this Agreement or the right of Bluebird to enter into this Agreement or consummate the transactions contemplated hereby.

(h) Other than with respect to any Patents, Know-How or Materials licensed to Celgene pursuant to any of the Baylor Agreements, (i) neither Bluebird nor any of its Affiliates has received any notice of any claim that any Patent, Know-How or other intellectual property owned or controlled by a Third Party would be infringed or misappropriated by the production, use, research, Development, Manufacture or Commercialization of any Product Candidate pursuant to this Agreement and any Development & Commercialization Agreement, and (ii) to the Knowledge of Bluebird, there are no Patents, Know-How or other intellectual property owned by a Third Party and not included in the Bluebird IP that are necessary for the production, use, research, Development, Manufacture or commercialization of any Product Candidate.

11.3 Disclaimers. Without limiting the respective rights and obligations of the Parties expressly set forth herein, each Party specifically disclaims any guarantee that the Collaboration Program will be successful, in whole or in part. EXCEPT AS OTHERWISE EXPRESSLY PROVIDED IN THIS AGREEMENT, THE PARTIES MAKE NO REPRESENTATIONS AND EXTEND NO WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO ANY BLUEBIRD IP, CELGENE IP, PRODUCT CANDIDATES, MATERIALS, INCLUDING WARRANTIES OF VALIDITY OR ENFORCEABILITY OF ANY PATENT RIGHTS, TITLE, QUALITY, MERCHANTABILITY, FITNESS FOR A PARTICULAR USE OR PURPOSE, PERFORMANCE, AND NONINFRINGEMENT OF ANY THIRD PARTY PATENTS OR OTHER INTELLECTUAL PROPERTY RIGHTS.

11.4 [***]

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

11.5 Performance by Others. The Parties recognize that each Party may perform some or all of its obligations under this Agreement through Affiliates and permitted subcontractors provided, however, that each Party will remain responsible and liable for the performance by its Affiliates and permitted subcontractors and will cause its Affiliates and permitted subcontractors to comply with the provisions of this Agreement in connection therewith.

11.6 Indemnification.

(a) *Indemnification by Celgene*. Celgene will indemnify Bluebird, its Affiliates and their respective directors, officers, employees, Third Party licensors and agents, and their respective successors, heirs and assigns (collectively, " Bluebird Indemnitees"), and defend and save each of them harmless, from and against any and all losses, damages, liabilities, costs and expenses (including reasonable attorneys' fees and expenses) (collectively, " Losses") in connection with any and all suits, investigations, claims or demands of Third Parties (collectively, " Third Party Claims") against the Bluebird Indemnitees arising from or occurring as a result of: (i) the material breach by Celgene of any term of this Agreement; (ii) Celgene's performance of the Collaboration Program (other than with respect to claims of actual or alleged infringement, misappropriation or other violation of a Third Party's Patents, trade secrets, or other intellectual property or proprietary rights); or (iii) any gross negligence or willful misconduct on the part of Celgene in performing its obligations under this Agreement, except in each case for those Losses for which Bluebird has an obligation to indemnify Celgene pursuant to Section 11.6(b), as to which Losses each Party will indemnify the other to the extent of their respective liability; provided, however, that Celgene will not be obligated to indemnify Bluebird Indemnitees for any Losses to the extent that such Losses arise as a result of gross negligence or willful misconduct on the part of a Bluebird Indemnitee.

(b) *Indemnification by Bluebird*. Bluebird will indemnify Celgene, its Affiliates and their respective directors, officers, employees and agents, and their respective successors, heirs and assigns (collectively, "Celgene Indemnitees"), and defend and save each of them harmless, from and against any and all Losses in connection with any and all Third Party Claims against Celgene Indemnitees arising from or occurring as a result of: (i) the material breach by Bluebird of any term of this Agreement; (ii) Bluebird's performance of the Collaboration Program (other than with respect to claims of actual or alleged infringement, misappropriation or other violation of a Third Party's Patents, trade secrets, or other intellectual property or proprietary rights); (iii) [***]; or (iv) any gross negligence or willful misconduct on the part of Bluebird in performing its obligations under this Agreement, except in each case for those Losses for which Celgene has an obligation to indemnify Bluebird pursuant to Section 11.6(a), as to which Losses each Party will indemnify the other to the extent of their respective liability for the Losses; provided, however, that Bluebird will not be obligated to indemnify Celgene Indemnitees for any Losses to the extent that such Losses arise as a result of gross negligence or willful misconduct on the part of a Celgene Indemnitee.

(c) *Notice of Claim*. All indemnification claims provided for in Section 11.6(a) and 11.6(b) will be made solely by such Party to this Agreement (the "Indemnified Party"). The Indemnified Party will promptly notify the indemnifying Party (an " Indemnification Claim Notice") of any Losses or the discovery of any fact upon which the Indemnified Party intends to base a request for indemnification under Section 11.6(a) or 11.6(b), but in no event will the

indemnifying Party be liable for any Losses that result from any delay in providing such notice. Each Indemnification Claim Notice must contain a description of the claim and the nature and estimated amount of such Loss (to the extent that the nature and amount of such Loss is known at such time). The Indemnified Party will furnish promptly to the indemnifying Party copies of all papers and official documents received in respect of any Losses and Third Party Claims.

(d) *Defense, Settlement, Cooperation and Expenses* .

(i) *Control of Defense*. At its option, the indemnifying Party may assume the defense of any Third Party Claim by giving written notice to the Indemnified Party within thirty (30) days after the indemnifying Party's receipt of an Indemnification Claim Notice, provided however that (i) the Third Party Claim solely seeks monetary damages and (ii) the indemnifying Party expressly agrees in writing that as between the indemnifying Party and the Indemnified Party, the indemnifying Party will be solely obligated to satisfy and discharge the Third Party Claim in full and is able to reasonably demonstrate that it has sufficient financial resources (the matters described in (i) and (ii), the " Litigation Conditions"). The assumption of the defense of a Third Party Claim by the indemnifying Party will not be construed as an acknowledgment that the indemnifying Party is liable to indemnify the Indemnified Party in respect of the Third Party Claim (except as provided in the immediately prior sentence), nor will it constitute a waiver by the indemnifying Party of any defenses it may assert against the Indemnified Party's claim for indemnification. Upon assuming the defense of a Third Party Claim, the indemnifying Party may appoint as lead counsel in the defense of the Third Party Claim any legal counsel selected by the indemnifying Party (the indemnifying Party will consult with the Indemnified Party with respect to a possible conflict of interest of such counsel retained by the indemnifying Party). In the event the indemnifying Party assumes the defense of a Third Party Claim, the Indemnified Party will immediately deliver to the indemnifying Party all original notices and documents (including court papers) received by the Indemnified Party in connection with the Third Party Claim. Should the indemnifying Party assume the defense of a Third Party Claim, except as provided in Section 11.6(d)(ii), the indemnifying Party will not be liable to the Indemnified Party for any legal costs or expenses subsequently incurred by such Indemnified Party in connection with the analysis, defense or settlement of the Third Party Claim. The Indemnified Party may, at any time, assume the defense of a Third Party Claim if at any time the Litigation Conditions are not satisfied with respect to such Claim. In the event that it is ultimately determined that the indemnifying Party is not obligated to indemnify, defend or hold harmless the Indemnified Party from and against the Third Party Claim, the Indemnified Party will reimburse the indemnifying Party for any and all costs and expenses (including attorneys' fees and costs of suit) and any Third Party Claims incurred by the indemnifying Party in its defense of the Third Party Claim.

(ii) *Right to Participate in Defense*. Without limiting Section 11.6(d)(i), any Indemnified Party will be entitled to participate in, but not control, the defense of such Third Party Claim and to employ counsel of its choice for such purpose; provided, however, that such employment will be at the Indemnified Party's own cost and expense unless (i) the employment thereof has been specifically authorized by the indemnifying Party in writing, (ii) the indemnifying Party has failed to assume the defense and employ counsel in accordance with Section 11.6(d)(i) (in which case the Indemnified Party will control the defense), (iii) the

interests of the Indemnified Party and the indemnifying Party with respect to such Third Party Claim are sufficiently adverse to prohibit the representation by the same counsel of both Parties under applicable Law, ethical rules or equitable principles, or (iv) the indemnifying Party no longer satisfies the Litigation Conditions, in which case the indemnifying Party will assume one hundred percent (100%) of any such costs and expenses of counsel for the Indemnified Party.

(iii) *Settlement*. With respect to any Third Party Claims that relate solely to the payment of money damages in connection with a Third Party Claim and that will not result in the Indemnified Party's becoming subject to injunctive or other relief or otherwise adversely affecting the business of the Indemnified Party in any manner, and as to which the indemnifying Party will have acknowledged in writing the obligation to indemnify the Indemnified Party hereunder, and subject to the Litigation Conditions being satisfied, the indemnifying Party will have the sole right to agree to the entry of any judgment, enter into any settlement or otherwise dispose of such Loss, on such terms as the indemnifying Party, in its sole discretion, will deem appropriate. With respect to all other Losses in connection with Third Party Claims, where the indemnifying Party has assumed the defense of the Third Party Claim in accordance with Section 11.6(d)(i), the indemnifying Party will have authority to agree to the entry of any judgment, enter into any settlement or otherwise dispose of such Loss provided it obtains the prior written consent of the Indemnified Party (such consent not to be unreasonably withheld, delayed or conditioned). The indemnifying Party will not be liable for any settlement or other disposition of a Loss by an Indemnified Party that is reached without the prior written consent of the indemnifying Party. Regardless of whether the indemnifying Party chooses to defend or prosecute any Third Party Claim, no Indemnified Party will admit any liability with respect to or settle, compromise or discharge, any Third Party Claim without the prior written consent of the indemnifying Party, such consent not to be unreasonably withheld, delayed or conditioned.

(iv) *Cooperation*. If the indemnifying Party chooses to defend or prosecute any Third Party Claim, the Indemnified Party will, and will cause each other Indemnified Party to, cooperate in the defense or prosecution thereof and will furnish such records, information and testimony, provide such witnesses and attend such conferences, discovery proceedings, hearings, trials and appeals as may be reasonably requested in connection therewith. Such cooperation will include access during normal business hours afforded to indemnifying Party to, and reasonable retention by the Indemnified Party of, records and information that are reasonably relevant to such Third Party Claim, and making Indemnified Parties and other employees and agents available on a mutually convenient basis to provide additional information and explanation of any material provided hereunder, and the indemnifying Party will reimburse the Indemnified Party for all its reasonable out-of-pocket costs and expenses in connection therewith.

(v) *Costs and Expenses*. Except as provided above in this Section 11.6(d), the costs and expenses, including attorneys' fees and expenses, incurred by the Indemnified Party in connection with any claim will be reimbursed on a calendar quarter basis by the indemnifying Party, without prejudice to the indemnifying Party's right to contest the Indemnified Party's right to indemnification and subject to refund in the event the indemnifying Party is ultimately held not to be obligated to indemnify the Indemnified Party.

11.7 [***]

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

12. Term and Termination.

12.1 Term. This Agreement will commence as of the Effective Date and, unless sooner terminated in accordance with the terms hereof or by mutual written consent, will continue until the later of the expiration of the Collaboration Program Term and expiration of the last-to-expire Celgene Option Period (the "Term").

12.2 Termination by Bluebird. Bluebird will have the right to terminate this Agreement in full upon delivery of written notice to Celgene in the event of any material breach by Celgene of any terms and conditions of this Agreement in a manner that fundamentally frustrates the transactions contemplated by this Agreement, provided that such termination will not be effective if such breach has been cured within [***] after written notice thereof is given by Bluebird to Celgene specifying the nature of the alleged breach (or, if such default cannot be cured within such [***] after such notice if Celgene commences actions to cure such default within such [***] and thereafter diligently continues such actions, but fails to cure the default by the end of such [***]); provided, however, that to the extent such material breach involves the failure to make a payment when due, such breach must be cured within [***] after written notice thereof is given by Bluebird to Celgene.

12.3 Termination by Celgene.

(a) *Breach*. Celgene will have the right to terminate this Agreement in full upon delivery of written notice to Bluebird in the event of any material breach by Bluebird of any terms and conditions of this Agreement in a manner that fundamentally frustrates the transactions contemplated by this Agreement, provided that such termination will not be effective if such breach has been cured within [***] after written notice thereof is given by Celgene to Bluebird specifying the nature of the alleged breach (or, if such default cannot be cured within such [***] after such notice if Bluebird commences actions to cure such default within such [***] and thereafter diligently continues such actions, but fails to cure the default by the end of such [***]).

(b) *Discretionary Termination.* Celgene will have the right to terminate this Agreement in full at its discretion for any reason [***] days after delivery of written notice to Bluebird.

12.4 Effects of Termination or Expiration. Upon termination or expiration of this Agreement for any reason, all rights granted by Bluebird to Celgene hereunder will terminate, provided that:

(a) *IND Product Candidates*. Bluebird will, at Celgene's election, complete initial Phase 1 Studies for one (1) or more IND Product Candidates selected by Celgene, and, if Celgene elects not to have Bluebird complete any such Phase 1 Study, Bluebird may do so at its own expense. In either case, (i) the provisions of Sections 5.1 through 5.6 will apply with respect to any such IND Product Candidates (but excluding Section 5.3 if Celgene has terminated this Agreement pursuant to Section 12.3(a)), (ii) Celgene will grant to Bluebird an exclusive, worldwide, royalty-free right and license in the Field, without the right to grant sublicenses (other than to permitted subcontractors under Section 2.4), under the Celgene IP and Celgene's interest in jointly owned Collaboration IP solely to complete any such Phase 1 Study,

and (iii) if Celgene has elected to have Bluebird complete such Phase 1 Study, or if Celgene has not elected to have Bluebird complete a Phase 1 Study but Bluebird has completed such Phase 1 Study and Celgene exercises its option with respect to such IND Product Candidate as set forth in Section 5.1, Celgene will reimburse Bluebird for [***] Notwithstanding the foregoing, if Bluebird has terminated this Agreement pursuant to Section 12.2, upon Celgene's exercise of its option with respect to an IND Product Candidate as set forth in Section 5.1, in lieu of paying the Option Fees and reimbursing Bluebird for its costs and expenses incurred in connection with completing a Phase 1 Study for such IND Product Candidate, Celgene will pay to Bluebird an amount equal to the greater of [***] If Celgene does not exercise its option with respect to such IND Product Candidate as set forth in Section 5.1, Bluebird (or an Affiliate designated by Bluebird) and Celgene will, at Bluebird's option, enter into a License Agreement in the form attached hereto as Exhibit A with respect to the IND Product Candidate, but reversing the roles of the Parties thereunder, *mutatis mutandis*, and updating the Appendices thereto and making such other changes as are appropriate from the context, provided that (A) such license shall be limited to the Celgene IP and jointly owned Collaboration IP as it exists at the time this Agreement has expired or been terminated (including in each case any additions, divisions, continuations, continuations-in-part, invention certificates, substitutions, reissues, reexaminations, extensions, registrations, supplementary protection certificates and renewals of such Celgene IP and Joint Collaboration IP), (B) no Option Fee will be payable by Bluebird in connection with such IND Product Candidates, (C) any royalties or Milestone Payments payable under such License Agreement will be reduced [***], (D) such IND Product Candidate will not be subject to the provisions of Section 5.7, (E) if any royalty, milestone or other payment, excluding [***], becomes due under any Applicable Celgene In-License that is attributable to Bluebird as a sublicensee (together with its licensees and their respective Affiliates) thereunder with respect to such Development, Manufacture or commercialization, Celgene will pay same, provided that Bluebird will reimburse Celgene for any such payment within thirty (30) days of Bluebird's receipt of Celgene's written invoice therefor, and Bluebird's failure to pay such reimbursement within such time period will entitle Celgene to terminate Bluebird's sublicense under the applicable Celgene In-License upon thirty (30) days written notice, (F) such License Agreement will be subject to any Target Antigen-related exclusivity agreed to between the Parties under any Development & Commercialization Agreement (whether executed before or after the date of such License Agreement), and (G) Bluebird will be responsible for [***] of any amounts owed to Third Parties (including under any Bluebird In-License) in connection with the acquisition of rights in order to Develop or commercialize such IND Product Candidates, provided that any such payments that are royalties will be subject to Section 4.3(d) of such License Agreement.

(b) *Outstanding Options*. Any options exercised by Celgene pursuant to Section 5.1 that have not at the time of termination or expiration resulted in an executed Development & Commercialization Agreement will, at Celgene's option, be consummated pursuant to Sections 5.2 through 5.4, and Bluebird's option under Section 5.3 will not terminate unless Celgene has terminated this Agreement pursuant to Section 12.3(a).

(c) *Pre-IND Product Candidates*. For all Product Candidates (other than Optioned Candidates and IND Product Candidates) for which *in vivo* efficacy or safety studies have been initiated or authorized by the JSC (each, a " Pre-IND Product Candidate"), the following will apply:

(i) The Parties will choose from the pool of Pre-IND Product Candidates as follows:

(A) if such termination is by Celgene pursuant to Section 12.3(a), Celgene will select the first and second Pre-IND Product Candidates, Bluebird will select the third and fourth Pre-IND Product Candidates, and thereafter the selection of each Pre-IND Product Candidate will alternate between Celgene and Bluebird until all Pre-IND Product Candidates have been selected;

(B) if such termination is by Bluebird pursuant to Section 12.2, Bluebird will select the first and second Pre-IND Product Candidates, Celgene will select the third and fourth Pre-IND Product Candidates, and thereafter the selection of each Pre-IND Product Candidate will alternate between the Bluebird and Celgene until all Pre-IND Product Candidates have been selected;

(C) if such termination or expiration occurs other than pursuant to Sections 12.2 or 12.3(a), the first Party to select from the pool of Pre-IND Product Candidates will be chosen by a coin toss. The winner of the coin toss will have the right to select the first Pre-IND Product Candidate, or may instead allow the other Party to select the first Pre-IND Product Candidate. The Party that does not make the first selection from the pool of Pre-IND Product Candidates will have the second and third selections, and thereafter the selection of each Pre-IND Product Candidate will alternate between the Parties until all Pre-IND Product Candidates have been selected; and

(D) In selecting from the pool of Pre-IND Product Candidates, Bluebird will not select any Pre-IND Product Candidate that targets the same Target Antigen that is targeted by any Optioned Candidates or the same Target Antigen that is targeted by the first Pre-IND Product Candidate selected by Celgene pursuant to Section 12.4(c)(i).

(E) In selecting from the pool of Pre-IND Product Candidates, Celgene will not select any Pre-IND Product Candidate that targets the same Target Antigen that is targeted by the first Pre-IND Product Candidate selected by Bluebird pursuant to Section 12.4(c)(i).

(ii) For the first Pre-IND Product Candidate selected by Celgene pursuant to Section 12.4(c)(i), Bluebird will grant to Celgene an exclusive, worldwide, royalty-free right and license in the Field, without the right to grant sublicenses (other than to permitted subcontractors under Section 2.4), under the Bluebird IP and Bluebird's interest in jointly owned Collaboration IP, solely to conduct research and Development activities with respect to such Pre-IND Product Candidate during the applicable Celgene Option Period. Celgene will have the exclusive option to take an exclusive license from Bluebird under the Bluebird IP and Bluebird's interest in jointly owned Collaboration IP to commercialize such Pre-IND Product Candidate, exercisable by providing to Bluebird a Celgene Option Notice for same within the time period set forth in Section 5.1. Upon such election by Celgene, the provisions of Sections 5.2 through 5.7 (but excluding Section 5.3 if Celgene has terminated this Agreement pursuant to Section 12.3(a)), Section 5.9 and Sections 8.4 and 8.5 will apply with respect to such Pre-IND Product Candidate,

provided that (A) the Option Fees payable with respect to such Pre-IND Candidate will be reduced by [***], (B) any royalties or Milestone Payments payable under the applicable Development & Commercialization Agreement with respect to such Pre-IND Product Candidate will be reduced by [***], (C) Celgene will be responsible for [***] of any In-License Payments under the applicable Development & Commercialization Agreement, and other amounts owed to Third Parties (including under any Celgene In-License) in connection with the acquisition of rights in order to Develop or commercialize such Pre-IND Product Candidate, provided that any such In-License Payments and such other payments that are royalties will be subject to Section 4.3(d) of such License Agreement or Section 11.3(d) of any Co-Development, Co-Promote and Profit Share Agreement, as applicable, and (D) Celgene will not have any diligence obligations with respect to such Pre-IND Product Candidate under such Development & Commercialization Agreement.

(iii) For the first Pre-IND Product Candidate selected by Bluebird pursuant to Section 12.4(c)(i), the provisions of Sections 5.1 through 5.6 and Section 5.9 will apply and Celgene will grant to Bluebird an exclusive, worldwide, royalty-free right and license in the Field, without the right to grant sublicenses (other than to permitted subcontractors under Section 2.4), under the Celgene IP and Celgene's interest in jointly owned Collaboration IP solely to conduct research and Development activities with respect to such Pre-IND Product Candidate. If any royalty, milestone or other payment becomes due under any Applicable Celgene In-License that is attributable to Bluebird as a sublicensee (together with its licensees and their respective Affiliates) thereunder with respect to such Development work, Celgene will pay same, provided that Bluebird will reimburse Celgene for any such payment within thirty (30) days of Bluebird's receipt of Celgene's written invoice therefor, and Bluebird's failure to pay such reimbursement within such time period will entitle Celgene to terminate Bluebird's sublicense under the applicable Celgene In-License upon [***] written notice. If Celgene exercises its option with respect to such Pre-IND Product Candidate as set forth in Section 5.1, Celgene will reimburse Bluebird for [***] If Celgene does not exercise its option with respect to such Pre-IND Product Candidate as set forth in Section 5.1, at Bluebird's option, Bluebird (or an Affiliate designated by Bluebird) and Celgene will enter into a License Agreement in the form attached hereto as Exhibit A with respect to such Pre-IND Product Candidate, but reversing the roles of the Parties thereunder, *mutatis mutandis*, and updating the Appendices thereto and making such other changes as are appropriate from the context, provided that (A) such license shall be limited to the Celgene IP and jointly owned Collaboration IP as it exists at the time this Agreement has expired or been terminated (including in each case any additions, divisions, continuations, continuations-in-part, invention certificates, substitutions, reissues, reexaminations, extensions, registrations, supplementary protection certificates and renewals of such Celgene IP and Joint Collaboration IP), (B) no Option Fee will be payable by Bluebird in connection with such Pre-IND Product Candidate, (C) any royalties or Milestone Payments payable under such License Agreement will be reduced by [***], (D) such License Agreement will include Target Antigen-related exclusivity, (E) Milestone Payments under such License Agreement are payable with respect to each Pre-IND Product Candidate to achieve an applicable Milestone Event, (F) Bluebird will be responsible for [***] of any amounts owed to Third Parties (including under any Bluebird In-License) in connection with the acquisition of rights in order to Develop or commercialize such Pre-IND Product Candidates, provided that any such payments

that are royalties will be subject to Section 4.3(d) of such License Agreement, (G) such Pre-IND Product Candidate will not be subject to the provisions of Section 5.7, (H) if any royalty, milestone or other payment becomes due under any Celgene In-License that is attributable to Bluebird as a sublicensee (together with its licensees and their respective Affiliates) thereunder with respect to such Development, Manufacture or commercialization, Celgene will pay same, provided that Bluebird will reimburse Celgene for any such payment excluding [***], and Bluebird's failure to pay such reimbursement within such time period will entitle Celgene to terminate Bluebird's sublicense under the applicable Celgene In-License upon thirty (30) days written notice, and (I) bluebird will not have any diligence obligations with respect to such Pre-IND Product Candidate under such Development & Commercialization Agreement.

(iv) Except with respect to the first Pre-IND Product Candidate selected by Celgene pursuant to Section 12.4(c)(i), Celgene (or an Affiliate designated by Celgene) and Bluebird, subject to Section 5.9, will enter into a License Agreement in the form attached hereto as Exhibit A with respect to the Pre-IND Product Candidates selected by Celgene in accordance with Section 12.4(c)(i), updating the Appendices thereto and making such other changes as are appropriate from the context, provided that (A) such license shall be limited to the Bluebird IP and jointly owned Collaboration IP as it exists at the time this Agreement has expired or been terminated (including in each case any additions, divisions, continuations, continuations-in-part, invention certificates, substitutions, reissues, reexaminations, extensions, registrations, supplementary protection certificates and renewals of such Celgene IP and Joint Collaboration IP), (B) no Option Fee will be payable by Celgene in connection with such Pre-IND Product Candidates, (C) any royalties or Milestone Payments payable under such License Agreement will be reduced by [***], (D) Milestone Payments under such License Agreement are payable with respect to each Pre-IND Product Candidate to achieve an applicable Milestone Event, (E) such License Agreement will not include Target Antigen-related exclusivity, (F) Celgene will be responsible for [***] of any In-License Payments under such License Agreement, and other amounts owed to Third Parties (including under any Celgene In-License) in connection with the acquisition of rights in order to Develop or commercialize such Pre-IND Product Candidates, provided that any such In-License Payments and such other payments that are royalties will be subject to Section 4.3(d) of such License Agreement, and (G) Celgene will not have any diligence obligations with respect to such Pre-IND Product Candidate under such Development & Commercialization Agreement.

(v) Except with respect to the first Pre-IND Product Candidate selected by Bluebird pursuant to Section 12.4(c)(i), Bluebird (or an Affiliate designated by Bluebird) and Celgene, subject Section 5.9, will enter into a License Agreement in the form attached hereto as Exhibit A with respect to the Pre-IND Product Candidates selected by Bluebird in accordance with Section 12.4(c)(i), but reversing the roles of the Parties thereunder, *mutatis mutandis*, and updating the Appendices thereto and making such other changes as are appropriate from the context, provided that (A) such license shall be limited to the Celgene IP and jointly owned Collaboration IP as it exists at the time this Agreement has expired or been terminated (including in each case any additions, divisions, continuations, continuations-in-part, invention certificates, substitutions, reissues, reexaminations, extensions, registrations, supplementary protection certificates and renewals of such Celgene IP and Joint Collaboration IP), (B) no Option Fee will be payable by Bluebird in connection with such Pre-IND Product Candidates, (C) any royalties

or Milestone Payments payable under such License Agreement will be reduced by [***], (D) such License Agreement will not include Target Antigen-related exclusivity, (E) Milestone Payments under such License Agreement are payable with respect to each Pre-IND Product Candidate to achieve an applicable Milestone Event, (F) Bluebird will be responsible for [***] of any amounts owed to Third Parties (including under any Bluebird In-License) in connection with the acquisition of rights in order to Develop or commercialize such Pre-IND Product Candidates, provided that any such payments that are royalties will be subject to Section 4.3(d) of such License Agreement, (G) if any royalty, milestone or other payment becomes due under any Celgene In-License that is attributable to Bluebird as a sublicensee (together with its licensees and their respective Affiliates) thereunder with respect to such Development, Manufacture or commercialization, Celgene will pay same, provided that Bluebird will reimburse Celgene for any such payment, excluding [***], within thirty (30) days of Bluebird's receipt of Celgene's written invoice therefor, and Bluebird's failure to pay such reimbursement within such time period will entitle Celgene to terminate Bluebird's sublicense under the applicable Celgene In-License upon thirty (30) days written notice, and (H) Bluebird will not have any diligence obligations with respect to such Pre-IND Product Candidate under such Development & Commercialization Agreement.

(d) Neither Party will (i) Develop an IND Product Candidate or Pre-IND Product Candidate following the expiration of the applicable option period set forth in this Section 12.4 with respect to such IND Product Candidate or Pre-IND Product Candidate, or (ii) Commercialize any IND Product Candidate or Pre-IND Product Candidate in each case ((i) and (ii)) without first entering into a License Agreement with the other Party in the form attached hereto as Exhibit A with respect to such IND Product Candidate or Pre-IND Product Candidate as set forth in this Section 12.4. For clarity, any agreement in the form of License Agreement attached hereto as Exhibit A entered into between the Parties pursuant to this Section 12.4 with respect to an IND Product Candidate or Pre-IND Product Candidate, and any resulting Co-Development, Co-Promote and Profit Share Agreement, shall be "Development & Commercialization Agreements" hereunder.

(e) Other than with respect to the rights and licenses granted to Bluebird hereunder pursuant to Section 2.1(h)(ii), all rights granted by Celgene to Bluebird hereunder will terminate.

(f) All executed Development & Commercialization Agreements will continue in full force and effect, provided that if Celgene has terminated this Agreement pursuant to Section12.3(a), then (i) Bluebird's rights to co-develop, co-promote and share in profits under any Co-Development, Co-Promote and Profit Share Agreements will terminate, and the Parties promptly will execute a License Agreement to replace each such Co-Development, Co-Promote and Profit Share Agreement, and (ii) all up-front payments, milestone payments and royalty payments under any License Agreement will be reduced by [***], provided that such reduction will not apply to the extent any such up-front payments, milestone payments and royalty payments have already been reduced pursuant to Section 10.3(c) of such License Agreement.

12.5 Survival. In addition to the termination consequences set forth in Section 12.4, the following provisions will survive termination or expiration of this Agreement: Sections 1, 2.1(f), 2.1(h)(ii), 2.2, 2.3(a), 2.3(c), 4.3(through the expiration of any options granted to Celgene hereunder), 4.5, 4.6, 5.5, 5.7, 5.8, 5.9, 5.10, 8.7, 9.4, 10, 11, 12.4,

12.5 and 13, and any other provisions of this Agreement that are required to survive to give effect to any Development & Commercialization Agreement. Termination or expiration of this Agreement will not relieve the Parties of any liability or obligation which accrued hereunder prior to the effective date of such termination or expiration nor preclude either Party from pursuing all rights and remedies it may have hereunder or at law or in equity with respect to any breach of this Agreement nor prejudice either Party's right to obtain performance of any obligation. All other rights and obligations will terminate upon expiration of this Agreement.

12.6 Right to Set-off. Notwithstanding anything to the contrary in this Agreement, each Party has the right at all times to retain and set off against all amounts due and owing to the other Party as determined in a final judgment any damages recovered by such Party for any Losses incurred by such Party.

13. General Provisions.

13.1 Dispute Resolution for this Agreement and Executed Development & Commercialization Agreements .

(a) *Disputes*. Disputes arising under or in connection with this Agreement or any executed Development and Commercialization Agreement will be resolved pursuant to this Section 13.1.

(b) *Dispute Escalation*. In the event of a dispute between the Parties, the Parties will first attempt in good faith to resolve such dispute by negotiation and consultation between themselves or the Program Directors. In the event that such dispute is not resolved on an informal basis within twenty (20) days, any Party may, by written notice to the other, have such dispute referred to the Bluebird CEO and the Celgene CEO or in either case his or her designee (who will be a senior executive), who will attempt in good faith to resolve such dispute by negotiation and consultation for a thirty (30) day period following receipt of such written notice.

(c) *Dispute Resolution*. In the event the Parties are not able to resolve such dispute in accordance with Section 13.1(b), either Party may at any time after such 20-day period submit such dispute to be finally settled in the federal courts located in the Southern District of New York. Each Party hereby irrevocably and unconditionally consents to submit to the exclusive jurisdiction of the federal courts located in the Southern District of New York, for any actions, suits or proceedings arising out of or relating to this Agreement and the transactions contemplated hereby. Each Party hereby irrevocably and unconditionally waives any objection to the laying of venue of any action, suit or proceeding arising out of or relating to this Agreement and the transactions contemplated hereby in the federal courts located in the Southern District of New York, and waives and agrees not to plead or claim in any such court that any such action, suit or proceeding brought in such court has been brought in an inconvenient forum. Notwithstanding the foregoing, a Party will be entitled to seek enforcement of a judgment entered pursuant to this Section in any court having competent jurisdiction thereof where enforcement is deemed necessary.

(d) *Injunctive Relief*. Notwithstanding the dispute resolution procedures set forth in this Section 13.1, in the event of an actual or threatened breach hereunder (or any executed Development & Commercialization Agreement, if applicable), the aggrieved Party may seek

equitable relief (including restraining orders, specific performance or other injunctive relief) in any court or other forum, without first submitting to any dispute resolution procedures hereunder.

(e) *Tolling.* The Parties agree that all applicable statutes of limitation and time-based defenses (such as estoppel and laches) will be tolled while the dispute resolution procedures set forth in this Section 13.1 are pending, and the Parties will cooperate in taking all actions reasonably necessary to achieve such a result. In addition, during the pendency of any dispute under this Agreement initiated before the end of any applicable cure period under Section 12.2 or 12.3 (or the cure periods under any executed Development & Commercialization Agreement, if applicable), (i) this Agreement (or any executed Development & Commercialization Agreement, if applicable) will remain in full force and effect, (ii) the provisions of this Agreement (or any executed Development & Commercialization Agreement, if applicable) relating to termination for material breach will not be effective, (iii) the time periods for cure under Section 12 (and the time periods from any executed Development & Commercialization Agreement, if applicable) as to any termination notice given prior to the initiation of the court proceeding will be tolled, and (iv) neither Party will issue a notice of termination pursuant to this Agreement (or any executed Development & Commercialization Agreement, if applicable) based on the subject matter of the court proceeding (and no effect will be given to previously issued termination notices), until the court has confirmed the existence of the facts claimed by a Party to be the basis for the asserted material breach.

13.2 Cumulative Remedies and Irreparable Harm. All rights and remedies of the Parties hereunder will be cumulative and in addition to all other rights and remedies provided hereunder or available by agreement, at law or otherwise. Each Party acknowledges and agrees that breach of any of the terms or conditions of this Agreement would cause irreparable harm and damage to the other and that such damage may not be ascertainable in money damages and that as a result thereof the non-breaching Party would be entitled to seek from a court equitable or injunctive relief restraining any breach or future violation of the terms contained herein by the breaching Party without the necessity of proving actual damages or posting bond. Such right to equitable relief is in addition to whatever remedies either Party may be entitled to as a matter of law or equity, including money damages.

13.3 Business Combination and IP.

(a) *Bluebird Business Combination*. Notwithstanding anything to the contrary herein, for purposes of this Agreement and any Development & Commercialization Agreement, no Know-How, Materials, Patents, Regulatory Data, Regulatory Filings or Regulatory Approvals not Controlled by Bluebird or any of its Affiliates prior to a Business Combination of Bluebird will be Controlled for purposes of this Agreement or any Development & Commercialization Agreement after such Business Combination of Bluebird, other than (i) Collaboration IP, (ii) Bluebird In-Licenses to the extent in effect immediately prior to such Business Combination of Bluebird and later Bluebird Collaboration In-Licenses (provided that after any such Business Combination, Bluebird may, but will not be obligated to, make any Bluebird New In-License available to Celgene or the JSC for review, election or conversion into a Bluebird Collaboration In-License pursuant to Section 4.1), and (iii) any Patent that claims priority, directly or indirectly, to any other Patent first Controlled before such Business Combination of Bluebird will be Controlled thereafter no matter when such Patent is filed or issued.

(b) *Celgene Business Combination*. Notwithstanding anything to the contrary herein, for purposes of this Agreement and any Development & Commercialization Agreement, no Know-How, Materials, Patents, Regulatory Data, Regulatory Filings or Regulatory Approvals not Controlled by Celgene or any of its Affiliates prior to a Business Combination of Celgene will be Controlled for purposes of this Agreement or any Development & Commercialization Agreement after such Business Combination of Celgene, other than (i) Collaboration IP, (ii) Applicable Celgene In-Licenses, and (iii) any Patent that claims priority, directly or indirectly, to any other Patent first Controlled before such Business Combination of Celgene will be Controlled thereafter no matter when such Patent is filed or issued.

13.4 Relationship of Parties. Nothing in this Agreement is intended or will be deemed to constitute a partnership, agency, employer-employee or joint venture relationship between the Parties. No Party will incur any debts or make any commitments for the other, except to the extent, if at all, specifically provided therein. There are no express or implied third party beneficiaries hereunder (except for Bluebird Indemnitees and Celgene Indemnitees, and any Third Party indemnitees under any executed Development & Commercialization Agreement, if applicable, for purposes of Section 11.6).

13.5 Compliance with Law. Each Party will perform or cause to be performed any and all of its obligations or the exercise of any and all of its rights hereunder in good scientific manner and in compliance with all applicable Law. Without limiting the foregoing, Bluebird will comply with comply with all applicable Laws and regulations (including U.S. Foreign Corrupt Practices Act and any other applicable anti-bribery or anti-kickback laws or regulations).

13.6 Force Majeure. Neither Party will be liable to the other for failure of or delay in performing obligations set forth in this Agreement (other than any obligation to pay monies when due), and neither will be deemed in breach of such obligations, if such failure or delay is due to natural disasters or any causes reasonably beyond the control of such Party and without the fault or negligence of the Party so failing or delaying; provided that the Party affected will promptly notify the other of the force majeure condition and will exert reasonable efforts to eliminate, cure or overcome any such causes and to resume performance of its obligations as soon as possible.

13.7 Governing Law. This Agreement will be governed by and construed in accordance with the Laws of the state of New York, without respect to its conflict of laws rules; provided, however, that any dispute relating to the scope, validity, enforceability or infringement of any Patents or Know-How will be governed by, and construed and enforced in accordance with, the substantive Laws of the jurisdiction in which such Patents or Know-How apply.

13.8 Counterparts; Facsimiles. This Agreement may be executed in one or more counterparts, each of which will be deemed an original, and all of which together will be deemed to be one and the same instrument. Facsimile or PDF execution and delivery of this Agreement by either Party will constitute a legal, valid and binding execution and delivery of this Agreement by such Party

13.9 Headings. All headings in this Agreement are for convenience only and will not affect the meaning of any provision hereof.

13.10 Waiver of Rule of Construction. Each Party has had the opportunity to consult with counsel in connection with the review, drafting and negotiation of this Agreement. Accordingly, the rule of construction that any ambiguity in this Agreement will be construed against the drafting party will not apply.

13.11 Interpretation. Whenever any provision of this Agreement uses the term "including" (or "includes"), such term will be deemed to mean "including without limitation" (or "includes without limitations"). "Herein," "hereby," "hereunder," "hereof" and other equivalent words refer to this Agreement as an entirety and not solely to the particular portion of this Agreement in which any such word is used. All definitions set forth herein will be deemed applicable whether the words defined are used herein in the singular or the plural. Unless otherwise provided, all references to Sections and Exhibits in this Agreement are to Sections and Exhibits of this Agreement. References to any Sections include Sections and subsections that are part of the related Section (*e.g.*, a section numbered "Section 2.1" would be part of "Section 2", and references to "Section 2.1" would also refer to material contained in the subsection described as "Section 2.1(a)").

13.12 Binding Effect. This Agreement will inure to the benefit of and be binding upon the Parties, their Affiliates, and their respective lawful successors and assigns.

13.13 Assignment. This Agreement may not be assigned by either Party, nor may either Party delegate its obligations or otherwise transfer licenses or other rights created by this Agreement, except as expressly permitted hereunder or otherwise without the prior written consent of the other Party, which consent will not be unreasonably withheld, delayed or conditioned; provided that without consent (i) Celgene may assign this Agreement to (x) an Affiliate or (y) its successor in connection with the merger, consolidation, or sale of all or substantially all of its assets, and (ii) Bluebird may assign this Agreement to (x) an Affiliate or (y) its successor in connection with the merger, consolidation, or sale of all or substantially all of its assets or that portion of its business pertaining to the subject matter of this Agreement; provided however that, except in the case where a Party is involved in a merger or consolidation where it is the surviving entity and no assets of such Party have been transferred as a result of such merger or consolidation, that (A) such assigning Party provides the other Party to this Agreement with at least thirty (30) business days advance written notice of such assignment(s) and the assigning Party agrees in a written agreement delivered prior to such assignment(s) to the non-assigning Party (and upon which such non-assigning Party may rely) to remain fully liable for the performance of its obligations under this Agreement by its assignee(s), (B) the assignee(s) agree in a written agreement delivered prior to such assignment(s) to the non-assigning Party (and upon which such non-assigning Party may rely) to assume performance of all such assigned obligations, (C) in the case of any assignment(s) by Bluebird, all Bluebird IP licensed to Celgene or subject to Celgene's option rights under this Agreement, along with all Product Candidates will be transferred to such assignee(s) effective as of such assignment(s), (D) all of the matters referred to in clauses (A), (B) and (C), as applicable, will be set forth in documentation reasonably acceptable to the non-assigning Party prior to any such assignment(s) (and with such reasonable acceptance not to be unreasonably withheld, conditioned or delayed) and in all cases

will provide the non-assigning Party with the full benefits of its rights under this Agreement (after taking into account all risks involving applicable counter-party performance and bankruptcy and insolvency risks, including those involving contractual rejection under 11 USC §365) as if no such assignment(s) had occurred, and (E) in the case of any assignment(s), the assigning Party will reimburse the non-assigning Party for all of the legal fees and expenses incurred by such non-assigning Party in connection with the matters set forth in clause (D) of this sentence in an aggregate amount not to exceed $50,000; and provided, further, that if Bluebird wishes to assign any Bluebird IP to its Affiliates, it will be permitted to do so conditioned on such Affiliate becoming a party to this Agreement, in the form of an amendment to this Agreement executed by Celgene, Bluebird and such Affiliate, pursuant to which such Affiliate would agree to assume all obligations hereunder, and grant to Celgene all rights hereunder, with respect to the Bluebird IP so assigned. The terms of this Agreement will be binding upon and will inure to the benefit of the successors, heirs, administrators and permitted assigns of the Parties. Any purported assignment in violation of this Section 13.13 will be null and void *ab initio*.

13.14 Notices. All notices, requests, demands and other communications required or permitted to be given pursuant to this Agreement will be in writing and will be deemed to have been duly given upon the date of receipt if delivered by hand, recognized international overnight courier, confirmed facsimile transmission, or registered or certified mail, return receipt requested, postage prepaid to the following addresses or facsimile numbers:

If to Bluebird:	bluebird bio, Inc. 840 Memorial Drive Cambridge, MA 02139 Attention: President & CEO Facsimile:
With a copy to:	Goodwin|Procter LLP 53 State Street Boston, MA 02109 Attention: Michael Bison, Esq. & Kingsley Taft, Esq. Facsimile: 617-523-1231
If to Celgene:	Celgene Corporation 86 Morris Avenue Summit, NJ 07901 Attention: George Golumbeski, Ph. D. Facsimile: 908-673-2791

with a copy to: Celgene Legal
86 Morris Avenue
Summit, NJ 07901
Attention: General Counsel
Telephone: (908) 673-9000
Facsimile: (908) 673-2771

Dechert LLP
902 Carnegie Center
Suite 500
Princeton, NJ 08540
Attention: James J. Marino, Esq.
David E. Schulman, Esq.
Telephone: (609) 955-3230
Facsimile: (609) 873-9138

Either Party may change its designated address and facsimile number by notice to the other Party in the manner provided in this Section 13.14.

13.15 Amendment and Waiver. This Agreement may be amended, supplemented, or otherwise modified only by means of a written instrument signed by both Parties; provided that any unilateral undertaking or waiver made by one Party in favor of the other will be enforceable if undertaken in a writing signed by the Party to be charged with the undertaking or waiver. Any waiver of any rights or failure to act in a specific instance will relate only to such instance and will not be construed as an agreement to waive any rights or fail to act in any other instance, whether or not similar.

13.16 Severability. In the event that any provision of this Agreement will, for any reason, be held to be invalid or unenforceable in any respect, such invalidity or unenforceability will not affect any other provision hereof, and the Parties will negotiate in good faith to modify this Agreement to preserve (to the extent possible) their original intent.

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13.17 Payment Floor. Except as permitted by Section 12.6, Section 10.6 of any License Agreement or Section 17.6 of any Co-Development, Co-Promote and Profit Share Agreement, in no event will any credits permitted to be taken by Celgene under this Agreement or any Development & Commercialization Agreement against any particular Milestone Payment, royalty payment or Profit & Loss Share payment owed to Bluebird under any Development & Commercialization Agreement act to reduce such payment by more than [***] than would otherwise be payable to Bluebird thereunder or thereunder (and for clarity "otherwise payable" above means that (i) any reductions pursuant to Section 10.3(c) of any License Agreement or Section 17.3 of any Co-Development, Co-Promote and Profit Share Agreement will be made before determining the [***] floor specified above, but (ii) any royalty reductions pursuant to Section 4.3(d) of any License Agreement or Section 11.3(d) of any Co-Development, Co-Promote and Profit Share Agreement will be included in calculating the up to [***] reduction permitted above).

13.18 Entire Agreement. This Agreement is the sole agreement with respect to the subject matter and supersedes all other agreements and understandings between the Parties with respect to same (including the Confidential Agreement).

[*Remainder of this Page Intentionally Left Blank*]

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IN WITNESS WHEREOF, the Parties have caused this Master Collaboration Agreement to be executed by their respective duly authorized officers as of the Effective Date.

BLUEBIRD BIO, INC.

By: /s/ Nick Leschly
(Signature)

Name: Nick Leschly

Title: CEO

Date: March 19, 2013

CELGENE CORPORATION

By: /s/ Perry Karsen
(Signature)

Name: Perry Karsen

Title: COO

Date: March 19, 2013

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Exhibit A

License Agreement

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

License Agreement

by and between

bluebird bio, Inc.

and

Celgene Corporation

[ ]

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Appendix A	Additional Definitions
Appendix B	Applicable New In-Licenses
Appendix C	Applicable Pre-Existing In-Licenses
Appendix D	Certain Manufacturing Definitions
Appendix E	Press Release
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Schedule 9.2	Exceptions to Bluebird's Representations and Warranties

License Agreement

This License Agreement (this "License Agreement"), dated as of [ ] (the "License Agreement Effective Date"), is made by and between bluebird bio, Inc., a Delaware corporation ("Bluebird"), and Celgene Corporation, a Delaware Corporation ("Celgene"). Each of Bluebird and Celgene may be referred to herein as a "Party" or together as the "Parties."

WHEREAS, Bluebird has developed and owns or has rights to certain Patents and technology relating to developing innovative gene therapies for genetic disorders;

WHEREAS, Celgene is a biopharmaceutical company focused on acquiring, Developing and Commercializing innovative anti-cancer agents; and

WHEREAS, Bluebird and Celgene are parties to that certain Master Collaboration Agreement (dated [ ], 2013) (the " Master Collaboration Agreement") pursuant to which Celgene has an option to take a license to Product Candidates;

WHEREAS, pursuant to the terms of the Master Collaboration Agreement, Celgene has exercised its option to select a Product Candidate to be an Optioned Candidate by delivering to Bluebird a Celgene Option Notice and payment of the applicable Initial Option Fee and Additional Option Fee (such Optioned Candidate, as defined more fully in Appendix A, the "Elected Candidate"); and

WHEREAS, the Parties now wish to enter into an exclusive licensing arrangement whereby Celgene will have exclusive rights to Develop and Commercialize Licensed Product, all on the terms and conditions set forth here.

NOW, THEREFORE, in consideration of the mutual covenants contained herein, and for other good and valuable consideration, the amount and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

1. Definitions.

The following terms and their correlatives will have the meanings set forth below. Capitalized terms used, but not defined, herein will have the meanings ascribed to such terms in the Master Collaboration Agreement.

1.1 "Applicable Bluebird In-Licenses" means the Applicable Pre-Existing In-Licenses and the Applicable New In-Licenses.

1.2 "Applicable New In-Licenses" means all New In-Licenses of Bluebird or its Affiliates necessary or useful for the research, Development and/or Commercialization of Elected Candidate and Licensed Product that Celgene has elected to list on Appendix B as of the License Agreement Effective Date, plus any other New In-License of Bluebird or its Affiliates that Celgene has elected to include as an Applicable New In-License pursuant to Section 3.2(b).

1.3 "Applicable Pre-Existing In-Licenses" means all Pre-Existing In-Licenses necessary or useful for the research, Development and/or Commercialization of Elected Candidate and Licensed Product, and any extensions or expansions of the scope of such Pre-Existing In-Licenses, including those listed on Appendix C.

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1.4 "Biosimilar Product" means, with respect to a Licensed Product in any country, any biosimilar product sold by a Third Party not authorized by or on behalf of Celgene, its Affiliates or Sublicensees, (i) that is a biosimilar biological product, as defined in 21 USC 379j-51 (or any successor or replacement thereof), a similar biological medicinal product, as defined in Annex I to Directive 2001/83/EC (or any successor or replacement thereof), or any similar biosimilar or generic product under the Laws of any country or jurisdiction, or (ii) regarding which Regulatory Approval is obtained by referencing Regulatory Data of such Licensed Product.

1.5 "Bluebird In-Licensed IP" means all Patents, Materials and Know-How in-licensed by Bluebird pursuant to Applicable Bluebird In-Licenses, including any extensions or expansions of the scope thereof.

1.6 "Bluebird Technology" means all Bluebird Solely Owned IP and all of Bluebird's right, title and interest in and to Joint IP.

1.7 "Celgene Development & Commercialization Program" means a Development and Commercialization program for Licensed Product in the Field worldwide.

1.8 "Celgene Licensed Product In-License" means any Applicable Celgene In-License or other agreement between Celgene or any of its Affiliates and a Third Party entered into under Section 4.3(d) pursuant to which Celgene or any of its Affiliates in-licenses any Know-How, Materials or Patents that directly relate to or Cover the Elected Candidate and/or Licensed Product or its Manufacture or use.

1.9 "Celgene Licensed Product In-Licensed IP" means any Patents, Materials and Know-How Controlled at any time during the License Agreement Term by Celgene or any of its Affiliates pursuant to a Celgene Licensed Product In-License or Celgene Other In-License that directly relate to or Cover the Elected Candidate and/or Licensed Product or its Manufacture or use.

1.10 "Celgene Licensed Product IP" means (i) Celgene Technology, (ii) Collaboration IP solely owned by Celgene and Celgene's interest in jointly owned Collaboration IP, and (iii) Patents, Materials or Know-How (to the extent not included in subsection (i) or (ii)) owned by Celgene or its Affiliates that are Controlled at any time during the License Agreement Term by Celgene or any of its Affiliates, in each case that directly relate to or Cover the Elected Candidate and/or Licensed Product or its Manufacture or use.

1.11 "Celgene Other In-License" means any agreement between Celgene or any of its Affiliates and a Third Party, other than Applicable Celgene In-Licenses and any agreement between Celgene or any of its Affiliates and a Third Party entered into under Section 4.3(d), pursuant to which Celgene or any of its Affiliates in-licenses any Know-How, Materials or Patents that directly relate to or Cover the Elected Candidate and/or Licensed Product or its Manufacture or use.

1.12 "Celgene Regulatory Rights" means all Regulatory Data, Regulatory Filings and Regulatory Approvals for Elected Candidate and Licensed Product worldwide Controlled by Celgene or any of its Affiliates.

1.13 "Celgene Technology" means all Celgene Solely Owned IP and all of Celgene's right, title and interest in and to Joint IP.

1.14 "Commercialization" means any and all activities directed to the Manufacturing, marketing, detailing, promotion and securing of reimbursement of a product after Regulatory Approval has been obtained (including making, having made, using, importing, selling and offering for sale such product), and will include post-approval clinical studies, post-launch marketing, promoting, detailing, marketing research, distributing, customer service, administering and commercially selling such product, importing, exporting or transporting such product for commercial sale, and all regulatory compliance with respect to the foregoing.

1.15 "Commercially Reasonable Efforts" means, with respect to the Development or Commercialization of Licensed Product by a Party, that level of efforts and resources that such Party would normally devote to the Development or Commercialization, as the case may be, of a product owned by it or to which it has rights of the type it has hereunder, which is of a similar commercial potential at a similar stage in its lifecycle, in each case taking into account issues of safety and efficacy, product profile, the proprietary position, the then current competitive environment for such product and the likely timing of such product's entry into the market, the pricing and launching strategy for the respective product, the regulatory environment and status of such product, and other relevant scientific, technical and commercial factors.

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1.16 "Control" or "Controlled" means, with respect to any Know-How, Material, Patent, Regulatory Data, Regulatory Filings and Regulatory Approvals, the possession (whether by ownership or license, other than by a license or sublicense granted pursuant to this License Agreement) by a Party or its Affiliates of the ability to grant to the other Party a license or access as provided herein to such item, without violating the terms of any agreement or other arrangement with any Third Party or, other than under Applicable Bluebird In-Licenses, being obligated to pay any royalties or other consideration therefor ("Additional Payments"). For clarity, Other In-Licenses are not "Controlled" for purposes of this License Agreement, unless and only after such Other In-License is converted into an Applicable New In-License pursuant to Section 3.2(b). Notwithstanding the foregoing, as provided in Section 3.2(a), if on or after the License Agreement Effective Date and for such time as the other Party agrees to pay and does in fact pay all Additional Payments with respect to such Party's access or license to any Know-How, Material, Patent, Regulatory Data, Regulatory Filings and Regulatory Approvals (other than that in-licensed by Bluebird pursuant to an Other In-License), such Know-How, Material, Patent, Regulatory Data, Regulatory Filings and Regulatory Approvals will be deemed to be included in the definition of "Control".

1.17 "Covers", with reference to (i) a Patent, means that the making, using, selling, offering for sale or importing of a product or practice of a method would infringe a Valid Claim of such Patent in the country in which such activity occurs, and (ii) Materials or Know-How, means that the Manufacture, Development or Commercialization of a product incorporates, embodies or otherwise makes use of such Materials or Know-How.

1.18 "EU" means the organization of member states of the European Union as it may be constituted from time to time.

1.19 "EU Regulatory Event" means, with respect to a Licensed Product, the earlier to occur of [***]

1.20 "First Commercial Sale" means the first sale for use or consumption of any Licensed Product in a country after all required Regulatory Approvals for commercial sale of such Licensed Product have been obtained in such country.

1.21 "First Indication" means the the first disease condition for which a particular Licensed Product has been approved by a Regulatory Authority.

1.22 "GAAP" means U.S. generally accepted accounting principles or International Financial Reporting Standards, consistently applied, as designated and used by the applicable Party.

1.23 "In-License Payments" means any amounts paid or payable under any Applicable Bluebird In-License that are incurred by Bluebird solely and directly as a result of the grant of a sublicense thereunder under this License Agreement to Celgene, any of Celgene's contract Third Parties under Section 3.5, or any further Sublicensees of Celgene (including of Celgene's Affiliates that are granted sublicenses) under this License Agreement. Any such payments will include [***] but excluding [***]

1.24 "Licensed IP" means all (i) Patents, Materials and Know-How Controlled at any time during the term of this License Agreement by Bluebird or any of its Affiliates (including any applicable Collaboration IP and Bluebird Technology), other than pursuant to an Applicable Bluebird In-License, and (ii) Bluebird In-Licensed IP, in each case to the extent necessary or useful to Develop Elected Candidate and Develop and Commercialize Licensed Product.

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1.25 "Licensed Product" means any product that constitutes or incorporates an Elected Candidate (including all modified and improved versions thereof), in all forms, presentations, and formulations (including manner of delivery and dosage). A modified or improved version of an Elected Candidate constituted or incorporated in a product will be deemed a "Modified Licensed Product" for purposes of Section 4.2 if it is Covered by patentable technology Controlled by Bluebird that (i) is first discovered, created, conceived, developed or reduced to practice after the later of (a) the License Agreement Effective Date and (b) the end of the Collaboration Program Term, (ii) requires the submission of a new BLA with respect to such modified or improved Elected Candidate, and (iii) materially contributes to the Elected Candidate being approved for a new indication or new patient population. For clarity, "Modified Licensed Products" are Licensed Products hereunder for all purposes other than Section 4.2.

1.26 "Manufacturing" means the production, manufacture, processing, filling, finishing, packaging, labeling, shipping and holding of product or any intermediate thereof, including process development, process qualification and validation, scale-up, commercial manufacture and analytic development, product characterization, stability testing, quality assurance and quality control. With reference to Elected Candidate and Licensed Product, Manufacturing includes Vector and associated Payload supply.

1.27 "Net Sales" means [***]

1.28 "Pivotal Study" means (i) a Phase 3 Study that is intended by Celgene to be submitted (together with any other registration trials that are prospectively planned when such Phase 3 Study is initiated) for Regulatory Approval in the U.S. or the EU, or (ii) any other clinical study that is designed to establish that a pharmaceutical product is safe and efficacious for its intended use, and to determine warnings, precautions, and adverse reactions that are associated with such pharmaceutical product in the dosage range to be prescribed, which clinical study is a registration trial intended to be sufficient for filing an application for a Regulatory Approval for the Licensed Product in the U.S. or another country or some or all of an extra-national territory, solely as evidenced by the acceptance for filing for a Regulatory Approval for such product after completion of such study.

1.29 "Regulatory Exclusivity Period" means with respect to a Licensed Product in a country, the period of time during which (a) Celgene or any of its Affiliates or Sublicensees has been granted the exclusive legal right by a Regulatory Authority (or is otherwise entitled to the exclusive legal right by operation of Law) in such country to market and sell the Licensed Product, or (b) the data and information submitted by Celgene or any of its Affiliates or Sublicensees to the relevant Regulatory Authority in such country for purposes of obtaining Regulatory Approval may not be disclosed, referenced or relied upon in any way by such Regulatory Authority (including by relying upon the Regulatory Authority's previous findings regarding the safety or effectiveness of the Licensed Product) to support the Regulatory Approval or marketing of any product by a Third Party in such country.

1.30 "Second Indication" means a [***]

1.31 "Selling Party" means Celgene and its Sublicensees (including Celgene's Affiliates that are granted sublicenses pursuant to Section 3.3).

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1.32 "Sublicensee" means any person or entity (including Affiliates of Celgene) that is granted a sublicense as permitted by Section 3.3 (or an option to take such a sublicense), either directly by Celgene or indirectly by any other Sublicensee hereunder.

1.33 "Valid Claim" means, with respect to a particular country, (i) any claim of an issued and unexpired Patent in such country that (a) has not been held revoked, unenforceable or invalid by a decision of a court or governmental agency of competent jurisdiction, which decision is unappealable or unappealed within the time allowed for appeal and (b) has not been abandoned, disclaimed, denied or admitted to be invalid or unenforceable through reissue or disclaimer or otherwise in such country, or (ii) a claim of a pending Patent application that has not been finally abandoned or finally rejected or expired and which has been pending [***] from the date of filing of the earliest priority Patent application to which such pending Patent application is entitled to claim benefit.

1.34 "Vector Supplies" means supplies of Vectors and associated Payloads Manufactured for incorporation into Elected Candidate and Licensed Product for Development or Commercialization thereof.

Definitions for each of the following terms are found in the body of this License Agreement or the Appendices hereto as indicated below:

Defined Terms	***Location***
Additional IP	Section 3.2(a)
Allocable Manufacturing Overhead	Appendix D
Biosimilar Application	Section 7.2(f)
Biosimilar Product Competition	Section 4.3(e)
Bluebird Indemnitees	Section 9.6(a)
Business Acquisition	Section 3.4
Business Party	Section 3.4
Business Program	Section 3.4
Celgene Indemnitees	Section 9.6(b)
Commercial Supplies	Appendix D
Competitive Infringement	Section 7.1
Elected Candidate	Appendix A
Fully Burdened Manufacturing Cost	Appendix D
Indemnification Claim Notice	Section 9.6(c)
Indemnified Party	Section 9.6(c)
Joint IP	Section 5.2
License Agreement Term	Section 10.1
Losses	Section 9.6(a)
Major EU Countries	Section 1.18
Manufacturing and Supply Agreement	Section 2.4(c)(ii)
Milestone Event	Section 4.2
Milestone Payment	Section 4.2

Defined Terms	***Location***
Modified Licensed Product	Section 1.21
Patent Challenge	Section 10.2(b)
Solely Owned IP	Section 5.1
Third Party Claims	Section 9.6(a)

2. Development and Commercialization.

2.1 Development. As of and after the License Agreement Effective Date, Celgene will assume sole responsibility for, and control of, Developing Elected Candidate and Licensed Product in the Field worldwide, and will establish a Celgene Development & Commercialization Program for that purpose. As of and after the License Agreement Effective Date, Celgene will have sole responsibility for all costs and expenses arising from the Development and Commercialization of Elected Candidate and Licensed Product in the Field worldwide. Notwithstanding the foregoing, if the initial Phase 1 Study with respect to Optioned Candidate has not been completed as of the License Agreement Effective Date, at Celgene's election, Bluebird will continue to be responsible for the performance of such initial Phase 1 Study under the oversight of the JSC under the Master Collaboration Agreement until completion of such initial Phase 1 Study. In the event Bluebird continues, at Celgene's election, to continue to be responsible for the performance of such initial Phase 1 Study, Bluebird will be responsible for the costs of performing such initial Phase 1 Study until the earlier to occur of (i) completion of such initial Phase 1 Study and (ii) expiration or termination of the Collaboration Program Term; following the end of the Collaboration Program Term, Celgene will reimburse Bluebird for the out-of-pocket costs of performing such initial Phase 1 Study incurred after the end of the Collaboration Program Term within thirty (30) days of Celgene's receipt of Bluebird's written invoice therefor.

2.2 Regulatory. Subject to the last sentence of Section 2.1, (i) as of and after the License Agreement Effective Date, Celgene will lead and have sole control of all efforts with Regulatory Authorities regarding the Development and Commercialization of Elected Candidate and Licensed Product in the Field worldwide, including taking full responsibility for preparing and filing the relevant Regulatory Filings and seeking Regulatory Approval and (ii) promptly following the License Agreement Effective Date, Bluebird will, at Celgene's expense, assign to Celgene all Regulatory Filings with respect to Elected Candidate and Licensed Product. For clarity, in the event Bluebird continues to be responsible for the performance of an initial Phase 1 Study following the License Agreement Effective Date in accordance with Section 2.1, Bluebird will retain ownership of any Regulatory Filings (including the IND) for Optioned Candidate until completion of such initial Phase 1 Study. In the event of failure to assign such Regulatory Filings to Celgene, Bluebird hereby consents and grants to Celgene the right to access and reference (without any further action required on the part of Bluebird, whose authorization to file this consent with any Regulatory Authority is hereby granted) any such Regulatory Filing.

2.3 Technical Assistance. During the Collaboration Program Term, Bluebird will reasonably cooperate with Celgene to provide all technical assistance, and to transfer to Celgene any additional Know-How licensed to Celgene under Section 3.1, requested by Celgene to facilitate the transfer of Development efforts related to Elected Candidate and Licensed Product.

Such cooperation will include providing Celgene with reasonable access by teleconference or in-person at Bluebird's facilities to Bluebird personnel involved in the research and Development of Elected Candidate to provide Celgene with a reasonable level of technical assistance and consultation in connection with the transfer of such Know-How. Following the Collaboration Program Term, Bluebird will reasonably cooperate with Celgene to provide reasonable amounts of technical assistance, including to transfer to Celgene any additional Know-How licensed to Celgene under Section 3.1, with respect to Elected Candidate or Licensed Product as reasonably requested by Celgene with reasonable advance notice to Bluebird. Any dispute with respect to the amount and completeness of the technical assistance and cooperation to be provided by Bluebird under this Section 2.3 will be referred to and finally resolved by binding arbitration by a mutually agreeable, disinterested, conflict-of-interest-free individual not affiliated or consulting with either Party. Any such arbitration will be conducted under the then-current rules of the American Arbitration Association.

2.4 Manufacture and Supply.

(a) *Manufacturing*. Subject to Section 2.4(b), Celgene will be solely responsible for, and will bear all the costs and expenses of, Manufacturing and supplying all Elected Candidate and Licensed Product for Development and Commercialization in the Field worldwide and, subject to Section 2.4(c), Celgene will purchase Vector Supply from Bluebird or its designee for such purpose.

(b) *Vector Supply.* Bluebird will have the sole right to Manufacture or have Manufactured Vector Supply, and Celgene will have no rights with respect thereto except as provided in Section 2.4(c)(iv). Except as provided in Section 2.4(c)(iv) or in the Manufacturing Supply Agreement, neither Celgene nor any Affiliate of Celgene (nor any others on behalf of or under license or sublicense from Celgene or any of its Affiliates) will Manufacture (i) any Vector and associated Payload for Licensed Product or (ii) Licensed Product, except for the Manufacture of Licensed Product using Vector Supply supplied by or on behalf of Bluebird. Except as provided in Section 2.4(c)(iv) or in the Manufacturing Supply Agreement, Celgene and its Affiliates and Sublicensees will purchase all Vector Supply exclusively from Bluebird or its designee.

(c) *Vector Supply Terms*.

(i) Except as provided otherwise in this Section 2.4(c) or in the Manufacturing Supply Agreement, Bluebird and its Affiliates will Manufacture, or cause a Third Party to Manufacture, all Vector Supply for all Elected Candidate and Licensed Product required for clinical Development and Commercialization in the Field worldwide, and will have the right to make all necessary decisions regarding arrangements with Third Party manufacturers, provided that Bluebird will reasonably consult with Celgene with respect to all such arrangements and obtain Celgene's prior written consent, which will not be unreasonably withheld, conditioned or delayed. [***]

(ii) The Parties will enter into a "Manufacturing and Supply Agreement," between each other or among the Parties and an Affiliate or a Third Party, covering Vector Supply as soon as reasonably practicable after the License Agreement Effective Date, which agreement will be consistent with and supersede the terms of this Section 2.4(c) and will otherwise be subject in all respects to the terms and conditions of this License Agreement.

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(iii) The cost to Celgene of Vector Supply will equal [***] of Bluebird's Fully Burdened Manufacturing Cost for such Manufacture, plus [***], unless otherwise agreed by the Parties in writing.

(iv) The Manufacturing and Supply Agreement will include the terms set forth in Appendix H, including terms permitting Celgene to establish "back-up" and/or "second source" rights for Vector Supply and license grants from Celgene to Bluebird under the Celgene Licensed Product IP and Celgene Licensed Product In-Licensed IP to the extent necessary or useful for Bluebird to Manufacture Vector Supply. [***]

(v) At Celgene's request, Bluebird will cooperate with Celgene's reasonable requests, at Celgene's cost and expense, to engage in a technology transfer to allow Celgene, in accordance with Section 2.4(c)(iv), to Manufacture Vector Supply (through the first commercial batch of Vector Supply) itself or by through its designated Third Party manufacturer, by transferring all Know-How, Materials, technology and trade secrets Controlled by Bluebird or its Affiliates that are necessary to Manufacture Vector Supply, thereby enabling Celgene (or such Third Party) to Manufacture the Vector Supply.

(vi) Any purchase of Vector Supply from Bluebird or its designee will expressly not include any license rights to any Know-How or Patents, but instead all licenses (implied, by exhaustion or otherwise) will arise under Section 3.1, if and as applicable.

(vii) For the purpose of this License Agreement, certain words and phrases (and their correlatives) relating to Manufacturing will have the meanings set forth on Appendix D.

2.5 Celgene Diligence. Celgene, directly or through one or more of its Sublicensees, will use Commercially Reasonable Efforts: (i) to Develop Licensed Product in the Field and to obtain Regulatory Approvals therefor; and (ii) to Commercialize Licensed Product in the Field after obtaining such Regulatory Approval, in each country worldwide where Commercializing Licensed Product would be warranted by using Commercially Reasonable Efforts.

2.6 Annual Update Meetings. At least once during each consecutive twelve (12)-month period from the License Agreement Effective Date until the earlier of first approval of a BLA for Licensed Product by the FDA or first approval of an MAA for Licensed Product by the EMA, within thirty (30) days of Bluebird's written request, the Parties will meet in person at a U.S. site of Celgene for Celgene to provide Bluebird with an update on the Development of Licensed Product by Celgene and its Sublicensees. During such meeting, Celgene will disclose to Bluebird all material information regarding such Development.

2.7 Reports by Celgene. Celgene will prepare and maintain, and will cause its Sublicensees to prepare and maintain, reasonably complete and accurate records regarding the Development of Elected Candidate and Licensed Product, and Commercialization of Licensed Product worldwide after Regulatory Approval therefor. Celgene will provide to Bluebird a reasonably detailed report regarding such efforts at least once every twelve (12)-month period from the License Agreement Effective Date. Such report will contain sufficient detail to enable Bluebird to assess Celgene's compliance with its Development and Commercialization obligations in Section 2.5, including information with respect to the following: (i) the design,

status and results of any animal studies and clinical trials for Licensed Product; (ii) any regulatory milestones, and any Regulatory Approvals achieved, for Licensed Product; and (ii) activities with respect to selling, promoting, supporting, detailing and marketing of Licensed Product. In addition to the foregoing, Celgene will provide Bluebird with such additional information regarding any such activities as Bluebird may reasonably request from time to time.

2.8 Applicable Bluebird In-Licenses and Other IP.

(a) *Maintenance of Applicable Bluebird In-Licenses*. Bluebird (i) will duly perform and observe all of its obligations under the Applicable Bluebird In-Licenses in all material respects and maintain in full force and effect the Applicable Bluebird In-Licenses, and (ii) will not, without Celgene's prior written consent (such consent not to be unreasonably withheld, conditioned or delayed), (1) amend, modify, restate, cancel, supplement or waive any provision of any Applicable Bluebird In-License, or grant any consent thereunder, or agree to do any of the foregoing, or (2) exercise any right to terminate any Applicable Bluebird In-License in each case ((1) and (2)) that would reasonably be expected to adversely affect in any respect the rights of Celgene under this License Agreement, provided that Bluebird will provide prior written notice to Celgene of all of the foregoing notwithstanding whether or not any of the foregoing would reasonably be expected to adversely affect in any respect the rights of Celgene under this License Agreement. Bluebird will provide Celgene with written notice as promptly as practicable (and in any event within five (5) business days) after becoming aware of any of the following: (A) any material breach or default by Bluebird or any of its Affiliates of any covenant, agreement or other provision of any Applicable Bluebird In-License, (B) any notice or claim from the counterparty to any Applicable Bluebird In-License terminating or providing notice of termination of any Applicable Bluebird In-License, (C) any notice or claim alleging any breach of default under any Applicable Bluebird In-License, or (D) the existence of any facts, circumstances or events which alone or together with other facts, circumstances or events could reasonably be expected (with or without the giving of notice or passage of time or both) to give rise to a breach of or default under or right to terminate any Applicable Bluebird In-License. If Bluebird fails to pay any amounts due under any Applicable Bluebird In-License and if such nonpayment would permit the counterparty to such Applicable Bluebird In-License to terminate or suspend the same or any rights thereunder, Celgene will have the right, but not the obligation, in its sole discretion, to pay such amounts on Bluebird's behalf, and any amounts so paid by Celgene may be taken by Celgene as a credit against any amounts payable to Bluebird under this License Agreement.

(b) [***]

(c) *Applicable Bluebird In-License Requirements*. Celgene will abide, and will cause all its Affiliates and applicable Sublicensees to abide, by all requirements of each Applicable Bluebird In-License in all material respects (and in any case in all respects in the case that failure to so abide would result in a breach under the Applicable Bluebird In-License), to the extent applicable to sublicensees thereunder and to the extent disclosed by Bluebird to Celgene, with the understanding that disclosure by Bluebird of any Applicable Bluebird In-License to Celgene will be deemed disclosure of such requirements of such Applicable Bluebird In-License to Celgene. In the event of a termination of any Applicable Bluebird In-License, Bluebird agrees, to the extent requested by Celgene, to reasonably assist Celgene in securing a direct license from

the applicable licensor under any Patents, Materials and Know-How that was licensed to Bluebird and sublicensed to Celgene hereunder prior to such termination. In addition, Bluebird agrees, if requested by Celgene, to reasonably assist Celgene in securing a standby license from the applicable licensor under any Patents, Materials and Know-How that are licensed to Bluebird and sublicensed to Celgene.

3. License Grants.

3.1 License by Bluebird. Subject to the terms and conditions of this License Agreement, Bluebird hereby grants to Celgene a worldwide, exclusive (even as to Bluebird) license, with the right to sublicense only as permitted by Section 3.4, under Licensed IP, to Develop Elected Candidate and to Develop and Commercialize Licensed Product. Further, (i) the license to Commercialize granted in this Section 3.1 will cover only the sale and offer for sale of Licensed Product in finished form and not the sale or offer for sale of Vectors (other than as and to the extent incorporated in the Licensed Product), and (ii) rights to Manufacture Vectors and associated Payloads are included within the scope of the license granted to Celgene under this Section 3.1, which rights are subject to the terms and conditions of Section 2.4(c).

3.2 Additional IP; Other In-Licenses.

(a) *Additional IP*. Except as set forth in Section 3.2(b), Celgene may, on or after the License Agreement Effective Date, elect to include within the scope of the Licensed IP any Know-How, Material, Patent, Regulatory Data, Regulatory Filings or Regulatory Approvals (" Additional IP"), that would be Controlled by Bluebird but for required payments of Additional Payments to a Third Party, by (i) providing notice to Bluebird of same and (ii) agreeing to pay and in fact paying all Additional Payments with respect to Celgene's access or license to such Additional IP. Following Bluebird's receipt of such notice and subject to Celgene's performance of its obligations to pay any Additional Payments with respect to Celgene's access or license to such Additional IP, such Additional IP will be deemed Licensed IP hereunder. For avoidance of doubt, this Section 3.2(a) does not apply to Know-How, Materials, Patents, Regulatory Data, Regulatory Filings or Regulatory Approvals licensed to Bluebird under the Applicable Bluebird In-Licenses, all of which are deemed Controlled by Bluebird notwithstanding this Section 3.2(a).

(b) *Other In-Licenses*. Celgene may, on or after the License Agreement Effective Date, elect to convert any Other In-License to an Applicable New In-License by providing notice to Bluebird of same. Upon Bluebird's receipt of such notice, such Other In-License will be an Applicable New In-License hereunder, Appendix B will automatically be updated to include such New In-License and the provisions of this License Agreement applicable to New In-Licenses, including Section 4.1(b), will apply with respect to such New In-License.

3.3 Sublicensing Rights.

(a) *Transfer*. The licenses granted in Sections 3.1 are transferable only upon a permitted assignment of this License Agreement in accordance with Section 11.12.

(b) *Celgene Sublicenses*. The license granted in Section 3.1 may be sublicensed, in full or in part, by Celgene by a written agreement to its Affiliates and Third Parties (with the right to sublicense through multiple tiers), provided, that as a condition precedent to and requirement of any such sublicense:

(i) Celgene will provide Bluebird with a copy of any sublicense agreement with a non-Affiliated Sublicensee within thirty (30) days of execution thereof, and to the extent permitted under any Applicable Bluebird In-License, such sublicense agreement may be redacted as necessary to protect commercially sensitive information;

(ii) Celgene will be responsible for any and all obligations of such Sublicensee as if such Sublicensee were "Celgene" hereunder; and

(iii) Any such Sublicensee will agree in writing to be bound by substantially identical obligations as Celgene hereunder with respect to the activities of such Sublicensee hereunder (and not with respect to the activities of any other), including Know-How disclosure obligations Celgene has to Bluebird hereunder with respect to the activities of such Sublicensee hereunder (but excluding payment obligations).

3.4 Exclusivity. During the License Agreement Term, neither Party nor its Affiliates (nor any others on behalf of or with, or under license or sublicense from, such Party or any its Affiliates) will research, Develop, Manufacture or Commercialize any products (including Vectors and associated Payloads) to be used in the Field (which, for the purposes of this Section 3.4, will include all indications and will not be limited to cancer) that specifically target the same Target Antigen as Elected Candidate, other than pursuant to this License Agreement (which includes, for avoidance of doubt, research, development, Manufacture and Commercialization of improved and modified versions of the Licensed Product by Celgene) or any other Development & Commercialization Agreement (if against the same Target Antigen) (which includes, for avoidance of doubt, research, development, Manufacture and Commercialization of improved and modified versions of the Licensed Product by Celgene). Notwithstanding this Section 3.4, if (i) a Business Combination occurs with respect to either Party with a Third Party or (ii) a Party acquires a Third Party (including by a merger or consolidation) so that such Third Party becomes an Affiliate over which the acquiring Party has control (as defined in the definition of Affiliate), or (iii) a Party acquires all or substantially all of the assets of a Third Party (including any Subsidiaries or divisions thereof) (each of (i), (ii) and (iii), a " Business Acquisition"; such Party, the "Business Party"), and, in each case, the Third Party (or any of such Third Party's Affiliates or any successors or assigns of such Third Party or such Third Party's Affiliates, other than the Business Party and its Affiliates as of the Business Acquisition) (a) already has, or the acquired assets contain, as applicable, a program that existed prior to, or was planned prior to and is demonstrably to be implemented shortly after, the Business Acquisition or (b) initiates and pursues a new program following such Business Acquisition, in each case that would otherwise violate this Section 3.4 (a " Business Program"), then such Third Party (or any of such Third Party's Affiliates or any successors or assigns of such Third Party or such Third Party's Affiliates, other than the Business Party and its Affiliates as of the Business Acquisition), as applicable, will be permitted to initiate, pursue and continue such Business Program after such Business Acquisition and such initiation, pursuit and continuation will not constitute a violation of this Section 3.4; provided however that (1) none of the Licensed IP, or other Patents, Materials or Know-How Controlled by the other Party and, in each case, licensed to the Business Party will be used in the Business Program, and (2) the research or Development activities required under this License Agreement will be conducted separately from any research or Development activities directed to such Business Program, including the maintenance of separate

lab notebooks and records (password-protected to the extent kept on a computer network) and separate personnel working on each of the activities under this License Agreement and the activities covered under such Business Program.

3.5 Contract Manufacturers. Subject to the terms and conditions of this License Agreement, Celgene will have the right to appoint by a written agreement "contract manufacturers", meaning any Third Party or Affiliate of Celgene that manufactures Licensed Product (or components therefor) for re-sale, but who itself is not a "Sublicensee" hereunder and thereby exercises "have made" rights granted by Bluebird under Section 3.1, as well as "contract research organizations" and other providers performing services on Celgene's behalf, none of which will be deemed a "Sublicensee" hereunder. Celgene will be responsible for any such contract manufacturer, contract research organization or service provider hereunder, and further will require any such contract manufacturer, contract research organization or service provider to agree in writing to comply with Sections 3.6 and 8.

3.6 No Implied Rights. No license, sublicense or other right is or will be created or granted hereunder by implication, estoppel or otherwise. Any licenses, sublicenses or rights will be granted only as expressly provided in this License Agreement. Celgene will not practice or otherwise use any Licensed IP other than in accordance with the licenses granted in Section 3.1.

3.7 Section 365(n) of the Bankruptcy Code. All rights and licenses granted pursuant to any section of this License Agreement are, and will be deemed to be, rights and licenses to "intellectual property" (as defined in Section 101(35A) of title 11 of the United States Code and of any similar provisions of applicable Laws under any other jurisdiction (the "Bankruptcy Code")). Bluebird agrees that Celgene, as a licensee of rights and licenses under this License Agreement, will retain and may fully exercise all of its rights and elections under the Bankruptcy Code. The Parties further agree that, in the event of the commencement of a bankruptcy proceeding by or against Bluebird under the Bankruptcy Code or analogous provisions of applicable Law outside the United States, Celgene will be entitled to a complete duplicate of (or complete access to, as appropriate) any intellectual property licensed to Celgene and all embodiments of such intellectual property, which, if not already in Celgene's possession, will be promptly delivered to it (i) upon any such commencement of a bankruptcy proceeding upon Celgene's written request therefor, unless Bluebird elects to continue to perform all of its obligations under this License Agreement or (ii) if not delivered under clause (i), following the rejection of this License Agreement by Bluebird in the bankruptcy proceeding upon written request therefor by Celgene.

4. Payments and Royalties.

4.1 Applicable Bluebird In-Licenses and Celgene Licensed Product In-Licenses.

(a) *Applicable Pre-Existing In-Licenses*. If any In-License Payment becomes due under any Applicable Pre-Existing In-License during the License Agreement Term, Bluebird will pay same, provided that Celgene will reimburse Bluebird for any such In-License Payment within thirty (30) days of Celgene's receipt of Bluebird's written invoice therefor, which In-License Payment (other than payments that are royalties) will not exceed [***], and subject to Section 6.1. Any such reimbursement by Celgene to Bluebird (1) is in addition to and not in lieu of the other payments required by this Section 4 and (2) will not be subject to Section 4.3(d). [***]

(b) *Applicable New In-Licenses*. Celgene may elect to take a sublicense under any New In-License of Bluebird and its Affiliates and upon such election, such New In-License will be an Applicable New In-License hereunder for all purposes. For the purposes of determining the Parties' respective payment obligations, all Applicable New In-Licenses as of and following the License Agreement Effective Date will be listed on Appendix B. If any In-License Payment becomes due under any Applicable New In-License during the License Agreement Term, Bluebird will pay same and, subject to Section 6.1, Celgene will reimburse Bluebird for (i) [***] of such payment that are royalties, which royalties will be subject to Section 4.3(d), and (ii) [***] of such payment that are not royalties, in each case ((i) and (ii)) within thirty (30) days of receipt of Bluebird's written invoice therefor. If Celgene elects to convert an Other In-License to an Applicable In-License pursuant to Section 3.2(b), Celgene will reimburse Bluebird for [***] of any In-License Payments that became due under such Applicable New In-License during the License Agreement Term to the same extent as if such Applicable New In-License was designated as such as of the License Agreement Effective Date, including with respect to applicable Patent Costs in accordance with Section 6.1, provided that Bluebird provides Celgene with a reasonable accounting of same. If any In-License Payments are royalties due under any Applicable New In-License during the License Agreement Term, such royalties will be subject to Section 4.3(d). To the extent that any grant of a sublicense by Celgene or any Sublicensees under an Applicable New In-License triggers a payment obligation under such Applicable New In-License, Bluebird will pay same and Celgene will reimburse Bluebird for [***] of such payment within thirty (30) days of receipt of Bluebird's written invoice therefor.

(c) *Celgene Licensed Product In-Licenses*. If any payments become due under any Celgene Licensed Product In-License with respect to the Licensed Product, Bluebird will be responsible for [***] of such payments as provided in Section 4.1(e) of the Master Collaboration Agreement, provided that if any such payments are royalties, such royalties will be subject to Section 4.3(d).

4.2 Milestone Payments. Celgene will make milestone payments (each, a "Milestone Payment") to Bluebird upon the occurrence of each of the milestones events (each, a "Milestone Event") as set forth below in this Section 4.2. Each of the Milestone Payments will be payable to Bluebird by Celgene within forty-five (45) days of the achievement of the specified Milestone Event, and such payments when owed or paid will be non-refundable and non-creditable, and not subject to set-off, except as otherwise set forth in Sections 2.8(a), 10.3(c) and 10.6 hereof, and Sections 4.1(e), 4.3 and 12.6 of the Master Collaboration Agreement. Except with respect to Modified Licensed Products, each of the Milestone Payments are payable only once in total under this License Agreement, whether achieved by one or more Licensed Products. Notwithstanding the foregoing, Bluebird will be entitled to receive [***] of the Milestone Payments below, other than the Milestone Payment for the first Milestone Event (*i.e.*, [***].

Milestone Event	***Milestone Payment***
[***]	
[***]	

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

4.3 Royalties.

(a) *Rates*. Subject to the remainder of this Section 4.3, Celgene will pay to Bluebird running royalties, on a Licensed Product-by-Licensed Product basis, based on the total aggregate annual Net Sales worldwide by Selling Parties of such Licensed Product in a given calendar year at the following royalty rates:

	Annual Worldwide Net Sales of each Licensed Product	***Royalty Rate***
[***]		

By way of example, in a given calendar year, if the aggregate annual worldwide Net Sales for a Licensed Product is [***], the following royalty payment would be payable for those Net Sales under this Section 4.3(a): [***]

(b) *Royalty Term.* Royalties under Section 4.3(a) will be payable, on a Licensed Product-by-Licensed Product and country-by-country basis, on the Net Sales of any Licensed Product if at least one of the following two (2) conditions apply: [***]

(c) *Royalty Reduction*. If Licensed Product is royalty-bearing only on account of Section 4.3(b)(ii), then the royalty rates set forth in Section 4.3(a) with respect to Net Sales attributable to Licensed Product will be reduced by [***].

(d) *Third Party Royalty Payments*. If Celgene or its Sublicensee, in its reasonable judgment, is required to obtain a license from any Third Party under any Patent Covering Licensed Product in order to Develop or Commercialize such Licensed Product, and if Celgene (or its Sublicensee) is required to pay to such Third Party under such license any royalties, and the infringement of such Patent cannot reasonably be avoided by Celgene (or its Sublicensee), or if Celgene (or its Sublicensee) is required by a court of competent jurisdiction to pay royalties or lost profits to such a Third Party (and the infringement of such Patent cannot reasonably be avoided), then the amount of Celgene's royalty obligations under this Section 4.3 will be reduced by [***] of the amount of such royalties paid to such Third Party, provided however, that the royalties payable under Section 4.3(a) will not be reduced in any such event below [***] of the amounts set forth in Section 4.3(a) (but as may be further reduced pursuant to Section 4.3(c) or Section 4.3(e)) for each royalty tier. Any royalties payable under any Applicable Pre-Existing In-Licenses may not be deducted under this Section 4.3(d) from royalties owed to Bluebird. Any royalties payable under any Applicable New In-Licenses and Celgene Licensed Product In-Licenses may be deducted under this Section 4.3(d) from royalties owed to Bluebird. Celgene (or its Sublicensee) will use its commercially reasonable efforts to minimize the amount of any of the foregoing payments owed to Third Parties. Prior to Celgene or its Sublicensee exercising its reasonable judgment under this Section 4.3(d), Celgene will provide Bluebird with written notice of a potential need to obtain any license from Third Parties. The Parties will discuss the best course of action to resolve such potential license requirement(s).

(e) [***]

(f) *Additional Royalty Provisions*. The royalties payable under Section 4.3(a) will be subject to the following:

(i) only one royalty will be payable hereunder with respect to each Licensed Product unit;

(ii) royalties when owed or paid hereunder will, except as provided in Section 4.3(d), be non-refundable and non-creditable and not subject to set-off (except as otherwise provided in Sections 2.8(a), 10.3(c) and 10.6 hereof, [***] and 17.6 of any Co-Development, Co-Promote and Profit Share Agreement, and Sections 4.1(e), 4.3 and 12.6 of the Master Collaboration Agreement); and

(iii) except as expressly set forth in Sections 4.3(c), 4.3(d) and 4.3(e), no other royalty deductions are permitted hereunder.

4.4 Payment Terms. [***]

(h) *Mutual Convenience of the Parties*. The royalty and other payment obligations set forth hereunder have been agreed to by the Parties for the purpose of reflecting and advancing their mutual convenience, including the ease of calculating and paying royalties and other amounts to Bluebird.

5. Ownership and Inventorship of IP.

5.1 Solely-Owned IP. Subject to Section 5.2, as between the Parties, each Party will own and retain all right, title and interest in and to any and all Know-How and Patents arising therefrom that are discovered, created, conceived, developed or reduced to practice solely by or on behalf of such Party under or in connection with this License Agreement, including as part the Celgene Development & Commercialization Program (" Solely Owned IP"). Subject to the licenses hereunder and the other terms and conditions of this License Agreement, each Party will be solely responsible for the Prosecution and Maintenance, and the enforcement and defense, of any Patents within its Solely Owned IP, and the other Party will have no rights with respect thereto.

5.2 Joint IP. The Parties will jointly own any and all Know-How and Patents arising therefrom that are discovered, created, conceived, developed or reduced to practice jointly by or on behalf of the Parties, under or in connection with this License Agreement, including as part of the Celgene Development & Commercialization Program ("Joint IP"). Each Party will have an undivided one-half interest in and to Joint IP. Each Party will exercise its ownership rights in and to such Joint IP, including the right to license and sublicense or otherwise to exploit, transfer or encumber its ownership interest, without an accounting or obligation to, or consent required from, the other Party, but subject to the licenses hereunder and the other terms and conditions of this License Agreement, including Section 3.4. At the reasonable written request of a Party, the other Party will in writing grant such consents and confirm that no such accounting is required to effect the foregoing regarding Joint IP. Each Party, for itself and on behalf of its Affiliates, licensees and sublicenses, and employees, subcontractors, consultants and agents of any of the foregoing, hereby assigns (and to the extent such assignment can only be made in the future hereby agrees to assign), to the other Party a joint and undivided interest in and to all Joint IP. The Prosecution and Maintenance, and the enforcement and defense, of any Patents within Joint IP will be jointly managed by the Parties on mutually agreeable terms to be entered into by the Parties at the time any such Patents are first filed, provided that (i) all recoveries and Patent

Costs arising from the enforcement or defense of any Patents within Joint IP, absent further agreement, will be shared by the Parties in accordance with Section 7.2(e) (provided that sufficient advance written notice of any such Patent Costs is given to the Party not incurring same) and (ii) Patent Costs incurred in connection with the Prosecution and Maintenance of Patents within Joint IP will be apportioned as set forth in Sections 6.1 and 6.3, provided that in each case ((i) and (ii)), if either Party elects not to pay any such Patent Costs for any such Patent, the Parties will meet and agree upon an equitable way to treat such Patent.

5.3 Inventorship. Inventorship determination for all Patents worldwide arising from any Know-How created, conceived or developed by or on behalf of the Parties under or in connection with this License Agreement and thus the ownership thereof will be made in accordance with applicable United States patent Laws.

5.4 Allocation. Notwithstanding Sections 5.1 – 5.3, the Patent Committee may allocate ownership of a particular item of intellectual property to improve the prospects of obtaining patent protection with respect to such item of intellectual property, even if such allocation is not in accordance with the terms of Sections 5.1 – 5.3, so long as the Parties mutually agree to such allocation.

6. Patent Prosecution and Maintenance.

6.1 Generally. Subject to Sections 6.2 and 6.3, Bluebird will have the sole right to Prosecute and Maintain Patents within the Licensed IP . Bluebird will use commercially reasonable efforts to, where applicable and upon Celgene's reasonable request, separate parent Patent applications within the Licensed IP into one or more separate Patent applications for Specific Patents, to the extent permitted under applicable Law, where doing so would not reasonably be expected to materially harm any Patent within the Licensed IP or other Patents owned by Bluebird or its Affiliates, provided that the foregoing limitation will not apply to Licensed IP that is Collaboration IP. [***]

6.2 Celgene Input. Bluebird will regularly provide Celgene with copies of all applications for Patents within the Licensed IP, and all other material submissions and correspondence with any patent authorities regarding such Patents, in sufficient time to allow for review and comment by Celgene. In addition, Bluebird will provide Celgene and its counsel with an opportunity to consult with Bluebird and its counsel regarding Prosecution and Maintenance of any such Patents in the Field, and Bluebird will consider in good faith all comments timely made by Celgene and its counsel. In the event of any disagreement between any of Bluebird or Celgene, Bluebird will have the final decision-making authority with respect to the matter involved as long as Bluebird acts in good faith.

6.3 Specific Patents. For any Patent within the Licensed IP [***] (each "Specific Patent"), the following will apply: upon Celgene's written request, and provided that Bluebird reasonably agrees with Celgene that the following Prosecution and Maintenance activities would not materially harm any other Patent within the Licensed IP or other Patents owned by Bluebird or its Affiliates (other than Collaboration IP), Celgene will control the Prosecution and Maintenance of the Specific Patents, and notwithstanding anything in Section 6.1 to the contrary, Celgene will be solely responsible for the payment of all related Patent Costs. In addition, Celgene will provide Bluebird and its counsel with an opportunity to consult with Celgene and

its counsel regarding Prosecution and Maintenance of any such Specific Patents, and Celgene will include or reflect all reasonable comments timely made by Bluebird and its counsel. Celgene acknowledges and agrees that Bluebird may grant similar rights to other exclusive Third Party licensees under any Patent within the Licensed IP that has claims Covering only a product that is not a Licensed Product (or its manufacture or use) and no other product (or its manufacture or use), other than Specific Patents. If the Parties cannot agree whether or not any Patent within the Licensed IP is a Specific Patent, or if Bluebird claims that the foregoing Prosecution and Maintenance activities would materially harm any other Patent within the Licensed IP or other Patents owned by Bluebird or any of its Affiliates, either of the Parties may refer such dispute to a mutually agreeable, disinterested, conflict-of-interest-free individual not affiliated or consulting with either Party and who has at least fifteen (15) years of patent prosecution experience in the pharmaceutical field. Any such arbitration will be conducted under the then-current rules of the American Arbitration Association, and the decision of the arbitrator will be final.

6.4 Election Not to Prosecute or Maintain or Pay Patent Costs. If Bluebird elects not (i) to Prosecute or Maintain any Patents within the Licensed IP in any particular country before the applicable filing deadline or continue such activities once filed in a particular country, or (ii) to pay the Patent Costs associated with Prosecution or Maintenance of any Patents within the Licensed IP, then in each such case Bluebird will so notify Celgene, promptly in writing and in good time to enable Bluebird to meet any deadlines by which an action must be taken to preserve such Patent in such country, if Celgene so requests. Upon receipt of each such notice by Bluebird, Celgene will have the right, but not the obligation, to notify Bluebird in writing on a timely basis that Celgene will assume control of the Prosecution or Maintenance of such Patent, and bear the Patent Costs thereafter incurred by Celgene with respect thereto. In addition, Celgene will provide Bluebird and its counsel with an opportunity to consult with Celgene and its counsel regarding Prosecution and Maintenance of any such Patents, and Celgene will include or reflect all reasonable comments timely made by Bluebird and its counsel. If after making such election, Celgene elects not to pay the Patent Costs associated with Prosecution or Maintenance of any such Patent, then in each such case Celgene will so notify Bluebird and on the ninetieth (90th) day after Bluebird's receipt of such notice such Patent will no longer be licensed to Celgene hereunder and will no longer be included within the "Licensed IP" hereunder.

6.5 Third Party Rights. To the extent that a Third Party licensor of Bluebird has retained any right to Prosecute or Maintain any Patent within the Licensed IP licensed to Celgene hereunder (including pursuant to an Applicable Bluebird In-License), or otherwise be involved in such activities, Bluebird will use commercially reasonable efforts to cause such Third Party licensor to take the actions specified by this Section 6 (including Sections 6.6 and 6.7) in a manner consistent with the in-license applicable thereto, but Bluebird will not be deemed to be in breach of its obligations under this Section 6 if, after using such commercially reasonable efforts, it is unable to comply with such obligations because of actions taken or not taken by such Third Party licensor.

6.6 Patent Extensions. Subject to the remainder of this Section 6.6, if any election for patent term restoration or extension, supplemental protection certificate or any of their

equivalents may be made with respect to any Patent within the Licensed IP, after consultation with Celgene, the Parties will discuss and seek to reach mutual agreement whether or not to take such action. If the Parties are not able to reach mutual agreement, (i) Celgene will have the sole right to make the final decision whether or not to seek such patent term restoration or extension, supplemental protection certificate or any of their equivalents with respect to Specific Patents and Patents within the Collaboration IP licensed to Celgene hereunder and (ii) Bluebird will have the sole right to make the final decision whether or not to seek such patent term restoration or extension, supplemental protection certificate or any of their equivalents with respect to all other Patents within the Licensed IP.

6.7 Regulatory Exclusivity Periods. With respect to any Patent listings required for any Regulatory Exclusivity Periods for Product, the Parties will mutually agree on which Patents within the Licensed IP to list, provided that if the Parties are not able to agree, Celgene will have the right to make the final decision, and provided further that the exercise of such right by Celgene will not increase or otherwise change the rights or obligations of the Parties hereunder.

6.8 Cooperation. Each Party will reasonably cooperate with the other Party in the Prosecution and Maintenance of Patents within the Licensed IP. Such cooperation includes promptly executing all documents, or requiring inventors, subcontractors, employees and consultants and agents of Celgene and Bluebird and their respective Affiliates and Sublicensees to execute all documents, as reasonable and appropriate so as to enable the Prosecution and Maintenance of any such Patents in any country.

6.9 Patent Marking. Celgene will mark, and will cause all other Selling Parties to mark, Product with all Patents within the Licensed IP in accordance with applicable Law, which marking obligation will continue for as long as (and only for as long as) required under applicable Law.

6.10 Common Interest Disclosures. With regard to any information or opinions disclosed pursuant to this License Agreement by one Party to the other Party regarding Prosecution and Maintenance of Patent within the Licensed IP, or enforcement of intellectual property and/or technology by or against Third Parties, Bluebird and Celgene agree that they have a common legal interest in determining the ownership, scope, validity and/or enforcement of the Licensed IP, and whether, and to what extent, Third Party intellectual property rights may affect the conduct of the Development and Commercialization of any Licensed Product, and have a further common legal interest in defending against any actual or prospective Third Party claims based on allegations of misuse or infringement of intellectual property rights relating to the Development or Commercialization of any Licensed Product. Accordingly, the Parties agree that all such information and materials obtained by the Parties from each other will be used solely for purposes of the Parties' common legal interests with respect to the conduct of the Agreement. All such information and materials will be treated as protected by the attorney-client privilege, the work product privilege, and any other privilege or immunity that may otherwise be applicable. By sharing any such information and materials, neither Party intends to waive or limit any privilege or immunity that may apply to the shared information and materials. Neither Party will have the authority to waive any privilege or immunity on behalf of the other Party without such other Party's prior written consent, nor will the waiver of privilege or immunity resulting from the conduct of one Party be deemed to apply against any other Party. This

Section 6.10 will be subject to any right granted by either Party to any Third Party, provided that the grant of such right to such Third Party does not conflict with the other Party's rights or the first Party's obligations under this License Agreement.

7. Patent Enforcement and Defense.

7.1 Notice. Each Party will promptly notify, in writing, the other Party upon learning of any actual or suspected Competitive Infringement of any Patents within the Licensed IP by a Third Party, or of any claim of invalidity, unenforceability, or non-infringement of any Patents within the Licensed IP, and will, along with such notice, supply the other Party with any evidence in its possession pertaining thereto. For purposes of this License Agreement, "Competitive Infringement" means any allegedly infringing activity in the Field (which, for the purposes of this definition, will include all indications and will not be limited to cancer) with respect to a Patent within the Licensed IP, which activity (i) falls within the scope then in effect of the licenses granted by Bluebird to Celgene as set forth in Sections 3.1, (ii) is subject to Section 7.2(f), or (iii) would be competitive with a Licensed Product and targets the same Target Antigen as such Licensed Product.

7.2 Enforcement and Defense. [***]

7.3 Third Party Rights. To the extent that a Third Party licensor of Bluebird has retained any right to (i) defend against a declaratory judgment action or other action challenging any Patents within the Licensed IP, (ii) seek to abate any Competitive Infringement of the Patents within the Licensed IP by a Third Party, or (iii) take any other actions described in Section 7.2 for any Patent within the Licensed IP licensed to Celgene hereunder (including pursuant to an Applicable Bluebird In-License), or otherwise be involved in such activities, Bluebird will use commercially reasonable efforts to cause such Third Party licensor to take the actions specified by this Section 7.3 in a manner consistent with the in-license applicable thereto, but Bluebird will not be deemed to be in breach of its obligations under this Section 7.3 if, after using such commercially reasonable efforts, it is unable to comply with such obligations because of actions taken or not taken by such Third Party licensor.

8. Confidentiality.

The Parties acknowledge and agree that terms of this License Agreement and all Materials, ideas and information of any kind, whether in written, oral, graphical, machine-readable or other form, whether or not marked as confidential or proprietary, which are transferred, disclosed or made available by a Party or at the request of a Party, including any of the foregoing of Third Parties, will be subject to the provisions of Section 10 of the Master Collaboration Agreement. The Parties agree to issue the joint press release on Appendix E promptly following the License Agreement Effective Date. A redacted version of this License Agreement is attached hereto as Appendix I.

9. Warranties; Limitations of Liability; Indemnification.

9.1 Representations and Warranties. Each Party represents and warrants to the other as of the License Agreement Effective Date that it has the legal right and power to enter into this License Agreement, to extend the rights and licenses granted or to be granted to the other in this License Agreement, and to fully perform its obligations hereunder.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

9.2 Additional Representations and Warranties of Bluebird. Except as set forth in Schedule 9.2, Bluebird represents and warrants to Celgene that, as of the License Agreement Effective Date:

(a) *Licensed IP*. Appendix F sets forth a complete and accurate list of all Patents included in the Licensed IP, indicating the owner, licensor and/or co-owner(s), if applicable, and, for any Elected Candidate and Licensed Product-relevant subject matter or Materials, if no Patent is specifically licensed, a list of all subject matter or Materials that are included in the Licensed IP, including those licensed under a materials use license or equivalent. Bluebird Controls the Patents listed on Appendix F and the Know-How within the Licensed IP, and is entitled to grant the licenses specified herein. Bluebird has not granted to any Third Party any rights or licenses under such Patents or Know-How within the Licensed IP that would conflict with the licenses granted to Celgene hereunder.

(b) *Third Party Agreements.* The Applicable Bluebird In-Licenses are valid and binding obligations of Bluebird and, to the Knowledge of Bluebird, the applicable licensor, enforceable against Bluebird and, to the Knowledge of Bluebird, the applicable licensor, in accordance with their terms, except as may be limited by general principles of equity (regardless of whether considered in a proceeding at law or in equity) and by applicable bankruptcy, insolvency, moratorium and other similar Laws of general application relating to or affecting creditors' rights generally. Neither Bluebird nor any of its Affiliates has received any notice of any counterparty's intention to terminate any Applicable Bluebird In-License in whole or in part or any notice requesting any amendment, alteration or modification of such Applicable Bluebird In-License or any sublicense or assignment thereunder. There is no breach or default, or event which upon notice or the passage of time, or both, could give rise to any breach or default, in the performance of any Applicable Bluebird In-License by Bluebird or any of its Affiliates or, to the Knowledge of Bluebird, the counterparty thereto, and Bluebird has not received any notice of any such breach, default or event. Except for the Applicable Bluebird In-Licenses, neither Bluebird nor any of its Affiliates is a party to any license, sublicense or other agreement pursuant to which Bluebird or such Affiliate has received a license or other rights relating to the Elected Candidate or Licensed Product. All Patents and Know-How licensed to Bluebird under the Applicable Bluebird In-Licenses are Controlled by Bluebird for purposes of the licenses granted to Celgene under this License Agreement.

(c) *Patents*. To Bluebird's Knowledge, the Patents listed on Appendix F have been procured or are being procured from the respective patent offices in accordance with applicable Law. None of the Patents included in the Licensed IP is or has been involved in any opposition, cancellation, interference, reissue or reexamination proceeding, and no Licensed IP is the subject of any judicial, administrative or arbitral order, award, decree, injunction, lawsuit, proceeding or stipulation. Neither Bluebird nor any of its Affiliates has received any notice alleging that the Patents in the Licensed IP are invalid or unenforceable, or challenging Bluebird's ownership of or right to use any such rights.

(d) *No Conflicts*. The execution, delivery and performance by Bluebird of this License Agreement and the consummation of the transactions contemplated hereby will not result in any violation of, conflict with, result in a breach of or constitute a default under any understanding, contract or agreement to which Bluebird is a party or by which it is bound.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

Neither Bluebird nor any of its Affiliates has entered into any agreement or otherwise licensed, granted, assigned, transferred, conveyed or otherwise encumbered or disposed of any right, title or interest in or to any of its assets, including any intellectual property rights, that would in any way conflict with or impair the scope of any rights or licenses granted to Celgene hereunder.

(e) *Outlicenses.* Appendix G sets forth a complete and accurate list of all agreements relating to the licensing, sublicensing or other granting of rights by Bluebird to any Person with respect to the Licensed IP and the Field, and Bluebird has provided complete and accurate copies of all such agreements to Celgene. Except for the Applicable Bluebird In-Licenses, Bluebird and its Affiliates are not subject to any payment obligations to Third Parties as a result of the execution or performance of this License Agreement. Neither Bluebird nor any of its Affiliates has granted any liens or security interests on the Licensed IP and the Licensed IP is free and clear of any mortgage, pledge, claim, security interest, covenant, easement, encumbrance, lien or charge of any kind.

(f) *No Proceedings*. There is no action, suit, proceeding or investigation pending or, to the Knowledge of Bluebird, currently threatened in writing against or affecting Bluebird that questions the validity of this License Agreement or the right of Bluebird to enter into this License Agreement or consummate the transactions contemplated hereby.

(g) *No Infringement*. Neither Bluebird nor any of its Affiliates has received any notice of any claim that any Patent, Know-How or other intellectual property Controlled by a Third Party would be infringed or misappropriated by the production, use, research, Development, Manufacture or Commercialization of the Elected Candidate or Licensed Product pursuant to this License Agreement, and, to the Knowledge of Bluebird, there are no Patents, Know-How or other intellectual property owned by a Third Party and not included in the Licensed IP or In-Licensed IP that are necessary for the production, use, research, Development, Manufacture or Commercialization of Elected Candidate or Licensed Product.

9.3 Disclaimers. Without limiting the respective rights and obligations of the Parties expressly set forth herein, each Party specifically disclaims any guarantee that any Licensed Product will be successful, in whole or in part. EXCEPT AS OTHERWISE EXPRESSLY PROVIDED IN THIS LICENSE AGREEMENT, THE PARTIES MAKE NO REPRESENTATIONS AND EXTEND NO WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO ANY PATENTS, KNOW-HOW, ELECTED CANDIDATE OR LICENSED PRODUCT, INCLUDING WARRANTIES OF VALIDITY OR ENFORCEABILITY OF ANY PATENT RIGHTS, TITLE, QUALITY, MERCHANTABILITY, FITNESS FOR A PARTICULAR USE OR PURPOSE, PERFORMANCE, AND NONINFRINGEMENT OF ANY THIRD PARTY PATENTS OR OTHER INTELLECTUAL PROPERTY RIGHTS.

9.4 [***]

9.5 Performance by Others. The Parties recognize that each Party may perform some or all of its obligations under this License Agreement through Affiliates and permitted subcontractors provided, however, that each Party will remain responsible and liable for the performance by its Affiliates and permitted subcontractors and will cause its Affiliates and permitted subcontractors to comply with the provisions of this License Agreement in connection therewith.

9.6 Indemnification.

(a) *Indemnification by Celgene*. Celgene will indemnify Bluebird, its Affiliates and their respective directors, officers, employees, Third Party licensors and agents, and their respective successors, heirs and assigns (collectively, " Bluebird Indemnitees"), and defend and save each of them harmless, from and against any and all losses, damages, liabilities, costs and expenses (including reasonable attorneys' fees and expenses) (collectively, " Losses") in connection with any and all suits, investigations, claims or demands of Third Parties (collectively, " Third Party Claims") against the Bluebird Indemnitees arising from or occurring as a result of: (i) the material breach by Celgene of any term of this License Agreement; (ii) any gross negligence or willful misconduct on the part of Celgene in performing its obligations under this License Agreement; or (iii) the Development or Commercialization by or on behalf of Celgene or any of its Affiliates or Sublicensees of Elected Candidate or Licensed Product, except in each case for those Losses for which Bluebird has an obligation to indemnify Celgene pursuant to Section 9.6(b), as to which Losses each Party will indemnify the other to the extent of their respective liability; provided, however, that Celgene will not be obligated to indemnify Bluebird Indemnitees for any Losses to the extent that such Losses arise as a result of gross negligence or willful misconduct on the part of an Bluebird Indemnitee.

(b) *Indemnification by Bluebird*. Bluebird will indemnify Celgene, its Affiliates and their respective directors, officers, employees and agents, and their respective successors, heirs and assigns (collectively, "Celgene Indemnitees"), and defend and save each of them harmless, from and against any and all Losses in connection with any and all Third Party Claims against Celgene Indemnitees arising from or occurring as a result of: (i) the material breach by Bluebird of any term of this License Agreement; (ii) any gross negligence or willful misconduct on the part of Bluebird in performing its obligations under this License Agreement; or (iii) the Development by or on behalf of Bluebird or any of its Affiliates or Sublicensees of Elected Candidate or Licensed Product, except in each case for those Losses for which Celgene has an obligation to indemnify Bluebird pursuant to Section 9.6(a), as to which Losses each Party will indemnify the other to the extent of their respective liability for the Losses; provided, however, that Bluebird will not be obligated to indemnify Celgene Indemnitees for any Losses to the extent that such Losses arise as a result of gross negligence or willful misconduct on the part of a Celgene Indemnitee.

(c) *Notice of Claim*. All indemnification claims provided for in Sections 9.6(a) and 9.6(b) will be made solely by such Party to this License Agreement (the "Indemnified Party"). The Indemnified Party will promptly notify the indemnifying Party (an " Indemnification Claim Notice") of any Losses or the discovery of any fact upon which the Indemnified Party intends to base a request for indemnification under Section 9.6(a) and 9.6(b), but in no event will the indemnifying Party be liable for any Losses that result from any delay in providing such notice. Each Indemnification Claim Notice must contain a description of the claim and the nature and estimated amount of such Loss (to the extent that the nature and amount of such Loss is known at such time). The Indemnified Party will furnish promptly to the indemnifying Party copies of all papers and official documents received in respect of any Losses and Third Party Claims.

(d) *Defense, Settlement, Cooperation and Expenses*.

(i) *Control of Defense*. At its option, the indemnifying Party may assume the defense of any Third Party Claim by giving written notice to the Indemnified Party within thirty (30) days after the indemnifying Party's receipt of an Indemnification Claim Notice, provided however that (i) the Third Party Claim solely seeks monetary damages and (ii) the indemnifying Party expressly agrees in writing that as between the indemnifying Party and the Indemnified Party, the indemnifying Party will be solely obligated to satisfy and discharge the Third Party Claim in full and is able to reasonably demonstrate that it has sufficient financial resources (the matters described in (i) and (ii), the " Litigation Conditions"). The assumption of the defense of a Third Party Claim by the indemnifying Party will not be construed as an acknowledgment that the indemnifying Party is liable to indemnify the Indemnified Party in respect of the Third Party Claim, nor will it constitute a waiver by the indemnifying Party of any defenses it may assert against the Indemnified Party's claim for indemnification. Upon assuming the defense of a Third Party Claim, the indemnifying Party may appoint as lead counsel in the defense of the Third Party Claim any legal counsel selected by the indemnifying Party (the indemnifying Party will consult with the Indemnified Party with respect to a possible conflict of interest of such counsel retained by the indemnifying Party). In the event the indemnifying Party assumes the defense of a Third Party Claim, the Indemnified Party will immediately deliver to the indemnifying Party all original notices and documents (including court papers) received by the Indemnified Party in connection with the Third Party Claim. Should the indemnifying Party assume the defense of a Third Party Claim, except as provided in Section 9.6(d)(ii), the indemnifying Party will not be liable to the Indemnified Party for any legal costs or expenses subsequently incurred by such Indemnified Party in connection with the analysis, defense or settlement of the Third Party Claim. The Indemnified Party may, at any time, assume the defense of a Third Party Claim if at any time the Litigation Conditions are not satisfied with respect to such Claim. In the event that it is ultimately determined that the indemnifying Party is not obligated to indemnify, defend or hold harmless the Indemnified Party from and against the Third Party Claim, the Indemnified Party will reimburse the indemnifying Party for any and all costs and expenses (including attorneys' fees and costs of suit) and any Third Party Claims incurred by the indemnifying Party in its defense of the Third Party Claim.

(ii) *Right to Participate in Defense*. Without limiting Section 9.6(d)(i), any Indemnified Party will be entitled to participate in, but not control, the defense of such Third Party Claim and to employ counsel of its choice for such purpose; provided, however, that such employment will be at the Indemnified Party's own cost and expense unless (i) the employment thereof has been specifically authorized by the indemnifying Party in writing, (ii) the indemnifying Party has failed to assume the defense and employ counsel in accordance with Section 9.6(d)(i) (in which case the Indemnified Party will control the defense), (iii) the interests of the Indemnified Party and the indemnifying Party with respect to such Third Party Claim are sufficiently adverse to prohibit the representation by the same counsel of both Parties under applicable Law, ethical rules or equitable principles, or (iv) the indemnifying Party no longer satisfies the Litigation Conditions, in which case the indemnifying Party will assume [***]percent ([***]%) of any such costs and expenses of counsel for the Indemnified Party.

(iii) *Settlement*. With respect to any Third Party Claims that relate solely to the payment of money damages in connection with a Third Party Claim and that will not result in the Indemnified Party's becoming subject to injunctive or other relief or otherwise adversely affecting the business of the Indemnified Party in any manner, and as to which the indemnifying Party will have acknowledged in writing the obligation to indemnify the Indemnified Party hereunder, and subject to the Litigation Conditions being satisfied, the indemnifying Party will have the sole right to agree to the entry of any judgment, enter into any settlement or otherwise dispose of such Loss, on such terms as the indemnifying Party, in its sole discretion, will deem appropriate. With respect to all other Losses in connection with Third Party Claims, where the indemnifying Party has assumed the defense of the Third Party Claim in accordance with Section 9.6(d)(i), the indemnifying Party will have authority to agree to the entry of any judgment, enter into any settlement or otherwise dispose of such Loss provided it obtains the prior written consent of the Indemnified Party (such consent not to be unreasonably withheld, delayed or conditioned). The indemnifying Party will not be liable for any settlement or other disposition of a Loss by an Indemnified Party that is reached without the prior written consent of the indemnifying Party. Regardless of whether the indemnifying Party chooses to defend or prosecute any Third Party Claim, no Indemnified Party will admit any liability with respect to or settle, compromise or discharge, any Third Party Claim without the prior written consent of the indemnifying Party, such consent not to be unreasonably withheld, delayed or conditioned.

(iv) *Cooperation*. If the indemnifying Party chooses to defend or prosecute any Third Party Claim, the Indemnified Party will, and will cause each other Indemnified Party to, cooperate in the defense or prosecution thereof and will furnish such records, information and testimony, provide such witnesses and attend such conferences, discovery proceedings, hearings, trials and appeals as may be reasonably requested in connection therewith. Such cooperation will include access during normal business hours afforded to indemnifying Party to, and reasonable retention by the Indemnified Party of, records and information that are reasonably relevant to such Third Party Claim, and making Indemnified Parties and other employees and agents available on a mutually convenient basis to provide additional information and explanation of any material provided hereunder, and the indemnifying Party will reimburse the Indemnified Party for all its reasonable out-of-pocket costs and expenses in connection therewith.

(v) *Costs and Expenses*. Except as provided above in this Section 9.6(d), the costs and expenses, including attorneys' fees and expenses, incurred by the Indemnified Party in connection with any claim will be reimbursed on a calendar quarter basis by the indemnifying Party, without prejudice to the indemnifying Party's right to contest the Indemnified Party's right to indemnification and subject to refund in the event the indemnifying Party is ultimately held not to be obligated to indemnify the Indemnified Party.

9.7 Insurance. Each Party will maintain at its sole cost and expense, an adequate liability insurance or self-insurance program (including product liability insurance) to protect against potential liabilities and risk arising out of activities to be performed under this License Agreement, and any agreement related hereto and upon such terms (including coverages, deductible limits and self-insured retentions) as are customary in the U.S. pharmaceutical industry for the activities to be conducted by such Party under this License Agreement. Subject to the preceding sentence, such liability insurance or self-insurance program will insure against

all types of liability, including personal injury, physical injury or property damage arising out of the manufacture, sale, use, distribution or marketing of Licensed Product. The coverage limits set forth herein will not create any limitation on a Party's liability to the other under this License Agreement.

10. Term and Termination.

10.1 Term. This License Agreement will commence as of the License Agreement Effective Date and, unless sooner terminated in accordance with the terms hereof or by mutual written consent, will continue on a country-by-country basis, until there are no more payments owed Bluebird on Licensed Product in such country (the longest such period of time for any Licensed Product hereunder, the " License Agreement Term"). Upon there being no more such payments hereunder for any such Licensed Product in such country, the licenses contained in Section 3.1 for such Licensed Product will become fully paid up and will remain exclusive with respect to such Licensed Product in such country.

10.2 Termination by Bluebird.

(a) *Breach*. Bluebird will have the right to terminate this License Agreement in full upon delivery of written notice to Celgene in the event of any material breach by Celgene of any terms and conditions of this License Agreement in a manner that fundamentally frustrates the transactions contemplated by this License Agreement, provided that such termination will not be effective if such breach, has been cured within [***] after written notice thereof is given by Bluebird to Celgene specifying the nature of the alleged breach (or, if such default cannot be cured within such [***] after such notice if Celgene commences actions to cure such default within such [***] and thereafter diligently continues such actions, but fails to cure the default by the end of such [***]); provided, however, that to the extent such material breach involves the failure to make a payment when due, such breach must be cured within [***] after written notice thereof is given by Bluebird to Celgene.

(b) [***]

10.3 Termination by Celgene.

(a) *Breach*. Celgene will have the right to terminate this License Agreement in full upon delivery of written notice to Bluebird in the event of any material breach by Bluebird of any terms and conditions of this License Agreement in a manner that fundamentally frustrates the transactions contemplated by this License Agreement, provided that such termination will not be effective if such breach has been cured within [***] after written notice thereof is given by Celgene to Bluebird specifying the nature of the alleged breach (or, if such default cannot be cured within such [***] period, within [***] days after such notice if Bluebird commences actions to cure such default within such [***] period and thereafter diligently continues such actions, but fails to cure the default by the end of such [***]).

(b) *Discretionary Termination.* Beginning with [***], Celgene will have the right to terminate this License Agreement in full at its discretion for any reason by delivering written notice to Bluebird, such termination to be effective [***] following the date of such notice.

(c) *Alternative to Termination Under Section* 10.3(a). If Celgene has the right to terminate this License Agreement under Section 10.3(a) (including expiration of all applicable

cure periods thereunder), in lieu of exercising such termination right, Celgene may elect once by written notice to Bluebird before the end of such applicable cure period to have this License Agreement continue in full force and effect and instead have, starting immediately after the end of such applicable cure period, any future Milestone Payments set forth in Section 4.2 and the royalty rates set forth in the table set forth in Section 4.3(a) be reduced by [***], provided that such reduction will not apply if such future Milestone Payments and royalty rates have already been reduced pursuant to Section 11.4(c) of the Master Collaboration Agreement.

10.4 Effects of Termination. Upon termination (but not expiration pursuant to Section 10.1) of this License Agreement for any reason:

(a) *Wind Down*. Celgene will responsibly wind-down, in accordance with accepted pharmaceutical industry norms and ethical practices, any on-going clinical studies for which it has responsibility hereunder in which patient dosing has commenced or, if reasonably practicable and requested by Bluebird, allow Celgene, its Affiliates or its Sublicensees to complete such trials. Celgene will be responsible for any costs associated with such wind-down. Bluebird will pay all costs incurred by either Party to complete such studies should Bluebird request that such studies be completed.

(b) *Sublicenses*. A termination of this License Agreement will not automatically terminate any sublicense granted by Celgene pursuant to Section 3.3 for Commercialization rights with respect to a non-Affiliated Sublicensee, provided that (i) such Sublicensee is not then (a) in material breach of any provision of this License Agreement or (b) in material breach of the applicable sublicense agreement or otherwise in breach of such sublicense agreement in a manner that would give rise to a right of termination on the part of Celgene, (ii) if Bluebird terminates this License Agreement pursuant to Section 10.2(a)(iii) for Celgene's failure to fulfill its payment obligations hereunder, such Sublicensee agrees to and does pay to Bluebird all outstanding amounts that accrued as a result of such Sublicensee's activities under the sublicense, (iii) Bluebird will have the right to step into the role of Celgene as sublicensor under any such sublicense executed after the License Agreement Effective Date, with all the rights that Celgene had under such sublicense, solely with respect to the Licensed IP, prior to termination of this License Agreement (including the right to receive any payments to Celgene by such Sublicensee that accrue from and after the date of the termination of this License Agreement solely with respect to the Licensed IP), (iv) such Sublicensee will pay to Bluebird all amounts that Celgene would have been obligated to pay to Bluebird hereunder with respect to such Sublicensee's activities had this License Agreement not terminated (less any amounts received by Bluebird in clause (iii) above) and (v) the survival of such sublicense will not result in an imposition of any additional obligations on the part of Bluebird that are not included within the scope of this License Agreement. Celgene will include in any sublicense agreement executed after the License Agreement Effective Date that relates solely to the Licensed IP a provision in which said Sublicensee acknowledges its obligations to Bluebird under this Section 10.4(b).

(c) *Cessation of Rights*. Except as otherwise expressly provided in Sections 10.4(b), all rights and licenses granted by Bluebird to Celgene in Section 3.1 will terminate, and Celgene and its Affiliates and Sublicensees will cease all use of Licensed IP and all Development, Manufacture and Commercialization of Elected Candidate and Licensed Product.

(d) *Regulatory Approvals*. To the extent permitted by applicable Law, and subject to Bluebird paying commercially reasonable compensation to Celgene for the assets to be transferred pursuant to this Section 10.4(d) (such compensation to either be mutually agreed to or determined through arbitration as provided in Section 10.4(g) below, and such compensation to be reduced by [***] from what would be commercially reasonable compensation if this License Agreement is terminated by Bluebird pursuant to Section 10.2(a)), all Regulatory Approvals and other regulatory filings and communications owned (in whole or in part) or otherwise Controlled by Celgene and its Affiliates and Sublicensees solely relating to the Elected Candidate and/or Licensed Product, and all other documents solely relating to and necessary to further Develop and Commercialize Elected Candidate and Licensed Product, as such items exist as of the effective date of such termination (including all solely related completed and ongoing clinical studies) will be assigned to Bluebird, and Celgene will provide to Bluebird one (1) copy of the foregoing and all documents contained in or referenced in any such items, together with the raw and summarized data for any clinical studies (and where reasonably available, electronic copies thereof). In the event of failure to obtain assignment, subject to the Parties agreeing on commercially reasonable compensation for the right to access and reference, Celgene hereby consents and grants to Bluebird the right to access and reference (without any further action required on the part of Celgene, whose authorization to file this consent with any Regulatory Authority is hereby granted) any such item.

(e) *Licenses*. Subject to Bluebird paying (i) commercially reasonable compensation to Celgene for the licenses to be granted pursuant to subsection (1) of this Section 10.4(e) (such compensation to either be mutually agreed to or determined through arbitration as provided in Section 10.4(g) below, and such compensation to be reduced by [***] from what would be commercially reasonable compensation if this License Agreement is terminated by Bluebird pursuant to Section 10.2(a)), and (ii) amounts payable to Celgene's applicable licensors as set forth below, Celgene will grant to Bluebird and its Affiliates (1) a worldwide, perpetual and irrevocable, nontransferable (except in connection with a permitted assignment of this License Agreement in accordance with Section 11.12), exclusive license, with the right to grant sublicenses through multiple tiers (subject to Section 3.3(b), *mutatis mutandis*), under the Celgene Licensed Product IP, and (2) an exclusive sublicense under the Celgene Licensed Product In-Licensed IP, in each case ((1) and (2)) to the extent such Celgene Licensed Product IP and Celgene Licensed Product In-Licensed IP are used in or Cover the Licensed Product as of the effective date of termination and to the extent such Celgene Licensed Product IP and Celgene Licensed Product In-Licensed IP exist as of the effective date of such termination (including in each case any additions, divisions, continuations, continuations-in-part, invention certificates, substitutions, reissues, reexaminations, extensions, registrations, supplementary protection certificates and renewals of such Celgene Licensed Product IP and Celgene Licensed Product In-Licensed IP) solely to the extent necessary to research, Develop, Manufacture and Commercialize the Elected Candidate and Licensed Product. With respect to grants of a sublicense under subsection (2) above, Bluebird will be responsible for all amounts payable to the applicable licensor, excluding maintenance fee payments, payments that are trigged by the grant of a sublicense (but including payments triggered by further grants of sublicenses by Bluebird or its sublicensees) and Patent Costs, that are attributable to Bluebird as a sublicensee thereunder under this License Agreement and Celgene will pay same and Bluebird will

reimburse Celgene for [***] of such payments within thirty (30) days of receipt of Celgene's written invoice therefor. Celgene will provide Bluebird with copies of all applicable Celgene Licensed Product In-Licenses promptly following the effective date of the termination of this License Agreement. The Prosecution and Maintenance and enforcement and defense rights and obligations of the Parties with respect to any Patents licensed or sublicensed to Bluebird pursuant to this Section 10.4(e) will be discussed and agreed to by the Parties, with the understanding that such Prosecution and Maintenance and enforcement and defense rights and obligations will be substantially similar to those set forth in Sections 6, with the roles of Bluebird and Celgene reversed (and such other changes as are appropriate from the context, and taking into account any rights retained by a Third Party licensor of Celgene to Prosecute and Maintain or enforce and defend any Patent sublicensed to Bluebird under this Section 10.4(e)). Bluebird will abide, and will cause all its Affiliates and applicable sublicensees to abide, by all requirements of each Celgene Licensed Product In-License under which Bluebird is sublicensed under this Section 10.4(e) in all material respects (and in any case in all respects in the case that failure to so abide would result in a breach under the Celgene Licensed Product In-License), to the extent applicable to sublicensees thereunder and to the extent disclosed by Celgene to Bluebird, with the understanding that disclosure by Celgene of any Celgene Licensed Product In-License to Bluebird will be deemed disclosure of such requirements of such Celgene Licensed Product In-License to Bluebird.

(f) *Trademarks*. Subject to Bluebird paying commercially reasonable compensation to Celgene for the license to be granted pursuant to this Section 10.4(f) (such compensation to either be mutually agreed to or determined through arbitration as provided in Section 10.4(g) below, and such compensation to be reduced by [***] from what would be commercially reasonable compensation if this License Agreement is terminated by Bluebird pursuant to Section 10.2(a)), Celgene will exclusively license to Bluebird any registered or unregistered trademarks or internet domain names that are specific to and solely used for the Licensed Product worldwide (it being understood that the foregoing will not include any trademarks or internet domain names that contain the corporate or business name(s) of Celgene).

(g) *Baylor Product License*. If the Licensed Product is subject to a Baylor Product License, then Celgene will, at Bluebird's written request, assign to Bluebird the applicable Baylor Product License in accordance with the terms of Section 13.5 thereof, provided that if such Baylor Product License applies to other products, Celgene will assign or sublicense to Bluebird that portion of the Baylor Product License that applies to the Licensed Product, and with the consequences therein stated (that is, Celgene will remain responsible for all payments accruing thereunder before the assignment, and Bluebird will be responsible for all payments accruing thereunder after such assignment).

(h) *Commercially Reasonable Compensation.* If the Parties are unable to agree on the amount of commercially reasonable compensation payable by Bluebird to Celgene pursuant to Sections 10.4(d), 10.4(e) or 10.4(f) within ten (10) days of the effective date of termination of this License Agreement, [***]

(i) *Country Termination*. If this License Agreement is terminated only with respect to a specific country pursuant to Section 10.2(b), the provisions of this Section 10.4 will apply only with respect to such terminated country.

10.5 Survival. In addition to the termination consequences set forth in Section 10.4, the following provisions will survive termination or expiration of this License Agreement: Sections 1, 3.3 (mutatis mutandis with respect to licenses granted to Bluebird under Section 10.4), 3.7, 3.8, 4.4, 5, 8, 9.3, 9.4, 9.6, 9.7, 10.4, and 11. Termination or expiration of this License Agreement will not relieve the Parties of any liability or obligation which accrued hereunder prior to the effective date of such termination or expiration nor preclude either Party from pursuing all rights and remedies it may have hereunder or at law or in equity with respect to any breach of this License Agreement nor prejudice either Party's right to obtain performance of any obligation. All other rights and obligations will terminate upon expiration of this License Agreement.

10.6 Right to Set-off. Notwithstanding anything to the contrary in this License Agreement, each Party has the right at all times to retain and set off against all amounts due and owing to the other Party as determined in a final judgment any damages recovered by such Party for any Losses incurred by such Party.

11. General Provisions.

11.1 Cumulative Remedies and Irreparable Harm. All rights and remedies of the Parties hereunder will be cumulative and in addition to all other rights and remedies provided hereunder or available by agreement, at law or otherwise. Each Party acknowledges and agrees that breach of any of the terms or conditions of this License Agreement would cause irreparable harm and damage to the other and that such damage may not be ascertainable in money damages and that as a result thereof the non-breaching Party would be entitled to seek from a court equitable or injunctive relief restraining any breach or future violation of the terms contained herein by the breaching Party without the necessity of proving actual damages or posting bond. Such right to equitable relief is in addition to whatever remedies either Party may be entitled to as a matter of law or equity, including money damages.

11.2 Business Combination and IP.

(a) *Bluebird Business Combination*. Notwithstanding anything to the contrary herein, for purposes of this License Agreement, no Know-How, Materials, Patents, Regulatory Data, Regulatory Filings or Regulatory Approvals not Controlled by Bluebird or any of its Affiliates prior to a Business Combination of Bluebird will be Controlled for purposes of this License Agreement after such Business Combination of Bluebird, other than (i) Applicable Bluebird In-Licenses to the extent in effect immediately prior to such Business Combination of Bluebird, (ii) Collaboration IP, and (iii) any Patent that claims priority, directly or indirectly, to any other Patent first Controlled before such Business Combination of Bluebird will be Controlled thereafter no matter when such Patent is filed or issued.

(b) *Celgene Business Combination*. Notwithstanding anything to the contrary herein, for purposes of this License Agreement, no Know-How, Materials, Patents Regulatory Data, Regulatory Filings or Regulatory Approvals not Controlled by Celgene or any of its Affiliates prior to a Business Combination of Celgene will be Controlled for purposes of this License Agreement after such Business Combination of Celgene, other than Collaboration IP, and except that any Patent that claims priority, directly or indirectly, to any other Patent first Controlled before such Business Combination of Celgene will be Controlled thereafter no matter when such Patent is filed or issued.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

11.3 Relationship of Parties. Nothing in this License Agreement is intended or will be deemed to constitute a partnership, agency, employer-employee or joint venture relationship between the Parties. No Party will incur any debts or make any commitments for the other, except to the extent, if at all, specifically provided therein. There are no express or implied third party beneficiaries hereunder (except for Bluebird Indemnitees and Celgene Indemnitees for purposes of Section 9.6).

11.4 Compliance with Law. Each Party will perform or cause to be performed any and all of its obligations or the exercise of any and all of its rights hereunder in good scientific manner and in compliance with all applicable Law. Without limiting the foregoing, Bluebird will comply with comply with all applicable Laws and regulations (including U.S. Foreign Corrupt Practices Act and any other applicable anti-bribery or anti-kickback laws or regulations).

11.5 Force Majeure. Neither Party will be liable to the other for failure of or delay in performing obligations set forth in this License Agreement (other than any obligation to pay monies when due), and neither will be deemed in breach of such obligations, if such failure or delay is due to natural disasters or any causes reasonably beyond the control of such Party; provided that the Party affected will promptly notify the other of the force majeure condition and will exert reasonable efforts to eliminate, cure or overcome any such causes and to resume performance of its obligations as soon as possible.

11.6 Governing Law. This License Agreement will be governed by and construed in accordance with the Laws of the State of New York, without respect to its conflict of laws rules, provided that any dispute relating to the scope, validity, enforceability or infringement of any Patents or Know-How will be governed by, and construed and enforced in accordance with, the substantive Laws of the jurisdiction in which such Patents or Know-How apply.

11.7 Counterparts; Facsimiles. This License Agreement may be executed in one or more counterparts, each of which will be deemed an original, and all of which together will be deemed to be one and the same instrument. Facsimile or PDF execution and delivery of this License Agreement by either Party will constitute a legal, valid and binding execution and delivery of this License Agreement by such Party

11.8 Headings. All headings in this License Agreement are for convenience only and will not affect the meaning of any provision hereof.

11.9 Waiver of Rule of Construction. Each Party has had the opportunity to consult with counsel in connection with the review, drafting and negotiation of this License Agreement. Accordingly, the rule of construction that any ambiguity in this License Agreement will be construed against the drafting party will not apply.

11.10 Interpretation. Whenever any provision of this License Agreement uses the term "including" (or "includes"), such term will be deemed to mean "including without limitation" (or "includes without limitations"). "Herein," "hereby," "hereunder," "hereof" and other equivalent words refer to this License Agreement as an entirety and not solely to the particular portion of this License Agreement in which any such word is used. All definitions set forth herein will be deemed applicable whether the words defined are used herein in the singular or the plural.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

Unless otherwise provided, all references to Sections and Appendices in this License Agreement are to Sections and Appendices of this License Agreement. References to any Sections include Sections and subsections that are part of the related Section (e.g., a section numbered "Section 2.1" would be part of "Section 2", and references to "Section 2.1" would also refer to material contained in the subsection described as "Section 2.1(a)").

11.11 Binding Effect. This License Agreement will inure to the benefit of and be binding upon the Parties, their Affiliates, and their respective lawful successors and assigns.

11.12 Assignment. This License Agreement may not be assigned by either Party, nor may either Party delegate its obligations or otherwise transfer licenses or other rights created by this License Agreement, except as expressly permitted hereunder or otherwise without the prior written consent of the other Party, which consent will not be unreasonably withheld, delayed or conditioned; provided that without consent (i) Celgene may assign this License Agreement to (x) an Affiliate or (y) its successor in connection with the merger, consolidation, or sale of all or substantially all of its assets, and (ii) Bluebird may assign this License Agreement to (x) an Affiliate or (y) its successor in connection with the merger, consolidation, or sale of all or substantially all of its assets or that portion of its business pertaining to the subject matter of this License Agreement; provided further that, except in the case where a Party is involved in a merger or consolidation where it is the surviving entity and no assets of such Party that are subject to this License Agreement have been transferred as a result of such merger or consolidation, (a) such assigning Party provides the other Party to this Agreement with at least thirty (30) business days advance written notice of such assignment(s) and the assigning Party agrees in a written agreement delivered prior to such assignment(s) to the non-assigning Party (and upon which such non-assigning Party may rely) to remain fully liable for the performance of its obligations under this Agreement by its assignee(s), (b) the assignee(s) agree in a written agreement delivered prior to such assignment(s) to the non-assigning Party (and upon which such non-assigning Party may rely) to assume performance of all such assigned obligations, (c) in the case of any assignment by Bluebird, all Licensed IP licensed to Celgene under this License Agreement will be transferred to such assignee(s) effective as of such assignment(s), (d) all of the matters referred to in clauses (a), (b) and (c), as applicable, will be set forth in documentation reasonably acceptable to the non-assigning Party prior to any such assignment(s) (and with such reasonable acceptance not to be unreasonably withheld, conditioned or delayed) and in all cases will provide the non-assigning Party with the full benefits of its rights under this Agreement (after taking into account all risks involving applicable counter-party performance and bankruptcy and insolvency risks, including those involving contractual rejection under 11 USC §365) as if no such assignment(s) had occurred, and (e) in the case of any assignment, the assigning Party will reimburse the non-assigning Party for all of the legal fees and expenses incurred by such non-assigning Party in connection with the matters set forth in clause (d) of this sentence in an aggregate amount not to exceed [***], and provided, further, that if Bluebird wishes to assign any Licensed IP to its Affiliates, it will be permitted to do so conditioned on each such Affiliate becoming a party to this License Agreement, in the form of an amendment to this License Agreement executed by Celgene, Bluebird and such Affiliate, pursuant to which such Affiliate would agree to assume all obligations hereunder, and grant to Celgene all rights hereunder, with respect to the Licensed IP. The terms of this Agreement will be binding upon and will inure to the benefit of the successors, heirs, administrators and permitted assigns of the Parties. Any purported assignment in violation of this Section 11.12 will be null and void *ab initio*.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

11.13 Notices. All notices, requests, demands and other communications required or permitted to be given pursuant to this License Agreement will be in writing and will be deemed to have been duly given upon the date of receipt if delivered by hand, recognized international overnight courier, confirmed facsimile transmission, or registered or certified mail, return receipt requested, postage prepaid to the applicable address or facsimile number set forth in Section 13.14 of the Master Collaboration Agreement. Either Party may change its designated address and facsimile number by notice to the other Party in the manner provided in this Section 11.13

11.14 Amendment and Waiver. This License Agreement may be amended, supplemented, or otherwise modified only by means of a written instrument signed by both Parties; provided that any unilateral undertaking or waiver made by one Party in favor of the other will be enforceable if undertaken in a writing signed by the Party to be charged with the undertaking or waiver. Any waiver of any rights or failure to act in a specific instance will relate only to such instance and will not be construed as an agreement to waive any rights or fail to act in any other instance, whether or not similar.

11.15 Severability. In the event that any provision of this License Agreement will, for any reason, be held to be invalid or unenforceable in any respect, such invalidity or unenforceability will not affect any other provision hereof, and the Parties will negotiate in good faith to modify this License Agreement to preserve (to the extent possible) their original intent.

11.16 Entire Agreement. This License Agreement, together with the Master Collaboration Agreement, is the sole agreement with respect to the subject matter and supersedes all other agreements and understandings between the Parties with respect to same (including Confidential Agreement). In the event of any conflict between the terms of this License Agreement and the terms of the Master Collaboration Agreement, the terms of this License Agreement will control.

11.17 Force Majeure. Neither Celgene nor Bluebird will be liable for failure of or delay in performing obligations set forth in this License Agreement (other than any obligation to pay monies when due), and neither will be deemed in breach of such obligations, if such failure or delay is due to natural disasters or any causes reasonably beyond the control of Celgene or Bluebird and without the fault or negligence of the Party so failing or delaying; provided that the Party affected will promptly notify the other of the force majeure condition and will exert reasonable efforts to eliminate, cure or overcome any such causes and to resume performance of its obligations as soon as possible.

[*Remainder of this Page Intentionally Left Blank*]

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IN WITNESS WHEREOF, the Parties have caused this License Agreement to be executed by their respective duly authorized officers as of the License Agreement Effective Date.

BLUEBIRD BIO, INC.

By: _____
(Signature)

Name: _____

Title: _____

Date: _____

CELGENE CORPORATION

By: _____
(Signature)

Name: _____

Title: _____

Date: _____

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Appendix A

Additional Defined Terms

"Elected Candidate"[20] means the Optioned Candidate selected by Celgene under the Master Collaboration Agreement that specifically targets the following Target Antigen: [ ].

[20] ***To be updated by the Parties to specifically identify the candidate that is the subject of the option election*** .

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Appendix B

Applicable New In-Licenses

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Appendix C

Applicable Pre-Existing In-Licenses

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Appendix D

Certain Manufacturing Definitions

[***]

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Appendix E

Press Release

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Appendix F

Certain Patents within the Licensed IP Controlled by Bluebird as of the License Agreement Effective Date

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Appendix G

Bluebird Agreements

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[***]

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Appendix I

Redacted Version of License Agreement

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Schedule 9.2

Exceptions to Bluebird's Representations and Warranties in Section 9.2

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Exhibit B

Co-Development, Co-Promote and Profit Share Agreement

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Co-Development, Co-Promote and Profit Share Agreement

by and between

bluebird bio, Inc.

and

Celgene Corporation

[ ]

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Co-Development, Co-Promote and Profit Share Agreement

This Co-Development, Co-Promote and Profit Share Agreement (this " CCPS Agreement"), dated as of [ ] (the "CCPS Agreement Effective Date"), is made by and between bluebird bio, Inc., a Delaware corporation (" Bluebird"), and Celgene Corporation, a Delaware ("Celgene"). Each of Bluebird and Celgene may be referred to herein as a " Party" or together as the "Parties."

WHEREAS, Bluebird has developed and owns or has rights to certain Patents and technology relating to developing innovative gene therapies for genetic disorders;

WHEREAS, Celgene is a biopharmaceutical company focused on acquiring, Developing and Commercializing innovative anti-cancer agents; and

WHEREAS, Bluebird and Celgene are parties to that certain Master Collaboration Agreement (dated [ ], 2013) (the " Master Collaboration Agreement") pursuant to which Celgene has an option to take a license to Product Candidates;

WHEREAS, pursuant to the terms of the Master Collaboration Agreement, Celgene has exercised its option to select a Product Candidate to be an Optioned Candidate by delivering to Bluebird a Celgene Option Notice and payment of the applicable Initial Option Fee (such Optioned Candidate, as defined more fully in Appendix A, the "Elected Candidate");

WHEREAS, pursuant to Section 5.3 of the Master Collaboration Agreement, Bluebird has delivered a Bluebird Option Notice to co-promote and co-Develop the Optioned Candidate in the U.S.; and

WHEREAS, the Parties now wish to enter into an exclusive arrangement whereby Bluebird and Celgene will co-Develop Licensed Product and Commercialize Licensed Product in the U.S. as part of a profit share arrangement, and Celgene will have exclusive rights to Commercialize Licensed Product in the ROW, all on the terms and conditions set forth here.

NOW, THEREFORE, in consideration of the mutual covenants contained herein, and for other good and valuable consideration, the amount and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

1. Definitions.

The following terms and their correlatives will have the meanings set forth below. Capitalized terms used, but not defined, herein will have the meanings ascribed to such terms in the Master Collaboration Agreement.

1.1 "Applicable Bluebird In-Licenses" means the Applicable Pre-Existing In-Licenses, the Applicable New In-Licenses, and any Co-Co In-Licenses where Bluebird is a contracting party.

1.2 "Applicable New In-Licenses" means all New In-Licenses of Bluebird or its Affiliates necessary or useful for the research, Development and/or Commercialization of Elected Candidate and Licensed Product that Celgene has elected to list on Appendix B as of the CCPS Agreement Effective Date, plus any other New In-License of Bluebird or its Affiliates that Celgene has elected to include as an Applicable New In-License pursuant to Section 10.7(b).

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1.3 "Applicable Pre-Existing In-Licenses" means all Pre-Existing In-Licenses necessary or useful for the research, Development and/or Commercialization of Elected Candidate and Licensed Product, and any extensions or expansions of the scope of such Pre-Existing In-Licenses, including those listed on Appendix C.

1.4 "Biosimilar Product" means, with respect to a Licensed Product in any country, any biosimilar product sold by a Third Party not authorized by or on behalf of Celgene, its Affiliates or Sublicensees, (i) that is a biosimilar biological product, as defined in 21 USC 379j-51 (or any successor or replacement thereof), a similar biological medicinal product, as defined in Annex I to Directive 2001/83/EC (or any successor or replacement thereof), or any similar biosimilar or generic product under the Laws of any country or jurisdiction, or (ii) regarding which Regulatory Approval is obtained by referencing Regulatory Data of such Licensed Product.

1.5 "Bluebird In-Licensed IP" means all Patents, Materials and Know-How in-licensed by Bluebird pursuant to Applicable Bluebird In-Licenses, including any extensions or expansions of the scope thereof.

1.6 "Bluebird Licensed IP" means all (i) Patents, Materials and Know-How Controlled at any time by Bluebird or any of its Affiliates (including any applicable Collaboration IP and Bluebird Technology) other than pursuant to an Applicable Bluebird In-License and (ii) Bluebird In-Licensed IP, in each case to the extent necessary or useful to Develop Elected Candidate and Develop and Commercialize Licensed Product.

1.7 "Bluebird Regulatory Rights" means all Regulatory Data, Regulatory Filings and Regulatory Approvals for Elected Candidate and Licensed Product worldwide Controlled at any time by Bluebird or any of its Affiliates.

1.8 "Bluebird Technology" means all Bluebird Solely Owned IP and all of Bluebird's right, title and interest in and to Joint IP.

1.9 "Celgene Licensed IP" means (i) Celgene Licensed Product IP, and (ii) Celgene Licensed Product In-Licensed IP.

1.10 "Celgene Licensed Product In-License" means any Applicable Celgene In-License or Celgene Co-Co In-License pursuant to which Celgene or any of its Affiliates in-licenses any Know-How, Materials or Patents that directly relate to or Cover the Elected Candidate and/or Licensed Product or its Manufacture or use.

1.11 "Celgene Licensed Product In-Licensed IP" means any Patents, Materials and Know-How Controlled at any time during the CCPS Agreement Term by Celgene or any of its Affiliates pursuant to a Celgene Licensed Product In-License or Celgene Other In-License that directly relate to or Cover the Elected Candidate and/or Licensed Product or its Manufacture or use.

1.12 "Celgene Licensed Product IP" means (i) Celgene Technology, (ii) Collaboration IP solely owned by Celgene and Celgene's interest in jointly owned Collaboration IP, and (iii) Patents, Materials or Know-How (to the extent not included in subsection (i) or (ii)) owned by Celgene or its Affiliates that are Controlled at any time during the CCPS Agreement Term by Celgene or any of its Affiliates, in each case that directly relate to or Cover the Elected Candidate and/or Licensed Product or its Manufacture or use.

1.13 "Celgene Other In-License" means any agreement between Celgene or any of its Affiliates and a Third Party, other than Applicable Celgene In-Licenses and Celgene Co-Co In-Licenses, pursuant to which Celgene or any of its Affiliates in-licenses any Know-How, Materials or Patents that directly relate to or Cover the Elected Candidate and/or Licensed Product or its Manufacture or use.

1.14 "Celgene Regulatory Rights" means all Regulatory Data, Regulatory Filings and Regulatory Approvals for Elected Candidate and Licensed Product worldwide Controlled at any time by Celgene or any of its Affiliates.

1.15 "Celgene Technology" means all Celgene Solely Owned IP and all of Celgene's right, title and interest in and to Joint IP.

1.16 "Commercialization" means any and all activities directed to the Manufacturing, marketing, detailing, promotion and securing of reimbursement of a product after Regulatory Approval has been obtained (including making, having made, using, importing, selling and offering for sale such product), and will include post-approval clinical studies, post-launch

marketing, promoting, detailing, marketing research, distributing, customer service, administering and commercially selling such product, importing, exporting or transporting such product for commercial sale, and all regulatory compliance with respect to the foregoing.

1.17 "Commercially Reasonable Efforts" means, with respect to the Development or Commercialization of Licensed Product by a Party, that level of efforts and resources that such Party would normally devote to the Development or Commercialization, as the case may be, of a product owned by it or to which it has rights of the type it has hereunder, which is of a similar commercial potential at a similar stage in its lifecycle, in each case taking into account issues of safety and efficacy, product profile, the proprietary position, the then current competitive environment for such product and the likely timing of such product's entry into the market, the pricing and launching strategy for the respective product, the regulatory environment and status of such product, and other relevant scientific, technical and commercial factors.

1.18 "Control" or "Controlled" means, with respect to any Know-How, Material, Patent, Regulatory Data, Regulatory Filings and Regulatory Approvals, the possession (whether by ownership or license, other than by a license or sublicense granted pursuant to this CCPS Agreement) by a Party or its Affiliates of the ability to grant to the other Party a license or access as provided herein to such item, without violating the terms of any agreement or other arrangement with any Third Party or, other than under Applicable Bluebird In-Licenses, being obligated to pay any royalties or other consideration therefor (" Additional Payments"). For clarity, Other In-Licenses are not "Controlled" for purposes of this CCPS Agreement, unless and only after such Other In-License is converted into an Applicable New In-License pursuant to Section 10.7(b). Notwithstanding the foregoing, as provided in Section 10.7(a), if on or after the CCPS Agreement Effective Date and for such time as the other Party agrees to pay and does in fact pay all Additional Payments with respect to such Party's access or license to any Know-How, Material, Patent, Regulatory Data, Regulatory Filings and Regulatory Approvals (other than that in-licensed by Bluebird pursuant to an Other In-License), such Know-How, Material, Patent, Regulatory Data, Regulatory Filings and Regulatory Approvals will be deemed to be included in the definition of "Control".

1.19 "Covers", with reference to (i) a Patent, means that the making, using, selling, offering for sale or importing of a product or practice of a method would infringe a Valid Claim of such Patent in the country in which such activity occurs, and (ii) Materials or Know-How, means that the Manufacture, Development or Commercialization of a product incorporates, embodies or otherwise makes use of such Materials or Know-How.

1.20 "EU" means the organization of member states of the European Union as it may be constituted from time to time.

1.21 "EU Regulatory Event" means, with respect to a Licensed Product, the earlier to occur of [***]

1.22 "First Commercial Sale" means the first sale for use or consumption of any Licensed Product in a country after all required Regulatory Approvals for commercial sale of such Licensed Product have been obtained in such country.

1.23 "First Indication" means the first sale for use or consumption of any Licensed Product in a country after all required Regulatory Approvals for commercial sale of such Licensed Product have been obtained in such country.

1.24 "GAAP" means U.S. generally accepted accounting principles or International Financial Reporting Standards, consistently applied, as designated and used by the applicable Party.

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1.25 "In-License Payments" means any amounts paid or payable under any Applicable Bluebird In-License that are incurred by Bluebird solely and directly as a result of the grant of a sublicense thereunder under this CCPS Agreement to Celgene, any of Celgene's contract Third Parties under Section 10.5, or any further Sublicensees of Celgene (including of Celgene's Affiliates that are granted sublicenses) under this CCPS Agreement. Any such payments will include (i) any amounts paid or payable under any Applicable Bluebird In-License solely and directly as a result of the grant of a sublicense (or an option thereto) by Bluebird to Celgene, [***]

1.26 "Licensed IP" means Bluebird Licensed IP and Celgene Licensed IP.

1.27 "Licensed Product" means any product that constitutes or incorporates an Elected Candidate (including all modified and improved versions thereof), in all forms, presentations, and formulations (including manner of delivery and dosage). A modified or improved version of an Elected Candidate constituted or incorporated in a product will be deemed a " Modified Licensed Product" for purposes of Section 11.2 if it is Covered by patentable technology Controlled by Bluebird that (i) is first discovered, created, conceived, developed or reduced to practice after the later of (a) the CCPS Agreement Effective Date and (b) the end of the Collaboration Program Term, (ii) requires the submission of a new BLA with respect to such modified or improved Elected Candidate, and (iii) materially contributes to the Elected Candidate being approved for a new indication or new patient population. For clarity, "Modified Licensed Products" are Licensed Products hereunder for all purposes other than Section 11.2.

1.28 "Manufacturing" means the production, manufacture, processing, filling, finishing, packaging, labeling, shipping and holding of product or any intermediate thereof, including process development, process qualification and validation, scale-up, commercial manufacture and analytic development, product characterization, stability testing, quality assurance and quality control. With reference to Elected Candidate and Licensed Product, Manufacturing includes Vector and associated Payload supply.

1.29 "Net Sales" means [***]

1.30 "Pivotal Study" means (i) a Phase 3 Study that is intended by Celgene to be submitted (together with any other registration trials that are prospectively planned when such Phase 3 Study is initiated) for Regulatory Approval in the U.S. or the EU, or (ii) any other clinical study that is designed to establish that a pharmaceutical product is safe and efficacious for its intended use, and to determine warnings, precautions, and adverse reactions that are associated with such pharmaceutical product in the dosage range to be prescribed, which clinical study is a registration trial intended to be sufficient for filing an application for a Regulatory Approval for the Licensed Product in the U.S. or another country or some or all of an extra-national territory, solely as evidenced by the acceptance for filing for a Regulatory Approval for such product after completion of such study.

1.31 "Regulatory Exclusivity Period" means with respect to a Licensed Product in a country, the period of time during which (a) Celgene or any of its Affiliates or Sublicensees has been granted the exclusive legal right by a Regulatory Authority (or is otherwise entitled to the

exclusive legal right by operation of Law) in such country to market and sell the Licensed Product, or (b) the data and information submitted by Celgene or any of its Affiliates or Sublicensees to the relevant Regulatory Authority in such country for purposes of obtaining Regulatory Approval may not be disclosed, referenced or relied upon in any way by such Regulatory Authority (including by relying upon the Regulatory Authority's previous findings regarding the safety or effectiveness of the Licensed Product) to support the Regulatory Approval or marketing of any product by a Third Party in such country.

1.32 "ROW" means the world other than the United States.

1.33 "ROW Administration" means administration of Licensed Product to a patient when located in the ROW.

1.34 "ROW Development & Commercialization Program" means the program under this CCPS Agreement for the Development of Elected Candidate and Licensed Product in the ROW, the Commercialization of Licensed Product in the ROW, and all Manufacturing (including Manufacturing of Vectors and associated Payloads) therefor.

1.35 "ROW Development Plan" means the Development plan for the Development of Elected Candidate and Licensed Product for ROW Administration during a given calendar year and the two (2) succeeding calendar years.

1.36 "Second Indication" means [***]

1.37 "Selling Party" means a Party and its Sublicensees (including such Party's Affiliates that are granted sublicenses pursuant to Section 10.3(c)).

1.38 "Sublicensee" means any person or entity (including Affiliates of the applicable Party) that is granted a sublicense as permitted by Section 10.3 (or an option to take such a sublicense), either directly by a Party or indirectly by any other Sublicensee hereunder.

1.39 "U.S. Administration" means administration of Licensed Product to a patient when located in the United States.

1.40 "U.S. Commercialization Budget" means the budget for conducting Commercialization in accordance with the U.S. Commercialization Plan during a given calendar year and the two (2) succeeding calendar years, as approved by the JGC in accordance with Section 5.3.

1.41 "U.S. Commercialization Plan" means that portion of the Worldwide Commercialization Plan that specifies the Commercialization plan for the Commercialization of Licensed Product for U.S. Administration during a given calendar year and the two (2) succeeding calendar years.

1.42 "U.S. Development Budget" means the budget for conducting Development of Elected Candidate and Licensed Product for U.S. Administration pursuant to the U.S. Development Plan during a given calendar year and the two (2) succeeding calendar years, as approved by the JGC in accordance with Section 4.3.

1.43 "U.S. Development Plan" means the Development plan for the Development of Elected Candidate and Licensed Product for U.S. Administration during a given calendar year and the two (2) succeeding calendar years, as approved by the JGC in accordance with Section 4.2.

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1.44 "U.S. Development & Commercialization Program" means the program under this CCPS Agreement for the Development of Elected Candidate and Licensed Product in the United States, the Commercialization of Licensed Product in the United States, and all Manufacturing (including Manufacturing of Vectors and associated Payloads) therefor.

1.45 "Valid Claim" means, with respect to a particular country, (i) any claim of an issued and unexpired Patent in such country that (a) has not been held revoked, unenforceable or invalid by a decision of a court or governmental agency of competent jurisdiction, which decision is unappealable or unappealed within the time allowed for appeal and (b) has not been abandoned, disclaimed, denied or admitted to be invalid or unenforceable through reissue or disclaimer or otherwise in such country, or (ii) a claim of a pending Patent application that has not been finally abandoned or finally rejected or expired and which has been pending [***] from the date of filing of the earliest priority Patent application to which such pending Patent application is entitled to claim benefit.

1.46 "Vector Supplies" means supplies of Vectors and associated Payloads Manufactured for incorporation into Elected Candidate and Licensed Product for Development or Commercialization thereof.

1.47 "Worldwide Commercialization Plan" means the Commercialization Plan that specifies the Commercialization plan for the Commercialization of Licensed Product for U.S. Administration and ROW Administration during a given calendar year and the two (2) succeeding calendar years.

1.48 "Worldwide Manufacturing Plan" means the Manufacturing plan for the Elected Candidate and Licensed Product for Development for both U.S. Administration and ROW Administration.

Definitions for each of the following terms are found in the body of this CCPS Agreement or the Appendices hereto as indicated below:

Defined Terms	***Location***
Additional Bluebird IP	Section 10.7(a)
Allowable Expenses	Appendix F
Allocable Manufacturing Overhead	Appendix D
Allocable Overhead	Appendix F
Biosimilar Application	Section 14.2(f)
Bluebird Development Cap	Section 4.3(c)(i)
Bluebird Indemnitees	Section 11.6(a)
Budgeted U.S. Development Costs	Section 4.3
Business Acquisition	Section 10.4
Business Party	Section 10.4
Business Program	Section 10.4
CCPS Agreement Term	Section 12.1
Celgene Indemnitees	Section 11.6(b)

Defined Terms	***Location***
Commercial Supplies	Appendix D
Competitive Infringement	Section 14.1
[***]	
Cost of Goods Sold or COGS	Appendix F
Development Cost Overage	Section 4.3(c)(i)
Development & U.S. Commercialization Program	Section 8.3(a)
Distribution Costs	Appendix F
Elected Candidate	Appendix A
Fully Burdened Manufacturing Cost	Appendix D
Gross Profit	Appendix F
Gross Sales	Appendix F
Indemnification Claim Notice	Section 11.6(c)
Indemnified Party	Section 11.6(c)
Information Request	Section 5.6(g)
JGC	Section 3.1(a)
Joint IP	Section 12.2
Losses	Section 11.6(a)
Major EU Countries	Section 1.21
Manufacturing and Supply Agreement	Section 7.4(b)(ii)
Marketing Costs	Appendix F
Milestone Event	Section 11.2(a)
Milestone Payment	Section 11.2(a)
Modified Licensed Product	Section 1.24
[***]	
Operating Profits or Losses	Appendix F
Other Operating Income/Expense	Appendix F
Profit & Loss Share	Section 11.4
ROW Post-Approval Manufacturing Plan	Section 7.3
Sales Costs	Appendix F
Sales Returns and Allowances	Appendix F
Solely Owned IP	Section 12.1
Specific Patent	Section 13.3
Third Party Claims	Section 11.6(a)
U.S. Administration Liabilities	Section 16.8
U.S. Development Costs	Appendix F

2. Overview.

2.1 General. During the CCPS Agreement Term, the Parties will conduct the Development and Commercialization of Elected Candidate and Licensed Product worldwide on the terms and conditions set forth in this CCPS Agreement.

2.2 Roles and Responsibilities; Diligence.

(a) The JGC will assign to each Party roles and responsibilities for performing the U.S. Development & Commercialization Program. Each Party, directly or through one or more of its Affiliates, Sublicensees or permitted subcontractors, will use Commercially Reasonable Efforts to perform the obligations assigned to such Party by the JGC under the U.S. Development & Commercialization Program. Each Party will reasonably cooperate with the other Party in performing such obligations.

(b) Celgene will assume sole responsibility for, and control of, Developing Elected Candidate and Licensed Product in the Field outside of the United States, and will establish a ROW Development & Commercialization Program for that purpose. Bluebird will reasonably cooperate with Celgene in such ROW Development & Commercialization Program.

2.3 Technical Assistance. During the Collaboration Program Term, Bluebird will reasonably cooperate with Celgene to provide all technical assistance, and to transfer to Celgene any additional Know-How licensed to Celgene under Section 10.1, requested by Celgene to facilitate the transfer of Development efforts related to Elected Candidate and Licensed Product. Such cooperation will include providing Celgene with reasonable access by teleconference or in-person at Bluebird's facilities to Bluebird personnel involved in the research and Development of Elected Candidate to provide Celgene with a reasonable level of technical assistance and consultation in connection with the transfer of such Know-How. Following the Collaboration Program Term, Bluebird will reasonably cooperate with Celgene to provide reasonable amounts of technical assistance, including to transfer to Celgene any additional Know-How licensed to Celgene under Section 10.1, with respect to Elected Candidate or Licensed Product as reasonably requested by Celgene with reasonable advance notice to Bluebird. Any dispute with respect to the amount and completeness of the technical assistance and cooperation to be provided by Bluebird under this Section 2.3 will be referred to and finally resolved by binding arbitration by a mutually agreeable, disinterested, conflict-of-interest-free individual not affiliated or consulting with either Party. Any such arbitration will be conducted under the then-current rules of the American Arbitration Association.

3. Governance and Joint Governance Committee.

3.1 Joint Governance Committee.

(a) *Governance Committee*. As soon as practicable following the CCPS Agreement Effective Date, the Parties will establish a Joint Governance Committee, comprised of three (3) representatives of Bluebird and three (3) representatives of Celgene (the " JGC"). Each Party may replace its representatives on the JGC or its Program Director at any time upon written notice to the other Party. With the consent of the other Party (such consent not to be unreasonably withheld, delayed or conditioned), each Party may invite non-voting employees and consultants to attend meetings of the JGC, subject to their agreement to be bound to the same extent as a permitted subcontractor under Section 2.4.

(b) *Meetings*. While in existence, the JGC will meet each calendar quarter and, at a minimum, two (2) of such meetings each calendar year will be in person (which in-person meeting will be held at locations mutually agreed by the Parties). In addition, either Party can

call a meeting of the JGC on five (5) business days prior written notice. Meetings of the JGC will be effective only if at least one (1) representative of each Party is present or participating. Each Party will be responsible for all of its own expenses of participating in the meetings. The Parties will endeavor to schedule the calendar quarterly meetings of the JGC at least six (6) months in advance. The Parties will alternate in preparing and circulating a meeting agenda prior to each such meeting. The Party that prepared the agenda (or called the meeting) will prepare written minutes of such meeting, and the preparing Party will circulate such minutes within fifteen (15) days after such meeting. The Parties will agree on the minutes of each meeting promptly, but in no event later than the next meeting of the JGC.

(c) *Responsibilities*. The JGC will supervise the overall performance of the Development and Commercialization of Elected Candidate and Licensed Product for U.S. Administration, and within such scope will:

(i) Make all decisions regarding the Parties' performance of the U.S. Development & Commercialization Program (except as otherwise expressly provided in this CCPS Agreement), including, subject to Section 2.2, which Party will have which responsibilities under the U.S. Development & Commercialization Program (taking into account each Party's reasonably available resources and expertise (either directly or through Third Party contracting));

(ii) Review and seek to coordinate the U.S. Development & Commercialization Program with the ROW Development & Commercialization Program;

(iii) Address all matters specifically delegated to the JGC pursuant to this CCPS Agreement;

(iv) Form such other committees as the JGC may deem appropriate, and require that such committees meet at such times and places, provided that such committees may make recommendations to the JGC but may not be delegated JGC decision-making authority;

(v) Address such other matters relating to the activities of the Parties under this CCPS Agreement as either Party may bring before the JGC, including any matters that are expressly for the JGC to decide as provided in this CCPS Agreement; and

(vi) Attempt to resolve any disputes on an informal basis.

(d) *Decision-making*. The three (3) JGC representatives of each Party will collectively have one (1) vote, and the JGC will make decisions only by unanimous consent of each Party with respect to its vote, and each Party will act reasonably in exercising its vote. [***]

(e) *Limits on JGC Authority*. Each Party will retain the rights, powers and discretion granted to it under this CCPS Agreement and no such rights, powers, or discretion will be delegated to or vested in the JGC unless such delegation or vesting of rights is expressly provided for in this CCPS Agreement or the Parties expressly so agree in writing. The JGC will not have the power to, nor will the Party having the tie-breaking vote in the JGC have the power to (i) amend, modify or waive compliance with this CCPS Agreement (other than as expressly permitted hereunder), (ii) alter, increase or expand the Parties' rights or obligations under this CCPS Agreement (other than as permitted by Section 2.2), (iii) determine that a Party has

fulfilled any obligations under this CCPS Agreement or that a Party has breached any obligation under this CCPS Agreement, (iv) make a decision that is expressly stated to require the mutual agreement of the Parties, or (v) determine that milestone events required for the payment of milestone payments have or have not occurred. For avoidance of doubt, the JGC will have no right to supervise or direct the Development and Commercialization of Elected Candidate or Licensed Product for ROW Administration, and Celgene will have sole decision making authority with respect to such Development and Commercialization, including with respect to the ROW Development & Commercialization Program.

(f) *Term.* The JGC will cease to exist upon the end of the CCPS Agreement Term, unless the Parties elect to extend the JGC upon termination of expiration of this CCPS Agreement.

4. Development.

4.1 Generally. As of and after the CCPS Agreement Effective Date, subject to the terms and conditions of this CCPS Agreement, the Parties will assume through the JGC joint responsibility for Development of Elected Candidate and Licensed Product for U.S. Administration, under the U.S. Development & Commercialization Program, and Celgene will assume responsibility for Development of Elected Candidate and Licensed Product for ROW Administration, under the ROW Development & Commercialization Program. Notwithstanding the foregoing, if the initial Phase 1 Study with respect to Optioned Candidate has not been completed as of the CCPS Agreement Effective Date, at Celgene's election, Bluebird will continue to be responsible for the performance of such initial Phase 1 Study under the oversight of the JSC under the Master Collaboration Agreement until completion of such initial Phase 1 Study. In the event Bluebird continues, at Celgene's election, to continue to be responsible for the performance of such initial Phase 1 Study, Bluebird will be responsible for the costs of performing such initial Phase 1 Study until the earlier to occur of (i) completion of such initial Phase 1 Study and (ii) expiration or termination of the Collaboration Program Term; following the end of the Collaboration Program Term, Bluebird's out-of-pocket costs of performing such initial Phase 1 Study incurred after the end of the Collaboration Program Term will be Development costs hereunder and, (a) if incurred for Licensed Product for U.S. Administration, will be subject to Section 4.3 and Section 11.4, and (b) if incurred for Licensed Product solely for ROW Administration, Celgene will reimburse Bluebird for such costs within thirty (30) days of Celgene's receipt of Bluebird's written invoice therefor.

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4.2 Development Plan. Promptly after the CCPS Agreement Effective Date, Celgene will prepare an initial U.S. Development Plan, and the JGC will review and approve such initial U.S. Development Plan, with the goal of coordinating and harmonizing the U.S. Development Plan with the ROW Development Plan. Thereafter, Celgene will update the U.S. Development Plan each calendar year, and the JGC will review and approve any such update or any other amendment to the U.S. Development Plan. In addition, either Party may request at any time that the JGC consider and approve other updates to the U.S. Development Plan. Promptly after the CCPS Agreement Effective Date, Celgene will prepare an initial ROW Development Plan and will provide it to the JGC for purposes of discussion and the goal of coordinating and harmonizing the U.S. Development Plan and the ROW Development Plan. Thereafter, Celgene will update the ROW Development Plan each year and submit it to the JGC for purposes of discussion and the goal of coordinating and harmonizing the U.S. Development Plan and ROW Development Plan. Notwithstanding anything in this CCPS Agreement to the contrary, the Parties acknowledge and agree that (i) Bluebird may decline to perform any Development activity proposed to be conducted by Bluebird in Worldwide Commercialization Plan (excluding the completion of a Phase 1 Study pursuant to Section 4.1 and excluding Manufacturing of Vectors and associated Payloads), and (ii) the U.S. Development Plan will not include, and Bluebird will have no obligation to perform, any such Development activity that Bluebird has declined to perform (other than the completion of a Phase 1 Study pursuant to Section 4.1 and Manufacture of Vectors and associated Payloads), provided that once Bluebird has agreed to perform a Development activity, it will be obligated to perform, and cannot decline to perform, such activity. Further:

(a) The JGC will set the required form and contents of the U.S. Development Plan. The JGC will seek to coordinate and harmonize the U.S. Development Plan and the ROW Development Plan.

(b) Neither Party (itself or by or through any others, including any Affiliates or Sublicensees) will take any material action regarding the Development of Elected Candidate or Licensed Product for U.S. Administration unless described in the U.S. Development Plan, provided that the foregoing will not restrict Celgene from taking any action regarding the Development of Elected Candidate or Licensed Product for ROW Administration.

(c) All Development of Elected Candidate and Licensed Product for U.S. Administration will be conducted under the supervision of the JGC and as part of the U.S. Development & Commercialization Program.

(d) All Development of Elected Candidate and Licensed Product for ROW Administration will be conducted under the sole control of Celgene and as part of the ROW Development & Commercialization Program. At each calendar quarter meeting of the JGC, Celgene will provide the JGC with an update on the Development of Elected Candidate and Licensed Product by Celgene for ROW Administration. During such meeting, Celgene will disclose to Bluebird all material information regarding such Development.

(e) Celgene will prepare and maintain, and will cause its Affiliates and Sublicensees to prepare and maintain, reasonably complete and accurate records regarding the Development of Elected Candidate and Licensed Product for ROW Administration. At each calendar quarter

meeting of the JGC, Celgene will provide the JGC with a reasonably detailed report regarding such efforts. Such report will contain sufficient detail to enable Bluebird to assess Celgene's compliance with its Development and Commercialization obligations hereunder, including information with respect to the following: (i) the design, status and results of any animal studies and clinical trials for Licensed Product; and (ii) any regulatory milestones, and any Regulatory Approvals achieved, for Licensed Product. In addition to the foregoing, Celgene will provide Bluebird with such additional information regarding any such activities as Bluebird may reasonably request from time to time.

4.3 Development Budget and Costs. Promptly after the CCPS Agreement Effective Date, and concurrently with the preparation of the U.S. Development Plan, Celgene will prepare an initial U.S. Development Budget, which U.S. Development Budget will specify estimated U.S. Development Costs for each calendar year covered by such U.S. Development Budget (as updated pursuant to the following sentence, the " Budgeted U.S. Development Costs"), and the JGC will review and approve, where practicable, such initial U.S. Development Budget at least six (6) months in advance of such U.S. Development Costs being incurred. [***]

5. Commercialization.

5.1 Generally. Subject to the terms and conditions of this CCPS Agreement, (i) the Parties will assume through the JGC joint responsibility for Commercialization of Licensed Product for U.S. Administration under the U.S. Development & Commercialization Program, and (ii) Celgene will assume sole responsibility for Commercialization of Licensed Product for ROW Administration (including all costs and expenses arising therefrom).

5.2 Commercialization Plan. At such times as the JGC will deem appropriate, the JGC will direct the Parties to mutually prepare a Worldwide Commercialization Plan, and the JGC will review and approve such initial Worldwide Commercialization Plan. Thereafter, the JGC will have one or the other Party (or both) update the Worldwide Commercialization Plan each calendar year, and the JGC will review and approve any such update or any other amendment to the Worldwide Commercialization Plan. Notwithstanding anything in this CCPS Agreement to the contrary, the Parties acknowledge and agree that (i) Bluebird may decline to perform any Commercialization activity proposed to be conducted by Bluebird in the Worldwide Commercialization Plan (other than Manufacturing of Vectors and associated Payloads), and (ii) the Worldwide Commercialization Plan will not include, and Bluebird will have no obligation to perform, any such Commercialization activity that Bluebird has declined to perform, provided that once Bluebird has agreed to perform a Commercialization activity, it will be obligated to perform, and cannot decline to perform, such activity. In addition, either Party may request at any time that the JGC consider and approve other updates to the Worldwide Commercialization Plan. Further:

(a) The JGC will set the required form and contents of the Worldwide Commercialization Plan. The Worldwide Commercialization Plan will reflect a singular marketing and sales approach worldwide, and will specify, among other things, the number of sales reps in the U.S. for each Party, allocation of regions in the U.S. for each Parties' sales force, creation of marketing materials, planning for conferences, and other marketing activities.

(b) Neither Party (itself or by or through any others, including any Affiliates or Sublicensees) will take any material action regarding the Commercialization of Licensed Product unless described in the Worldwide Commercialization Plan or approved by the JGC.

(c) All Commercialization of Licensed Product for U.S. Administration will be conducted under the supervision of the JGC and as part of the U.S. Development & Commercialization Program.

(d) Celgene will have final decision making authority for all Commercialization activities worldwide, including timing of launch and pricing and the Worldwide Development Plan.

5.3 U.S. Commercialization Budget. At such times as the JGC will deem appropriate, and concurrently with the preparation of the initial Worldwide Commercialization Plan, Celgene will prepare an initial U.S. Commercialization Budget, and the JGC will review and approve such initial U.S. Commercialization Budget. [***]

5.4 Commercialization in the ROW. Celgene, directly or through one or more of its Affiliates or Sublicensees, will use Commercially Reasonable Efforts, (i) to Develop Licensed Product in the Field for ROW Administration and to obtain Regulatory Approvals therefor; and (ii) to Commercialize Licensed Product in the Field for ROW Administration after obtaining such Regulatory Approval, in each country in the ROW where Commercializing Licensed Product would be warranted by using Commercially Reasonable Efforts.

5.5 Branding. Subject to further mutual written agreement of the Parties, to the extent permitted by applicable Law and applicable Regulatory Authorities, (i) all Licensed Product sold or distributed for U.S. Administration will have the corporate brands of each Party displayed on an equally prominent basis, and (ii) all Licensed Product sold or distributed for ROW Administration will have the corporate brand of Bluebird displayed on a reasonably prominent basis. At such time as the JGC will deem appropriate, the Parties will enter into appropriate trademark licensing agreements to achieve the foregoing.

5.6 Training; Details.

(a) Celgene will direct the training of both Parties' sales representatives and will prepare and implement, in consultation with Bluebird, a training program and training materials for such sales representatives. In addition, Celgene will specify the conduct and content of details (including detail scripts) for the Licensed Product. Bluebird will cause each of its sales representatives assigned to promote the Licensed Product to attend and complete the training program developed by Celgene for the Licensed Product in the United States to assure a consistent, focused promotional strategy and message as and to the extent consistent with applicable Law.

(b) Each Party will be solely responsible for recruiting, hiring and maintaining its sales force of sales representatives for promotion of the Licensed Product in accordance with its standard procedures and the requirements of this CCPS Agreement. Each Party will be responsible for the activities of its sales representatives, including compliance by its sales representatives with training and detailing requirements. In particular, each Party will provide its sales representatives assigned to promote the Licensed Product with the level of oversight,

management, direction and sales support with respect to the promotion of Licensed Product necessary to effectively and efficiently promote the Licensed Product in accordance with the terms of this CCPS Agreement and applicable Law. If Celgene raises any concern with Bluebird regarding the performance or fitness of any Bluebird sales representative, Bluebird will address such concerns in a manner consistent with Celgene's instructions, including removal of such sales representative from the promotion of the Licensed Product.

(c) Each Party's sales representatives assigned to promote the Licensed Product will utilize only promotional materials that have been approved by the JGC. All detailing activities conducted by each Party's sales representatives will be consistent in all material respects with the promotional materials so approved. Each Party will train and instruct their respective sales representatives to make only those statements and claims regarding the Licensed Product, including as to efficacy and safety, that are consistent with the Licensed Product labeling and accompanying inserts and the approved promotional materials.

(d) Bluebird will have the right, but not the obligation, to provide [***] of the total sales representatives used by both Parties for promotion of Licensed Product. The Worldwide Commercialization Plan will set forth the precise number of Bluebird sales representatives consistent with the foregoing. If Bluebird is not at any particular time able to provide, for any reason, the number of sales representatives specified in the Worldwide Commercialization Plan, then Celgene will have the right to make up such shortfall using its sales representatives until such time as Bluebird is able to provide its agreed upon number of sales representatives. Bluebird will engage sales representatives having the minimum qualifications set forth in Schedule 5.6. [***]

(e) Each Party will provide the JGC with a report, as soon as practicable but in no event later than forty-five (45) days following the end of each calendar quarter during the Term, setting forth the number of details made by its sales representatives of Licensed Product in the United States during such calendar quarter. Costs and expenses for sales representatives will be charged to the Profit & Loss Share on an FTE basis.

(f) Each Party will maintain records and otherwise establish procedures to ensure compliance with all applicable Laws and professional requirements that apply to the promotion and marketing of the Licensed Product, including compliance with the PhRMA Code on Interactions with Healthcare Professionals.

(g) Celgene will have sole authority to execute medical and scientific affairs and programs, including professional symposia and other educational activities, and medical affairs studies based upon approved protocols. Celgene will have sole authority over all medical affairs activities relating to the Licensed Product, including medical information support and medical communications and publishing activities. The Parties acknowledge that each Party may receive requests for medical information concerning the Licensed Product from members of the medical professions and consumers. Celgene will have the exclusive right to respond to questions and requests for information about the Licensed Product received from such Persons that (i) warrant a response beyond the understanding of the sales representatives or (ii) are beyond the scope of the Licensed Product labels and inserts (each such request, an " Information Request"). If Information Requests are received by Bluebird, the request will be referred to Celgene's medical information department or appointed Third Party vendor to which Celgene has instructed Bluebird in writing to refer Information Requests.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

6. Regulatory.

6.1 Generally. Subject to Section 6.2 and the last sentence of Section 4.1, as of and after the CCPS Agreement Effective Date, subject to the terms and conditions of this CCPS Agreement, the Parties will assume through the JGC joint responsibility for all regulatory matters regarding seeking Regulatory Approval for Elected Candidate and Licensed Product for U.S. Administration, including interacting with Regulatory Authorities in connection therewith, before and after Regulatory Approval of Licensed Product. Celgene will have sole responsibility for all regulatory matters regarding seeking Regulatory Approval for Elected Candidate and Licensed Product for ROW Administration, including interacting with Regulatory Authorities in connection therewith, before and after Regulatory Approval of Licensed Product. Further:

(a) Prior to Regulatory Approval of Licensed Product for U.S. Administration, any such regulatory activities for Elected Candidate and such Licensed Product will be included in and will be part of the U.S. Development Plan (and thus subject to Section 4.2(a)) and the U.S. Development & Commercialization Program.

(b) Prior to Regulatory Approval of Licensed Product for ROW Administration, any such regulatory activities for Elected Candidate and such Licensed Product will be included in and will be part of the ROW Development Plan and the ROW Development & Commercialization Program.

(c) After any such Regulatory Approval for such Licensed Product for U.S. Administration, any such regulatory activities for U.S. Administration will be included in and will be part of the Worldwide Commercialization Plan and the U.S. Development & Commercialization Program.

(d) After any such Regulatory Approval for such Licensed Product for ROW Administration, any such regulatory activities for ROW Administration will be included in and will be part of the Worldwide Commercialization Plan and the ROW Development & Commercialization Program.

(e) Neither Party (itself or by or through any others, including any Affiliates or Sublicensees) will take any material action regarding any such regulatory activities unless described in the U.S. Development Plan, ROW Development Plan or the U.S. Commercialization Plan.

(f) Celgene will deploy and administer any REMS or other safety monitoring activity implemented for the Licensed Product, and be responsible for all pharmacovigilance activities for the Licensed Product.

6.2 Roles. Subject to Section 6.1, Celgene will take the lead and have final authority with respect to any regulatory activities for seeking Regulatory Approval for Elected Candidate and Licensed Product worldwide. Bluebird will have the right (i) to review and provide comments on all Regulatory Data, Regulatory Filings and Regulatory Approvals for U.S. Administration regarding such activities, which comments will be included if reasonable, and (ii) participate in all meeting with any Regulatory Authorities in the United States regarding such activities.

6.3 Ownership. All Regulatory Filings for Elected Candidate and Licensed Product worldwide will be made by Celgene, in Celgene's name, and all Regulatory Filings and Regulatory Approvals for Elected Candidate and Licensed Product worldwide will be solely owned by Celgene.

7. Manufacture and Supply.

7.1 Generally. As of and after the CCPS Agreement Effective Date, subject to the terms and conditions of this CCPS Agreement, (i) the Parties will assume through the JGC joint responsibility for (1) Manufacture of Elected Candidate and Licensed Product for Development and (2) Manufacture of Licensed Product for Commercialization for U.S. Administration, each under the Development & U.S. Commercialization Program, and (ii) Celgene will assume sole responsibility for Manufacturing Licensed Product for Commercialization for ROW Administration and, subject to Section 7.4, Celgene will purchase Vector Supply from Bluebird or its designee for such purpose.

7.2 Manufacturing for Development and Commercialization for U.S. Administration . Prior to Regulatory Approval of Licensed Product in any country, any Manufacturing activities for Development of Elected Candidate and such Licensed Product will be included in and will be part of the Worldwide Manufacturing Plan. After any such Regulatory Approval for such Licensed Product in the United States, any Manufacturing activities for Commercialization of Licensed Product for U.S. Administration will be included in and will be part of the U.S. Commercialization Plan and the U.S. Development and Commercialization Program. Neither Party (itself or by or through any others, including any Affiliates or Sublicensees) will take any material action regarding any such Manufacturing activities unless described in the Worldwide Manufacturing Plan or the U.S. Commercialization Plan, unless approved by the JGC.

7.3 Manufacturing for ROW Administration . Prior to Regulatory Approval of Licensed Product in any country in the ROW, Celgene will provide to the JGC a Manufacturing plan for the ROW in form and substance at least as detailed as the applicable section of the U.S. Commercialization Plan (including covering the applicable three-year time period) (the "ROW Post-Approval Manufacturing Plan"). Celgene (itself or by or through any others, including any Affiliates or Sublicensees) will not materially deviate from the then current ROW Post-Approval Manufacturing Plan when Manufacturing Licensed Product for Commercialization for ROW Administration without first notifying the JGC in writing and providing an updated ROW Post-Approval Manufacturing Plan.

7.4 Vector Manufacturing. Notwithstanding this Section 7:

(a) *Generally*. Bluebird will have the sole right to Manufacture Vector Supply for the Development and Commercialization of Elected Candidate and Licensed Product worldwide, and Celgene will have no rights with respect thereto except as provided in Section 7.4(b)(iv). Except as provided in Section 7.4(b)(iv) or in the Manufacturing Supply Agreement, neither Celgene nor any Affiliate of Celgene (nor any others on behalf of or under license or sublicense from Celgene or any of its Affiliates) will Manufacture (i) any Vector and associated Payload for Licensed Product or (ii) Licensed Product, except for the Manufacture of Licensed Product using Vector Supply supplied by or on behalf of Bluebird. Except as provided in Section 7.4(b)(iv) or in the Manufacturing Supply Agreement, Celgene and its Affiliates and Sublicensees will purchase all Vector Supply exclusively from Bluebird or its designee.

(b) *Vector Supply Terms*.

(i) Except as provided in this Section 7.4(b)(iv) or in the Manufacturing Supply Agreement, Bluebird and its Affiliates will Manufacture, or cause a Third Party to Manufacture, all Vector Supply for all Elected Candidate and Licensed Product required for clinical Development and Commercialization in the Field worldwide, and will have the right to make all necessary decisions regarding arrangements with Third Party manufacturers, provided that Bluebird will reasonably consult with Celgene with respect to all such arrangements and obtain Celgene's prior written consent, which will not be unreasonably withheld, conditioned or delayed. [***]

(ii) The Parties will enter into a "Manufacturing and Supply Agreement," between each other or among the Parties and an Affiliate or a Third Party, covering Vector Supply as soon as reasonably practicable after the CCPS Agreement Effective Date, which agreement will be consistent with and supersede the terms of this Section 7.4(b) and will otherwise be subject in all respects to the terms and conditions of this CCPS Agreement.

(iii) The cost to Celgene of Vector Supply for Commercialization for ROW Administration will equal [***], unless otherwise agreed by the Parties in writing. The cost of Vector Supply for Commercialization for U.S. Administration will be included in the Cost of Goods Sold. The cost of Vector Supply for Development will be included in the U.S. Development Costs, subject to adjustment as provided therein.

(iv) The Manufacturing and Supply Agreement will include the terms set forth in Appendix I, including terms permitting Celgene to establish "back-up" and/or "second source" rights for Vector Supply and license grants from Celgene to Bluebird under the Celgene Licensed IP to the extent necessary or useful for Bluebird to Manufacture Vector Supply. [***]

(v) At Celgene's request, Bluebird will cooperate with Celgene's reasonable requests, at Celgene's cost and expense, to engage in a technology transfer to allow Celgene, in accordance with Section 7.4(b), to Manufacture Vector Supply (through the first commercial batch of Vector Supply) itself or by through its designated Third Party manufacturer, by transferring all Know-How, Materials, technology and trade secrets Controlled by Bluebird or its Affiliates that are necessary to Manufacture Vector Supply, thereby enabling Celgene (or such Third Party) to Manufacture the Vector Supply.

(vi) Any purchase of Vector Supply from Bluebird or its designee will expressly not include any license rights to any Know-How or Patents, but instead all licenses (implied, by exhaustion or otherwise) will arise under Section 10.1, if and as applicable.

(vii) For the purpose of this CCPS Agreement, certain words and phrases (and their correlatives) relating to Manufacturing will have the meanings set forth on Appendix D.

8. Supporting Provisions for Development and Commercialization.

8.1 Co-Co Licenses. In the event that through the JGC the Parties identify Patents, Know-How or Materials of a Third Party that are necessary to Develop and Commercialize Elected Candidate and Licensed Product worldwide, upon JGC recommendation, one or the

other Party (or both) will use commercially reasonable efforts to obtain a license or other rights to such Patents, Know-How or Materials for use in connection with the performance of such Development and Commercialization (" Co-Co In-Licenses"). Prior to entering into any Co-Co In-License, the contracting Party will provide a draft copy to the other Party and the other Party will have the right to review and provide comments to such proposed Co-Co In-License. Neither Party will enter into a Co-Co In-License without the prior approval of the JGC, provided that Celgene will be free to enter into any Co-Co In-License for ROW Administration notwithstanding this Section 8.1. If a Party enters into any Co-Co In-Licenses during the CCPS Agreement Term, Appendix F hereto will be updated accordingly to include such Co-Co In-Licenses.

8.2 Records. Each Party will maintain, or cause to be maintained, records of its activities under this CCPS Agreement (including the Development & U.S. Commercialization Program) in sufficient detail and in good manner appropriate for research. Development, Commercialization, scientific, Patent and regulatory purposes, that will properly reflect all work included in the Development & U.S. Commercialization Program and under this CCPS Agreement, for a period of at least ten (10) years after the creation of such records. Each Party will have the right to request a copy of any such records.

8.3 Materials.

(a) Each Party will, during the CCPS Agreement Term, as a matter of course under the U.S. Development & Commercialization Program or ROW Development & Commercialization Program (collectively the " Development & U.S. Commercialization Program ") or upon the other Party's reasonable written request, furnish to each other samples of Materials that are in such Party's Control and are necessary for the other Party to carry out its responsibilities hereunder.

(b) Each Party will use such Materials only in accordance with the Development & U.S. Commercialization Program and otherwise in accordance with the terms and conditions of this CCPS Agreement and any instructions provided by the Party furnishing the Materials. Except with the prior written consent of the supplying Party (such consent not to be unreasonably withheld, delayed or conditioned), the Party receiving any Materials will not distribute or otherwise allow the release of Materials to any Affiliate (other than wholly-owned subsidiaries) or Third Party, except for subcontracting as permitted hereunder. All Materials delivered to the receiving Party will remain the sole property of the supplying Party and will be used in compliance with all applicable Law. The Materials supplied under this CCPS Agreement will be used with prudence and appropriate caution in any experimental work because not all of their characteristics may be known.

8.4 Permitted Subcontracting. Each Party may subcontract any of its activities to be performed under the Development & U.S. Commercialization Program to an Affiliate or Third Party, provided that any such Affiliate or Third Party will have entered into a written agreement with such Party that includes terms and conditions protecting and limiting use and disclosure of Confidential Information and Materials and Know-How at least to the same extent as under this CCPS Agreement, and requiring such Affiliate or Third Party and its personnel to assign to such Party all right, title and interest in and to any Patents, Know-How and Materials created,

conceived or developed in connection with the performance of subcontracted activities to the extent required to research, Develop, Manufacture and Commercialize Elected Candidate and Licensed Product, provided that with respect to Third Parties that are academic or other non-commercial Persons, a Party will be required only to use commercially reasonable efforts to obtain such assignment. Any such subcontracting activities will be described in the reports for the Collaboration Program required by Section 8.5.

8.5 Reports. The Parties will prepare and provide to the other Party such reports regarding their activities under this CCPS Agreement as the JGC may reasonably require. In addition, each Party will disclose to the other Party information regarding those activities as such Party may reasonable request. Without limiting the foregoing, each Party will prepare and maintain, and will cause its Affiliates and Sublicensees to prepare and maintain, reasonably complete and accurate records regarding the Development of Elected Candidate and Licensed Product, and Commercialization of Licensed Product worldwide after Regulatory Approval therefor. Each Party will provide to the other Party a reasonably detailed report regarding such efforts at least once every calendar year (and more frequently if required by the JGC). Such report will contain sufficient detail to enable a Party to assess the other Party's compliance with its Development and Commercialization obligations hereunder (including under the Development & U.S. Commercialization Program), including information with respect to the following: (i) the design, status and results of any animal studies and clinical trials for Licensed Product; (ii) any regulatory milestones, and any Regulatory Approvals achieved, for Licensed Product; and (iii) activities with respect to selling, promoting, supporting, detailing and marketing of Licensed Product.

9. In-Licenses.

9.1 Applicable Bluebird In-Licenses and Other IP.

(a) *Maintenance of Applicable Bluebird In-Licenses*. Bluebird (i) will duly perform and observe all of its obligations under the Applicable Bluebird In-Licenses in all material respects and maintain in full force and effect the Applicable Bluebird In-Licenses, and (ii) will not, without Celgene's prior written consent (such consent not to be unreasonably withheld, conditioned or delayed), (1) amend, modify, restate, cancel, supplement or waive any provision of any Applicable Bluebird In-License, or grant any consent thereunder, or agree to do any of the foregoing, or (2) exercise any right to terminate any Applicable Bluebird In-License in each case ((1) and (2)) that would reasonably be expected to adversely affect in any respect the rights of Celgene under this CCPS Agreement, provided that Bluebird will provide prior written notice to Celgene of all of the foregoing notwithstanding whether or not any of the foregoing would reasonably be expected to adversely affect in any respect the rights of Celgene under this CCPS Agreement. Bluebird will provide Celgene with written notice as promptly as practicable (and in any event within five (5) business days) after becoming aware of any of the following: (A) any material breach or default by Bluebird or any of its Affiliates of any covenant, agreement or other provision of any Applicable Bluebird In-License, (B) any notice or claim from the counterparty to any Applicable Bluebird In-License terminating or providing notice of termination of any Applicable Bluebird In-License, (C) any notice or claim alleging any breach of default under any Applicable Bluebird In-License, or (D) the existence of any facts, circumstances or events which alone or together with other facts, circumstances or events would

reasonably be expected (with or without the giving of notice or passage of time or both) to give rise to a breach of or default under or right to terminate any Applicable Bluebird In-License. If Bluebird fails to pay any amounts due under any Applicable Bluebird In-License and if such nonpayment would permit the counterparty to such Applicable Bluebird In-License to terminate or suspend the same or any rights thereunder, Celgene will have the right, but not the obligation, in its sole discretion, to pay such amounts on Bluebird's behalf, and any amounts so paid by Celgene may be taken by Celgene as a credit against any amounts payable to Bluebird under this CCPS Agreement.

(b) *Maintenance of Co-Co In-Licenses*. The contracting Party to any Co-Co In-License (i) will duly perform and observe all of its obligations under the Co-Co In-License in all material respects and maintain in full force and effect the Co-Co In-License, and (ii) will not, without the other Party's prior written consent (such consent not to be unreasonably withheld, conditioned or delayed), (1) amend, modify, restate, cancel, supplement or waive any provision of any Co-Co In-License, or grant any consent thereunder, or agree to do any of the foregoing, or (2) exercise any right to terminate any Co-Co In-License in each case ((1) and (2)) that would reasonably be expected to adversely affect in any respect the rights of the non-contracting Party under this CCPS Agreement, provided that the contracting Party will provide prior written notice to the non-contracting Party of all of the foregoing notwithstanding whether or not any of the foregoing would reasonably be expected to adversely affect in any respect the rights of the non-contracting Party under this CCPS Agreement. The contracting Party to any Co-Co In-License will provide the other Party with written notice as promptly as practicable (and in any event within five (5) business days) after becoming aware of any of the following: (A) any material breach or default by such contracting Party or any of its Affiliates of any covenant, agreement or other provision of the Co-Co In-License, (B) any notice or claim from the counterparty to the Co-Co In-License terminating or providing notice of termination of the Co-Co In-License, (C) any notice or claim alleging any breach of default under the Co-Co In-License, or (D) the existence of any facts, circumstances or events which alone or together with other facts, circumstances or events would reasonably be expected (with or without the giving of notice or passage of time or both) to give rise to a breach of or default under or right to terminate the Co-Co In-License. If the contracting Party to a Co-Co In-License fails to pay any amounts due under such Co-Co In-License and if such nonpayment would permit the counterparty to such Co-Co In-License to terminate or suspend the same or any rights thereunder, the other Party will have the right, but not the obligation, in its sole discretion, to pay such amounts on the other Party's behalf, and any amounts so paid by such other Party may be taken by such other Party as a credit against any amounts payable to the other Party under this CCPS Agreement.

(c) [***]

(d) *Applicable Bluebird In-License Requirements*. Celgene will abide, and will cause all its Affiliates and applicable Sublicensees to abide, by all requirements of each Applicable Bluebird In-License in all material respects (and in any case in all respects in the case that failure to so abide would result in a breach under the Applicable Bluebird In-License), to the extent applicable to sublicensees thereunder and to the extent disclosed by Bluebird to Celgene, with the understanding that disclosure by Bluebird of any Applicable Bluebird In-License to Celgene will be deemed disclosure of such requirements of such Applicable Bluebird In-License to

Celgene. In the event of a termination of any Applicable Bluebird In-License, Bluebird agrees, to the extent requested by Celgene, to reasonably assist Celgene in securing a direct license from the applicable licensor under any Patents, Materials and Know-How that was licensed to Bluebird and sublicensed to Celgene hereunder prior to such termination. In addition, Bluebird agrees, if requested by Celgene, to reasonably assist Celgene in securing a standby license from the applicable licensor under any Patents, Materials and Know-How that are licensed to Bluebird and sublicensed to Celgene.

(e) *Applicable Co-Co In-License Requirements*. Each non-contracting Party to a Co-Co In-License will abide, and will cause all its Affiliates and applicable Sublicensees to abide, by all requirements of each such Co-Co In-License in all material respects (and in any case in all respects in the case that failure to so abide would result in a breach under the Co-Co In-License), to the extent applicable to sublicensees thereunder and to the extent disclosed by the contracting Party to the non-contracting Party, with the understanding that disclosure by the contracting Party of any Co-Co In-License to the non-contracting Party will be deemed disclosure of such requirements of such Co-Co In-License to the non-contracting Party. In the event of a termination of any Co-Co In-License, the contracting Party agrees, to the extent requested by the non-contracting Party, to reasonably assist the non-contracting Party in securing a direct license from the applicable licensor under any Patents, Materials and Know-How that was licensed to the contracting Party and sublicensed to the non-contracting Party hereunder prior to such termination. In addition, the contracting Party agrees, if requested by the non-contracting Party, to reasonably assist the non-contracting Party in securing a standby license from the applicable licensor under any Patents, Materials and Know-How that are licensed to the contracting Party and sublicensed to the non-contracting Party hereunder.

(f) [***]

10. License Grants.

10.1 Development and Commercialization Licenses by Bluebird. Subject to the terms and conditions of this CCPS Agreement, Bluebird hereby grants to Celgene:

(a) a co-exclusive (with Bluebird and its Affiliates) license, with the right to sublicense only as permitted by Section 10.3, under Bluebird Licensed IP and Bluebird Regulatory Rights, (i) to Develop (including for clarity Manufacture) Elected Candidate and Licensed Product for U.S. Administration and (ii) to Commercialize (including for clarity Manufacture) Licensed Product for U.S. Administration;

(b) a worldwide, exclusive (even as to Bluebird) license, with the right to sublicense only as permitted by Section 10.3, under Bluebird Licensed IP and Bluebird Regulatory Rights, (i) Develop (including for clarity Manufacture (other than Vectors)) Elected Candidate and Licensed Product for ROW Administration and (ii) to Commercialize (including for clarity Manufacture (other than Vectors)) Licensed Product for ROW Administration; and

(c) a worldwide, co-exclusive (with Bluebird and its Affiliates) license, with the right to sublicense only as permitted by Section 10.3, under Bluebird Licensed IP and Bluebird Regulatory Rights, to Manufacture Vectors and associated Payloads for Licensed Product for ROW Administration.

Further, (i) the foregoing licenses to Bluebird Regulatory Rights include the right to reference same, (ii) the licenses to Commercialize granted in this Section 10.1 will cover only the sale and offer for sale of Licensed Product in finished form and not the sale or offer for sale of Vectors and associated Payloads (other than as and to the extent incorporated in the Licensed Product), and (iii) rights to Manufacture Vectors and associated Payloads are included within the scope of the licenses granted to Celgene under this Section 10.1, which rights are subject to the terms and conditions of Section 7.4(b).

10.2 Development and Commercialization Covenant Not To Sue by Celgene.

(a) Subject to the terms and conditions of this CCPS Agreement, Celgene agrees that neither it nor its Affiliates will sue, assert any claim against, or otherwise participate in any action or proceeding against Bluebird or any of its Affiliates, sublicensees, contractors (including suppliers and manufacturers) or agents, or cause or authorize any Person to do any of the foregoing, under the Celgene Licensed IP and Celgene Regulatory Rights, with respect to Bluebird's (i) Development (including for clarity Manufacture) of Elected Candidate and Licensed Product for U.S. Administration and (ii) Commercialization (including for clarity Manufacture) of Licensed Product for U.S. Administration, all as part of the Development & U.S. Commercialization Program; and (iii) Manufacture of Vectors and associated Payloads for Licensed Product for ROW Administration.

(b) Celgene will require that any Person that takes after the CCPS Agreement Effective Date any license or right in or to any Celgene Licensed IP and Celgene Regulatory Rights that is subject to the covenant not to sue in Section 10.2(a) is subject to the covenants not to sue set forth in this Section 10.2.

For clarity, (i) the foregoing covenants not to sue regarding Celgene Regulatory Rights includes the right to reference same, (ii) such covenants not to sue with respect to the Commercialization granted in this Section 10.2 will cover only the sale and offer for sale of Licensed Product in finished form, and (iii) Manufacture of Vectors and associated Payloads is included within the scope of the covenants not to sue granted to Bluebird under this Section 10.2.

10.3 Licensing and Sublicensing Rights.

(a) *Transfer*. The licenses and covenants granted in Sections 10.1 and 10.2 are transferable only upon a permitted assignment of this CCPS Agreement in accordance with Section 13.13.

(b) *Other Licenses*. Either Party can grant licenses to its own Licensed IP to its Affiliates and other Third Parties, subject to the terms of this CCPS Agreement (including the exclusivity and co-exclusivity provided for in the licenses granted in Sections 10.1 and 10.2).

(c) *Sublicenses*. The licenses and covenants granted in Sections 10.110.2 may be sublicensed, in full or in part, by the licensee Party by a written agreement to its Affiliates and Third Parties (with the right to sublicense through multiple tiers), provided, that as a condition precedent to and requirement of any such sublicense:

(i) Celgene will obtain Bluebird's written consent prior to granting to a Third Party any sublicense of the licenses granted by Bluebird in Section 10.1 with respect to the Development or Commercialization of Licensed Product for U.S. Administration (such consent not to be unreasonably withheld, delayed or conditioned).

(ii) Bluebird will obtain Celgene's written consent prior to granting to a Third Party any sublicense of the covenant not to sue granted by Celgene in Section 10.2, or any other right to license, with respect to the Development or Commercialization of Licensed Product for U.S. Administration (such consent not to be unreasonably withheld, delayed or conditioned).

(iii) The licensee Party will provide the licensor Party with a copy of any sublicense agreement with a non-Affiliated Sublicensee within thirty (30) days of execution thereof, and to the extent permitted under any Applicable Bluebird In-License, such sublicense agreement may be redacted as necessary to protect commercially sensitive information;

(iv) The licensor Party will be responsible for any and all obligations of such Sublicensee as if such Sublicensee were such licensee Party hereunder;

(v) Any such Sublicensee will agree in writing to be bound by substantially identical obligations as such licensee Party hereunder with respect to the activities of such Sublicensee hereunder (and not with respect to the activities of any other), including any Know-How disclosure obligations such licensee Party has to the licensor Party hereunder with respect to the activities of such Sublicensee hereunder (but excluding payment obligations); and

(vi) The licensor Party will be made an express third-party beneficiary of any such Sublicensee's obligations under such sublicense agreement that relate to compliance with the terms and conditions of this CCPS Agreement.

10.4 Exclusivity. During the CCPS Agreement Term, neither Party nor its Affiliates (nor any others on behalf of or with, or under license or sublicense from, such Party or any of its Affiliates) will research, Develop, Manufacture or Commercialize any products (including Vectors and associated Payloads) to be used in the Field (which, for the purposes of this Section 10.4, will include all indications and will not be limited to cancer) that specifically target the same Target Antigen as Elected Candidate, other than pursuant to this CCPS Agreement (which includes, for avoidance of doubt, research, development, Manufacture and Commercialization of improved and modified versions of the Licensed Product by Celgene) or any other Development & U.S. Commercialization Agreement (if against the same Target Antigen) (which includes, for avoidance of doubt, research, development, Manufacture and Commercialization of improved and modified versions of the Licensed Product pursuant to this CCPS Agreement). Notwithstanding this Section 10.4, if (i) a Business Combination occurs with respect to either Party with a Third Party or (ii) a Party acquires a Third Party (including by a merger or consolidation) so that such Third Party becomes an Affiliate over which the acquiring Party has control (as defined in the definition of Affiliate), or (iii) a Party acquires all or substantially all of the assets of a Third Party (including any Subsidiaries or divisions thereof) (each of (i), (ii) and (iii), a " Business Acquisition"; such Party, the "Business Party"), and, in each case, the Third Party (or any of such Third Party's Affiliates or any successors or assigns of such Third Party or such Third Party's Affiliates, other than the Business Party and its Affiliates as of the Business Acquisition) (a) already has, or the acquired assets contain, as applicable, a program that existed prior to, or was planned prior to and is demonstrably to be implemented shortly after, the Business Acquisition or (b) initiates and pursues a new program following such Business Acquisition, in each case that would otherwise violate this Section 10.4 (a " Business Program"),

then such Third Party (or any of such Third Party's Affiliates or any successors or assigns of such Third Party or such Third Party's Affiliates, other than the Business Party and its Affiliates as of the Business Acquisition), as applicable, will be permitted to initiate, pursue and continue such Business Program after such Business Acquisition and such initiation, pursuit and continuation will not constitute a violation of this Section 10.4; provided however that (A) none of the Bluebird Licensed IP or Celgene Licensed IP, as the case may be, or other Patents, Materials or Know-How Controlled by the other Party and, in each case, licensed to the Business Party will be used in the Business Program, and (B) the research or Development activities required under this CCPS Agreement will be conducted separately from any research or Development activities directed to such Business Program, including the maintenance of separate lab notebooks and records (password-protected to the extent kept on a computer network) and separate personnel working on each of the activities under this CCPS Agreement and the activities covered under such Business Program

10.5 Contract Manufacturers. Subject to the terms and conditions of this CCPS Agreement, either Party will have the right to appoint by a written agreement "contract manufacturers", meaning any Third Party or Affiliate of such Party that Manufactures Licensed Product (or components therefor, including for Bluebird, Vectors and associated Payloads) for re-sale, but who itself is not a "Sublicensee" hereunder and thereby exercises "have made" rights granted by the other Party under Section 10.1 or Section 10.2, as applicable, as well as "contract research organizations" and other providers performing services on a Party's behalf, none of which will be deemed a "Sublicensee" hereunder. Such Party will be responsible for any such contract manufacturer, contract research organization or service provider hereunder, and further will require any such contract manufacturer, contract research organization or service provider to agree in writing to comply with Sections 4.4 and 15.

10.6 No Implied Rights. No license, sublicense or other right is or will be created or granted hereunder by implication, estoppel or otherwise. Any licenses, sublicenses or rights will be granted only as expressly provided in this CCPS Agreement. Neither Party will practice or otherwise use any Licensed IP of the other Party other than in accordance with the licenses granted in Section 10.1 and Section 10.2, as applicable.

10.7 Additional IP; Other In-Licenses.

(a) *Additional IP*. Except as set forth in Section 10.7(b), Celgene may, on or after the CCPS Agreement Effective Date, elect to include within the scope of the Bluebird Licensed IP any Know-How, Material, Patent, Regulatory Data, Regulatory Filings or Regulatory Approvals (" Additional Bluebird IP"), that would be Controlled by Bluebird but for required payments of Additional Payments to a Third Party, by (i) providing notice to Bluebird of same and (ii) agreeing to pay and in fact paying all Additional Payments with respect to Celgene's access or license to such Additional Bluebird IP. Following Bluebird's receipt of such notice and subject to Celgene's performance of its obligations to pay any Additional Payments with respect to Celgene's access or license to such Additional Bluebird IP, such Additional Bluebird IP will be deemed Bluebird Licensed IP hereunder. For avoidance of doubt, this Section 10.7(a) does not apply to Know-How, Materials, Patents, Regulatory Data, Regulatory Filings or Regulatory Approvals licensed to Bluebird under the Applicable Bluebird In-Licenses, all of which are deemed Controlled by Bluebird notwithstanding the terms of this Section 10.7(a).

(b) *Other In-Licenses*. Celgene may, on or after the CCPS Agreement Effective Date, elect to convert any Other In-License to an Applicable New In-License by providing notice to Bluebird of same. Upon Bluebird's receipt of such notice, such Other In-License will be an Applicable New In-License hereunder, Appendix B will automatically be updated to include such New In-License and the provisions of this CCPS Agreement applicable to New In-Licenses, including Section 11.1, will apply with respect to such Other In-License.

10.8 Section 365(n) of the Bankruptcy Code. All rights and licenses granted pursuant to any section of this CCPS Agreement are, and will be deemed to be, rights and licenses to "intellectual property" (as defined in Section 101(35A) of title 11 of the United States Code and of any similar provisions of applicable Laws under any other jurisdiction (the "Bankruptcy Code")). Each Party agrees that the other Party, as a licensee of rights and licenses under this CCPS Agreement, will retain and may fully exercise all of its rights and elections under the Bankruptcy Code. The Parties further agree that, in the event of the commencement of a bankruptcy proceeding by or against a Party under the Bankruptcy Code or analogous provisions of applicable Law outside the United States, the other Party will be entitled to a complete duplicate of (or complete access to, as appropriate) any intellectual property licensed to it and all embodiments of such intellectual property, which, if not already in its possession, will be promptly delivered to it (a) upon any such commencement of a bankruptcy proceeding upon such other Party's written request therefor, unless the Party involved in the bankruptcy proceeding elects to continue to perform all of its obligations under this CCPS Agreement or (b) if not delivered under clause (a), following the rejection of this CCPS Agreement by the Party in the bankruptcy proceeding upon written request therefor by the other Party.

11. Payments and Royalties.

11.1 Payments for In-Licenses.

(a) *United States*. With respect to the Development and Commercialization of Elected Candidate and Licensed Product for U.S. Administration hereunder, if any payments become due under any Applicable Pre-Existing In-License, Applicable New In-Licenses, Co-Co In-Licenses or Celgene Licensed Product In-License during the CCPS Agreement Term, the contracting Party thereto will pay same and such payment will be treated as U.S. Development Expenses or Allowable Expenses, as appropriate, provided [***]

(b) *ROW*. With respect to the Development and Commercialization of Elected Candidate and Licensed Product for ROW Administration hereunder (including the Manufacture of Vectors and associated Payloads therefor pursuant to Section 7.4):

(i) *Applicable Pre-Existing In-Licenses*. If any In-License Payment becomes due under any Applicable Pre-Existing In-License during the CCPS Agreement Term, Bluebird will pay same, provided that Celgene will reimburse Bluebird for any such In-License Payment applicable to ROW Administration within thirty (30) days of Celgene's receipt of Bluebird's written invoice therefor, which In-License Payments (other than payments that are royalties) will not exceed [***], and subject to Section 13.1. Any such reimbursement by Celgene to Bluebird (1) is in addition to and not in lieu of the other payments required by this Section 11 and (2) will not be subject to Section 11.3(d).

(ii) *Applicable New In-Licenses*. Celgene may elect to take a sublicense under any New In-License of Bluebird or its Affiliates and upon such election, such New In-License will be an Applicable New In-License hereunder for all purposes. For the purposes of determining the Parties' respective payment obligations, all Applicable New In-Licenses as of and following the CCPS Agreement Effective Date will be listed on Appendix B. If any In-License Payment becomes due under any Applicable New In-License during the CCPS Agreement Term with respect to ROW Administration, Bluebird will pay same and, subject to Section 13.1, Celgene will reimburse Bluebird for (i) [***] of such payment that are royalties, which royalties will be subject to Section 11.3(d), and (ii) [***] of such payment that are not royalties, in each case ((i) and (ii)) within thirty (30) days of receipt of Bluebird's written invoice therefor. If Celgene elects to convert an Other In-License to an Applicable In-License pursuant to Section 10.7(b), Celgene will reimburse Bluebird for [***] of any In-License Payments that became due under such Applicable New In-License during the CCPS Agreement Term with respect to ROW Administration to the same extent as if such Applicable New In-License was designated as such as of the CCPS Agreement Effective Date, including with respect to applicable Patent Costs in accordance with Section 6.1, provided that Bluebird provides Celgene with a reasonable accounting of same. If any In-License Payments are royalties due under any Applicable New In-License during the CCPS Agreement Term with respect to Licensed Product for ROW Administration, such royalties will be subject to Section 11.3(d). To the extent that any grant of a sublicense by Celgene or any Sublicensees under an Applicable New In-License triggers a payment obligation under such Applicable New In-License, Bluebird will pay same and Celgene will reimburse Bluebird for [***] of such payment within thirty (30) days of receipt of Bluebird's written invoice therefor. To the extent that any grant of a sublicense by Bluebird or any Sublicensees under a Celgene Licensed Product In-License triggers a payment obligation under such Celgene Licensed Product In-License, Celgene will pay same and Bluebird will reimburse Celgene for [***] of such payment within thirty (30) days of receipt of Celgene's written invoice therefor.

(iii) If any payments become due under any Co-Co In-Licenses during the CCPS Agreement Term with respect to Licensed Product for ROW Administration, the contracting Party will pay same, and further if Bluebird is the contracting Party, Celgene will reimburse Bluebird for such payment within thirty (30) days upon receipt of Bluebird's written invoice therefor, subject to Section 13.1. Any such reimbursement by Celgene to Bluebird (1) is in addition to and not in lieu of the other payments required by this Section 11 and (2) will not be subject to Section 11.3(d). If any payments are royalties due under any Co-Co In-License during the CCPS Agreement Term with respect to Licensed Product for ROW Administration, such royalties will be subject to Section 11.3(d).

(iv) If any payments become due under any Celgene Licensed Product In-License with respect to Licensed Product for ROW Administration, Bluebird will be responsible for [***] of such payments as provided in Section 4.1(e) of the Master Collaboration Agreement, provided that if any such payments are royalties with respect to Licensed Product for ROW Administration, such royalties will be subject to Section 11.3(d).

(c) [***]

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

11.2 Milestone Payments.

(a) *Generally*. Celgene will make milestone payments (each, a "Milestone Payment") to Bluebird upon the occurrence of each of the milestones events (each, a "Milestone Event") as set forth below in this Section 11.2. Each of the Milestone Payments will be payable to Bluebird by Celgene within forty-five (45) days of the achievement of the specified Milestone Event, and such payments when owed or paid will be non-refundable and non-creditable, and not subject to set-off, except as otherwise set forth in Sections 4.3(c), 9.1(a), 9.1(b), 17.3(c) and 17.6 hereof or Sections 4.1(e), 4.3 and 12.6 of the Master Collaboration Agreement. Except with respect to Modified Licensed Products, each of the Milestone Payments are payable only once in total under this CCPS Agreement, whether achieved by one or more Licensed Products. Notwithstanding the foregoing, Bluebird will be entitled to receive [***] of the Milestone Payments below, other than the Milestone Payment for the first Milestone Event ([***]], for [***] for each new Modified Licensed Product.

(b) *Development Milestones*.

Milestone Event	***Milestone Payment***
[***]	
[***]	

11.3 Royalties for Licensed Product for ROW Administration.

(a) *Rates*. Subject to the remainder of this Section 11.3, Celgene will pay to Bluebird running royalties, on a Licensed Product-by-Licensed Product basis, based on the total aggregate annual Net Sales by Selling Parties of such Licensed Product for ROW Administration in a given calendar year based on the Royalty Rate in the table set forth below.

Annual Net Sales of Each Licensed Product for ROW Administration	***Royalty Rate***
[***]	

By way of example, in a given calendar year, if the aggregate annual Net Sales for a Licensed Product for ROW Administration is [***] the following royalty payment would be payable for those Net Sales under this Section 11.3(a): [***]

The Parties acknowledge and agree that for the purposes of calculating royalties under this Section 11.3(a), the country of sale for Licensed Product will be deemed to be the country in which such Licensed Product is administered to a patient.

(b) *Royalty Term.* Royalties under Section 11.3(a) will be payable, on a Licensed Product-by-Licensed Product and country-by-country basis, on the Net Sales of any Licensed Product for ROW Administration if at least one of the following two (2) conditions apply:

(i) if one or more Valid Claims within any of Patents included within the Bluebird Licensed IP Covers in such country such Licensed Product for ROW Administration; or

(ii) [***]

(c) *Royalty Reduction*. If Licensed Product is royalty-bearing only on account of Section 11.3(b)(ii), then the royalty rates set forth in Section 11.3(a) with respect to Net Sales attributable to Licensed Product will be reduced by [***]

(d) *Third Party Royalty Payments – ROW Administration*. As provided in Section 11.1(b), if Celgene (or its Sublicensee) is required to pay to a Third Party under any New In-License or Co-Co License or any Celgene Licensed Product In-License, any royalties for Commercialization of Licensed Product for ROW Administration, or if Celgene or its Sublicensee, in its reasonable judgment, is required to obtain a license from any Third Party under any Patent Covering Licensed Product in order to Develop or Commercialize such Licensed Product for ROW Administration, and if Celgene (or its Sublicensee) is required to pay to such Third Party under such license any royalties, and the infringement of such Patent cannot reasonably be avoided by Celgene or its Sublicensee, or if Celgene (or its Sublicensee) is required by a court of competent jurisdiction to pay royalties or lost profits to a Third Party based on a Patent as a result of the such Commercialization (and the infringement of such Patent cannot reasonably be avoided by Celgene or its Sublicensee), then the amount of Celgene's royalty obligations under this Section 11.3 will be reduced by [***] of the amount of such royalties paid to such Third Party, provided however, that the royalties payable under Section 11.3(a) will not be reduced in any such event below [***] of the amounts set forth in Section 11.3(a) (but as may be further reduced pursuant to Section 11.3(c) or 11.3(e)) for each royalty tier. Any royalties payable under any Applicable Pre-Existing In-Licenses may not be deducted under this Section 11.3(d) from royalties owed to Bluebird. Any royalties payable under any Applicable New In-Licenses, Celgene Licensed Product In-Licenses and Co-Co Licenses may be deducted under this Section 11.3(d) from royalties owed to Bluebird. Celgene (or its Sublicensee) will use its commercially reasonable efforts to minimize the amount of any of the foregoing payments owed to Third Parties. Prior to Celgene or its Sublicensee exercising its reasonable judgment under this Section 11.3(d), Celgene will provide Bluebird with written notice of a potential need to obtain any license from Third Parties. The Parties will discuss the best course of action to resolve such potential license requirement(s). For clarity, the Parties acknowledge and agree that, notwithstanding anything in this CCPS Agreement to the contrary, no royalties or other amounts payable by Celgene (or its Sublicensee) to a Third Party with respect to Licensed Product for U.S. Administration may act to reduce the amount of Celgene's royalty obligations under this Section 11.3.

(e) [***]

(f) *Additional Royalty Provisions*. The royalties payable under Section 11.3(a) will be subject to the following:

(i) only one royalty will be payable hereunder with respect to each Licensed Product unit;

(ii) royalties when owed or paid hereunder will, except as provided in Section 11.3(b), be non-refundable and non-creditable and not subject to set-off, except as otherwise provided in [***] 9.1(b), 17.3(d) and 17.6 hereof or Sections 4.1(e), 4.3 and 12.6 of the Master Collaboration Agreement; and

(iii) except as expressly set forth in Section 11.3(c), Section 11.3(d) and Section 11.3(e), no other royalty deductions are permitted hereunder

11.4 Profit & Loss Share for Licensed Product for U.S. Administration . The Parties will share in Operating Profit or Loss with respect to Licensed Product for U.S. Administration as follows: Bluebird will bear (and be entitled to) fifty percent (50%), and Celgene will bear (and be entitled to) fifty percent (50%) (the "Profit & Loss Share"). Procedures for calendar quarterly reporting of actual results and review and discussion of potential discrepancies, quarterly reconciliation, reasonable forecasting, and other finance and accounting matters, are set forth in Appendix F, and to the extent not set forth in Appendix F, will be established by the JGC, subject to Section 11.5(e).

11.5 Payment Terms for Milestones and Royalties Due Hereunder. [***]

11.6 *Mutual Convenience of the Parties*. The royalty and other payment obligations set forth hereunder have been agreed to by the Parties for the purpose of reflecting and advancing their mutual convenience, including the ease of calculating and paying royalties and other amounts to Bluebird.

12. Ownership and Inventorship of IP.

12.1 Solely-Owned IP. Subject to Section 12.2, as between the Parties, each Party will own and retain all right, title and interest in and to any and all Know-How and Patents arising therefrom that are discovered, created, conceived, developed or reduced to practice solely by or on behalf of such Party under or in connection with this CCPS Agreement, including as part of the Development & U.S. Commercialization Program (" Solely Owned IP"). Subject to the licenses hereunder and the other terms and conditions of this CCPS Agreement, each Party will be solely responsible for the Prosecution and Maintenance, and the enforcement and defense, of any Patents within its Solely Owned IP, and the other Party will have no rights with respect thereto.

12.2 Joint IP. The Parties will jointly own any and all Know-How and Patents arising therefrom that are discovered, created, conceived, developed or reduced to practice jointly by or on behalf of the Parties under or in connection with this CCPS Agreement, including as part of the Development & U.S. Commercialization Program ("Joint IP"). Each Party will have an undivided one-half interest in and to Joint IP. Each Party will exercise its ownership rights in and to such Joint IP, including the right to license and sublicense or otherwise to exploit, transfer or encumber its ownership interest, without an accounting or obligation to, or consent required from, the other Party, but subject to the licenses hereunder and the other terms and conditions of this CCPS Agreement, including Section 10.4. At the reasonable written request of a Party, the other Party will in writing grant such consents and confirm that no such accounting is required to effect the foregoing regarding Joint IP. Each Party, for itself and on behalf of its Affiliates, licensees and sublicenses, and employees, subcontractors, consultants and agents of any of the foregoing, hereby assigns (and to the extent such assignment can only be made in the future hereby agrees to assign), to the other Party a joint and undivided interest in and to all Joint IP. The Prosecution and Maintenance, and the enforcement and defense, of any Patents within Joint IP will be jointly managed by the Parties on mutually agreeable terms to be entered into by the Parties at the time any such Patents are first filed, provided that (i) all recoveries and Patent Costs arising from the enforcement or defense of any Patents within Joint IP, absent further

agreement, will be shared by the Parties in accordance with Section 14.2 (provided that sufficient advance written notice of any such Patent Costs is given to the Party not incurring same) and (ii) Patent Costs incurred in connection with the Prosecution and Maintenance of Patents within Joint IP will be apportioned as set forth in Sections 13.1 and 13.3, provided that in each case ((i) and (ii)), and all recoveries and Patent Costs arising from those activities, absent further agreement, will be shared equally by the Parties (provided that sufficient advance written notice of any such Patent Costs is given to the Party not incurring same), provided that if either Party elects not to pay any such Patent Costs for any such Patent, the Parties will meet and agree upon an equitable way to treat such Patent.

12.3 Inventorship. Inventorship determination for all Patents worldwide arising from any Know-How discovered, created, conceived, developed or reduced to practice by or on behalf of the Parties under or in connection with this CCPS Agreement and thus the ownership thereof will be made in accordance with applicable United States patent Laws.

12.4 Allocation. Notwithstanding Sections 12.1 – 12.3, the Patent Committee may allocate ownership of a particular item of intellectual property to improve the prospects of obtaining patent protection with respect to such item of intellectual property, even if such allocation is not in accordance with the terms of Sections 12.1 – 12.3, so long as the Parties mutually agree to such allocation.

13. Patent Prosecution and Maintenance.

13.1 Generally. Subject to Sections 13.2 and 13.3, each Party will have the sole right to Prosecute and Maintain Patents within its respective Licensed IP. Bluebird will use commercially reasonable efforts to, where applicable and permitted under applicable Law and upon Celgene's reasonable request, separate parent Patent applications within the Bluebird Licensed IP into one or more separate Patent applications for Specific Patents, where doing so would not reasonably be expected to materially harm any Patent within the Bluebird Licensed IP or other Patents owned by Bluebird or its Affiliates, provided that the foregoing limitation will not apply to Bluebird Licensed IP that is Collaboration IP. [***]

13.2 Input. Each Party will regularly provide the other with copies of all applications for Patents within its respective Licensed IP, and all other material submissions and correspondence with any patent authorities regarding such Patents, in sufficient time to allow for review and comment by the other Party. In addition, each Party will provide the other Party and its counsel with an opportunity to consult with such Party and its counsel regarding Prosecution and Maintenance of any such Patents within the Field, and such Party will consider in good faith all such comments timely made by such other Party and its counsel. In the event of any disagreement between the Parties, the licensor Party will have the final decision-making authority with respect to the matter involved as long as the licensor Party acts in good faith.

13.3 Specific Patents. For any Patent within the Bluebird Licensed IP [***] (each "Specific Patent"), the following will apply: upon Celgene's written request, and provided that Bluebird reasonably agrees with Celgene that the following Prosecution and Maintenance activities would not materially harm any other Patent within the Bluebird Licensed IP or other Patents owned by Bluebird or its Affiliates (other than Collaboration IP), Celgene will control the Prosecution and Maintenance of the Specific Patents, and notwithstanding anything in

Section 13.1 to the contrary, Celgene will be solely responsible for the payment of all related Patent Costs. In addition, Celgene will provide Bluebird and its counsel with an opportunity to consult with Celgene and its counsel regarding Prosecution and Maintenance of any such Specific Patents, and Celgene will include or reflect all reasonable comments timely made by Bluebird and its counsel. Celgene acknowledges and agrees that Bluebird may grant similar rights to other exclusive Third Party licensees under any Patent within the Bluebird Licensed IP that has claims Covering only a product that is not a Licensed Product (or its manufacture or use) and no other product (or its manufacture or use), other than Specific Patents. If the Parties cannot agree whether or not any Patent within the Bluebird Licensed IP is a Specific Patent, or if Bluebird claims that the foregoing Prosecution and Maintenance activities would materially harm any other Patent within the Bluebird Licensed IP or other Patents owned by Bluebird or any of its Affiliates, either of the Parties may refer such dispute to a mutually agreeable, disinterested, conflict-of-interest-free individual not affiliated or consulting with either Party and who has at least fifteen (15) years of patent prosecution experience in the pharmaceutical field. Any such arbitration will be conducted under the then-current rules of the American Arbitration Association, and the decision of the arbitrator will be final.

13.4 Election Not to Prosecute or Maintain or Pay Patent Costs . If a Party elects not (i) to Prosecute or Maintain any Patents within its respective Licensed IP in any particular country before the applicable filing deadline or continue such activities once filed in a particular country, or (ii) to pay the Patent Costs associated with Prosecution or Maintenance of any Patents within the Licensed IP as required by Section 13.1, then in each such case such first Party will so notify the other Party, promptly in writing and in good time to enable any deadlines by which an action must be taken to preserve such Patent in such country to be met. Upon receipt of each such notice by such first Party, such other Party will have the right, but not the obligation, to notify such first Party in writing on a timely basis that such other Party will continue the Prosecution or Maintenance of such Patent on terms the Parties shall mutually agree; it being understood that only U.S. Patents controlled by Celgene will be subject to this sentence. Notwithstanding the foregoing, upon receipt of each such notice by Bluebird, Celgene will have the right, but not the obligation, to notify Bluebird in writing on a timely basis that Celgene will assume control of the Prosecution or Maintenance of such Patent within the Bluebird Licensed IP, and bear the Patent Costs thereafter incurred by Celgene with respect thereto. In addition, Celgene will provide Bluebird and its counsel with an opportunity to consult with Celgene and its counsel regarding Prosecution and Maintenance of any such Patents, and Celgene will include or reflect all reasonable comments timely made by Bluebird and its counsel. If after making such election, Celgene elects not to pay the Patent Costs associated with Prosecution or Maintenance of any such Patent, then in each such case Celgene will so notify Bluebird and on the ninetieth (90th) day after Bluebird's receipt of such notice such Patent will no longer be licensed to Celgene hereunder and will no longer be included within the "Bluebird Licensed IP" hereunder.

13.5 Third Party Rights. To the extent that a Third Party licensor of a Party has retained any right to Prosecute or Maintain any Patent within such Party's Licensed IP licensed to the other Party hereunder, or otherwise be involved in such activities, such Party will use commercially reasonable efforts to cause such Third Party licensor to take the actions specified by this Section 13 (including Sections 13.6 and 13.7) in a manner consistent with the in-license applicable thereto, but such Party will not be deemed to be in breach of its obligations under this Section 13 if, after using such commercially reasonable efforts, it is unable to comply with such obligations because of actions taken or not taken by such Third Party licensor.

13.6 Patent Extensions. Subject to the remainder of this Section 13.6, if any election for patent term restoration or extension, supplemental protection certificate or any of their equivalents may be made with respect to any Patent within the Licensed IP, after consultation through the JGC. If the Parties are not able to reach mutual agreement, (i) Celgene will have the sole right to make the final decision whether or not to seek such patent term restoration or extension, supplemental protection certificate or any of their equivalents with respect to Specific Patents and Patents within the Collaboration IP licensed to Celgene hereunder and the Celgene Licensed IP, and (ii) Bluebird will have the sole right to make the final decision whether or not to seek such patent term restoration or extension, supplemental protection certificate or any of their equivalents with respect to all other Patents within the Bluebird Licensed IP.

13.7 Regulatory Exclusivity Periods. With respect to any Patent listings required for any Regulatory Exclusivity Periods for Product, the Parties will mutually agree on which Patents within the Licensed IP to list, provided that if the Parties are not able to agree, Celgene will have the right to make the final decision, and provided further that the exercise of such right by Celgene will not increase or otherwise change the rights or obligations of the Parties hereunder.

13.8 Cooperation. Each Party will reasonably cooperate with the other Party in the Prosecution and Maintenance of Patents within the Licensed IP. Such cooperation includes promptly executing all documents, or requiring inventors, subcontractors, employees and consultants and agents of such Party and its Affiliates and Sublicensees to execute all documents, as reasonable and appropriate so as to enable the Prosecution and Maintenance of any such Patents in any country.

13.9 Patent Marking. For Licensed Product for U.S. Administration, the JGC will determine the Patent marking requirements in accordance with applicable Law. For Licensed Product for ROW Administration, Celgene will mark, and will cause all other Selling Parties to mark, Product with all Patents within the Bluebird Licensed IP in accordance with applicable Law, which marking obligation will continue for as long as (and only for as long as) required under applicable Law.

13.10 Common Interest Disclosures. With regard to any information or opinions disclosed pursuant to this CCPS Agreement by one Party to the other Party regarding Prosecution and Maintenance of Patent within the Licensed IP, or enforcement of intellectual property and/or technology by or against Third Parties, Bluebird and Celgene agree that they have a common legal interest in determining the ownership, scope, validity and/or enforcement of the Licensed IP, and whether, and to what extent, Third Party intellectual property rights may affect the conduct of the Development and Commercialization of any Licensed Product, and have a further common legal interest in defending against any actual or prospective Third Party claims based on allegations of misuse or infringement of intellectual property rights relating to the Development or Commercialization of any Licensed Product. Accordingly, the Parties agree that all such information and materials obtained by the Parties from each other will be used solely for purposes of the Parties' common legal interests with respect to the conduct of the Agreement. All such information and materials will be treated as protected by the attorney-client privilege,

the work product privilege, and any other privilege or immunity that may otherwise be applicable. By sharing any such information and materials, neither Party intends to waive or limit any privilege or immunity that may apply to the shared information and materials. Neither Party will have the authority to waive any privilege or immunity on behalf of the other Party without such other Party's prior written consent, nor will the waiver of privilege or immunity resulting from the conduct of one Party be deemed to apply against any other Party. This Section 13.10 will be subject to any right granted by either Party to any Third Party, provided that the grant of such right to such Third Party does not conflict with the other Party's rights or the first Party's obligations under this CCPS Agreement.

14. Patent Enforcement and Defense.

14.1 Notice. Each Party will promptly notify, in writing, the other Party upon learning of any actual or suspected Competitive Infringement of any Patents within the Licensed IP by a Third Party, or of any claim of invalidity, unenforceability, or non-infringement of any Patents within the Licensed IP, and will, along with such notice, supply the other Party with any evidence in its possession pertaining thereto. For purposes of this CCPS Agreement, "Competitive Infringement" means any allegedly infringing activity in the Field (which, for the purposes of this definition, will include all indications and will not be limited to cancer) with respect to a Patent within the Licensed IP, which activity (i) falls within the scope then in effect of the licenses granted by Bluebird to Celgene as set forth in Sections 10.1 and 10.2, (ii) is subject to Section 14.2(f), or (iii) would be competitive with a Licensed Product and targets the same Target Antigen as such Licensed Product.

14.2 Enforcement and Defense. [***]

15. Confidentiality.

The Parties acknowledge and agree that terms of this CCPS Agreement and all Materials, ideas and information of any kind, whether in written, oral, graphical, machine-readable or other form, whether or not marked as confidential or proprietary, which are transferred, disclosed or made available by a Party or at the request of a Party, including any of the foregoing of Third Parties, will be subject to the provisions of Section 10 of the Master Collaboration Agreement. The Parties agree to issue the joint press release on Appendix G promptly following the CCPS Agreement Effective Date. A redacted version of this CCPS Agreement is attached hereto as Appendix M.

16. Warranties; Limitations of Liability; Indemnification.

16.1 Representations and Warranties. Each Party represents and warrants to the other as of the CCPS Agreement Effective Date that it has the legal right and power to enter into this CCPS Agreement, to extend the rights and licenses granted or to be granted to the other in this CCPS Agreement, and to fully perform its obligations hereunder.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

16.2 Additional Representations and Warranties of Bluebird. Except as set forth in Schedule 16.2, Bluebird represents and warrants to Celgene that, as of the CCPS Agreement Effective Date:

(a) *Licensed IP*. Appendix H sets forth a complete and accurate list of all Patents included in the Bluebird Licensed IP, indicating the owner, licensor and/or co-owner(s), if applicable, and, for any Elected Candidate and Licensed Product-relevant subject matter or Materials, if no Patent is specifically licensed, a list of all subject matter or Materials that are included in the Bluebird Licensed IP, including those licensed under a materials use license or equivalent. Bluebird Controls the Patents listed on Appendix H and the Know-How within the Bluebird Licensed IP, and is entitled to grant the licenses specified herein. Bluebird has not granted to any Third Party any rights or licenses under such Patents or Know-How within the Bluebird Licensed IP that would conflict with the licenses granted to Celgene hereunder.

(b) *Third Party Agreements.* The Applicable Bluebird In-Licenses are valid and binding obligations of Bluebird and, to the Knowledge of Bluebird, the applicable licensor, enforceable against Bluebird and, to the Knowledge of Bluebird, the applicable licensor, in accordance with their terms, except as may be limited by general principles of equity (regardless of whether considered in a proceeding at law or in equity) and by applicable bankruptcy, insolvency, moratorium and other similar Laws of general application relating to or affecting creditors' rights generally. Neither Bluebird nor any of its Affiliates has received any notice of any counterparty's intention to terminate any Applicable Bluebird In-License in whole or in part or any notice requesting any amendment, alteration or modification of such Applicable Bluebird In-License or any sublicense or assignment thereunder. There is no breach or default, or event which upon notice or the passage of time, or both, would give rise to any breach or default, in the performance of any Applicable Bluebird In-License by Bluebird or any of its Affiliates or, to the Knowledge of Bluebird, the counterparty thereto, and Bluebird has not received any notice of any such breach, default or event. Except for the Applicable Bluebird In-Licenses, neither Bluebird nor any of its Affiliates is a party to any license, sublicense or other agreement pursuant to which Bluebird or such Affiliate has received a license or other rights relating to the Elected Candidate or Licensed Product. All Patents and Know-How licensed to Bluebird under the Applicable Bluebird In-Licenses are Controlled by Bluebird for purposes of the licenses granted to Celgene under this CCPS Agreement.

(c) *Patents*. To Bluebird's Knowledge, the Patents listed on Appendix H have been procured or are being procured from the respective patent offices in accordance with applicable Law. None of the Patents included in the Bluebird Licensed IP is or has been involved in any opposition, cancellation, interference, reissue or reexamination proceeding, and no Bluebird Licensed IP is the subject of any judicial, administrative or arbitral order, award, decree, injunction, lawsuit, proceeding or stipulation. Neither Bluebird nor any of its Affiliates has received any notice alleging that the Patents in the Bluebird Licensed IP are invalid or unenforceable, or challenging Bluebird's ownership of or right to use any such rights.

(d) *No Conflicts*. The execution, delivery and performance by Bluebird of this CCPS Agreement and the consummation of the transactions contemplated hereby will not result in any violation of, conflict with, result in a breach of or constitute a default under any understanding, contract or agreement to which Bluebird is a party or by which it is bound. Neither Bluebird nor any of its Affiliates has entered into any agreement or otherwise licensed, granted, assigned, transferred, conveyed or otherwise encumbered or disposed of any right, title or interest in or to any of its assets, including any intellectual property rights, that would in any way conflict with or impair the scope of any rights or licenses granted to Celgene hereunder.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

(e) *Outlicenses.* Appendix J sets forth a complete and accurate list of all agreements relating to the licensing, sublicensing or other granting of rights by Bluebird to any Person with respect to the Bluebird Licensed IP and the Field, and Bluebird has provided complete and accurate copies of all such agreements to Celgene. Except for the Applicable Bluebird In-Licenses, Bluebird and its Affiliates are not subject to any payment obligations to Third Parties as a result of the execution or performance of this CCPS Agreement. Neither Bluebird nor any of its Affiliates has granted any liens or security interests on the Bluebird Licensed IP and the Bluebird Licensed IP is free and clear of any mortgage, pledge, claim, security interest, covenant, easement, encumbrance, lien or charge of any kind.

(f) *No Proceedings*. There is no action, suit, proceeding or investigation pending or, to the Knowledge of Bluebird, currently threatened in writing against or affecting Bluebird that questions the validity of this CCPS Agreement or the right of Bluebird to enter into this CCPS Agreement or consummate the transactions contemplated hereby.

(g) *No Infringement*. Neither Bluebird nor any of its Affiliates has received any notice of any claim that any Patent, Know-How or other intellectual property Controlled by a Third Party would be infringed or misappropriated by the production, use, research, Development, Manufacture or Commercialization of the Elected Candidate or Licensed Product pursuant to this CCPS Agreement, and, to the Knowledge of Bluebird, there are no Patents, Know-How or other intellectual property owned by a Third Party and not included in the Bluebird Licensed IP or Bluebird In-Licensed IP that are necessary for the production, use, research, Development, Manufacture or Commercialization of Elected Candidate or Licensed Product.

16.3 Disclaimers. Without limiting the respective rights and obligations of the Parties expressly set forth herein, each Party specifically disclaims any guarantee that any Licensed Product will be successful, in whole or in part. EXCEPT AS OTHERWISE EXPRESSLY PROVIDED IN THIS CCPS AGREEMENT, THE PARTIES MAKE NO REPRESENTATIONS AND EXTEND NO WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO ANY PATENTS, KNOW-HOW, ELECTED CANDIDATE OR LICENSED PRODUCT, INCLUDING WARRANTIES OF VALIDITY OR ENFORCEABILITY OF ANY PATENT RIGHTS, TITLE, QUALITY, MERCHANTABILITY, FITNESS FOR A PARTICULAR USE OR PURPOSE, PERFORMANCE, AND NONINFRINGEMENT OF ANY THIRD PARTY PATENTS OR OTHER INTELLECTUAL PROPERTY RIGHTS.

16.4 [***]

16.5 Performance by Others. The Parties recognize that each Party may perform some or all of its obligations under this CCPS Agreement through Affiliates and permitted subcontractors provided, however, that each Party will remain responsible and liable for the performance by its Affiliates and permitted subcontractors and will cause its Affiliates and permitted subcontractors to comply with the provisions of this CCPS Agreement in connection therewith.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

16.6 Indemnification.

(a) *Indemnification by Celgene*. Celgene will indemnify Bluebird, its Affiliates and their respective directors, officers, employees, Third Party licensors and agents, and their respective successors, heirs and assigns (collectively, " Bluebird Indemnitees"), and defend and save each of them harmless, from and against any and all losses, damages, liabilities, costs and expenses (including reasonable attorneys' fees and expenses) (collectively, " Losses") in connection with any and all suits, investigations, claims or demands of Third Parties (collectively, " Third Party Claims") against the Bluebird Indemnitees arising from or occurring as a result of: (i) the material breach by Celgene of any term of this CCPS Agreement; (ii) any gross negligence or willful misconduct on the part of Celgene in performing its obligations under this CCPS Agreement; (iii) the Development or Commercialization by or on behalf of Celgene or any of its Affiliates or Sublicensees of Elected Candidate or Licensed Product for ROW Administration, and (iv) [***] except in each case for those Losses for which Bluebird has an obligation to indemnify Celgene pursuant to Section 11.6(b), as to which Losses each Party will indemnify the other to the extent of their respective liability; provided, however, that Celgene will not be obligated to indemnify Bluebird Indemnitees for any Losses to the extent that such Losses arise as a result of gross negligence or willful misconduct on the part of an Bluebird Indemnitee.

(b) *Indemnification by Bluebird*. Bluebird will indemnify Celgene, its Affiliates and their respective directors, officers, employees and agents, and their respective successors, heirs and assigns (collectively, "Celgene Indemnitees"), and defend and save each of them harmless, from and against any and all Losses in connection with any and all Third Party Claims against the Celgene Indemnitees arising from or occurring as a result of: (i) the material breach by Bluebird of any term of this CCPS Agreement; (ii) any gross negligence or willful misconduct on the part of Bluebird in performing its obligations under this CCPS Agreement; or (iii) the Development by or on behalf of Bluebird or any of its Affiliates or Sublicensees of Elected Candidate or Licensed Product, except in each case for those Losses for which Celgene has an obligation to indemnify Bluebird pursuant to Section 11.6(a), as to which Losses each Party will indemnify the other to the extent of their respective liability for the Losses; provided, however, that Bluebird will not be obligated to indemnify Celgene Indemnitees for any Losses to the extent that such Losses arise as a result of gross negligence or willful misconduct on the part of a Celgene Indemnitee.

(c) *Notice of Claim*. All indemnification claims provided for in Sections 11.6(a) and 11.6(b) will be made solely by such Party to this CCPS Agreement (the "Indemnified Party"). The Indemnified Party will promptly notify the indemnifying Party (an " Indemnification Claim Notice") of any Losses or the discovery of any fact upon which the Indemnified Party intends to base a request for indemnification under Section 11.6(a) and 11.6(b), but in no event will the indemnifying Party be liable for any Losses that result from any delay in providing such notice. Each Indemnification Claim Notice must contain a description of the claim and the nature and estimated amount of such Loss (to the extent that the nature and amount of such Loss is known at such time). The Indemnified Party will furnish promptly to the indemnifying Party copies of all papers and official documents received in respect of any Losses and Third Party Claims.

(d) *Defense, Settlement, Cooperation and Expenses*.

(i) *Control of Defense*. At its option, the indemnifying Party may assume the defense of any Third Party Claim by giving written notice to the Indemnified Party within thirty

(30) days after the indemnifying Party's receipt of an Indemnification Claim Notice, provided however that (A) the Third Party Claim solely seeks monetary damages and (B) the indemnifying Party expressly agrees in writing that as between the indemnifying Party and the Indemnified Party, the indemnifying Party will be solely obligated to satisfy and discharge the Third Party Claim in full and is able to reasonably demonstrate that it has sufficient financial resources (the matters described in (A) and (B), the "Litigation Conditions"). The assumption of the defense of a Third Party Claim by the indemnifying Party will not be construed as an acknowledgment that the indemnifying Party is liable to indemnify the Indemnified Party in respect of the Third Party Claim, nor will it constitute a waiver by the indemnifying Party of any defenses it may assert against the Indemnified Party's claim for indemnification. Upon assuming the defense of a Third Party Claim, the indemnifying Party may appoint as lead counsel in the defense of the Third Party Claim any legal counsel selected by the indemnifying Party (the indemnifying Party will consult with the Indemnified Party with respect to a possible conflict of interest of such counsel retained by the indemnifying Party). The Indemnified Party may, at any time, assume the defense of a Third Party Claim if at any time the Litigation Conditions are not satisfied with respect to such Claim. In the event the indemnifying Party assumes the defense of a Third Party Claim, the Indemnified Party will immediately deliver to the indemnifying Party all original notices and documents (including court papers) received by the Indemnified Party in connection with the Third Party Claim. Should the indemnifying Party assume the defense of a Third Party Claim, except as provided in Section 11.6(d)(ii) the indemnifying Party will not be liable to the Indemnified Party for any legal costs or expenses subsequently incurred by such Indemnified Party in connection with the analysis, defense or settlement of the Third Party Claim. In the event that it is ultimately determined that the indemnifying Party is not obligated to indemnify, defend or hold harmless the Indemnified Party from and against the Third Party Claim, the Indemnified Party will reimburse the indemnifying Party for any and all costs and expenses (including attorneys' fees and costs of suit) and any Third Party Claims incurred by the indemnifying Party in its defense of the Third Party Claim.

(ii) *Right to Participate in Defense*. Without limiting Section 11.6(d)(i), any Indemnified Party will be entitled to participate in, but not control, the defense of such Third Party Claim and to employ counsel of its choice for such purpose; provided, however, that such employment will be at the Indemnified Party's own cost and expense unless (i) the employment thereof has been specifically authorized by the indemnifying Party in writing, (ii) the indemnifying Party has failed to assume the defense and employ counsel in accordance with Section 11.6(d)(i) (in which case the Indemnified Party will control the defense), (iii) the interests of the Indemnified Party and the indemnifying Party with respect to such Third Party Claim are sufficiently adverse to prohibit the representation by the same counsel of both Parties under applicable Law, ethical rules or equitable principles, or (iv) the indemnifying Party no longer satisfies the Litigation Conditions, in which case the indemnifying Party will assume [***] percent ([***]%) of any such costs and expenses of counsel for the Indemnified Party.

(iii) *Settlement*. With respect to any Third Party Claims that relate solely to the payment of money damages in connection with a Third Party Claim and that will not result in the Indemnified Party's becoming subject to injunctive or other relief or otherwise adversely affecting the business of the Indemnified Party in any manner, and as to which the indemnifying Party will have acknowledged in writing the obligation to indemnify the Indemnified Party

hereunder, and subject to the Litigation Conditions being satisfied, the indemnifying Party will have the sole right to agree to the entry of any judgment, enter into any settlement or otherwise dispose of such Loss, on such terms as the indemnifying Party, in its sole discretion, will deem appropriate. With respect to all other Losses in connection with Third Party Claims, where the indemnifying Party has assumed the defense of the Third Party Claim in accordance with Section 11.6(d)(i), the indemnifying Party will have authority to agree to the entry of any judgment, enter into any settlement or otherwise dispose of such Loss provided it obtains the prior written consent of the Indemnified Party (such consent not to be unreasonably withheld, delayed or conditioned). The indemnifying Party will not be liable for any settlement or other disposition of a Loss by an Indemnified Party that is reached without the prior written consent of the indemnifying Party. Regardless of whether the indemnifying Party chooses to defend or prosecute any Third Party Claim, no Indemnified Party will admit any liability with respect to or settle, compromise or discharge, any Third Party Claim without the prior written consent of the indemnifying Party, such consent not to be unreasonably withheld, delayed or conditioned.

(iv) *Cooperation*. If the indemnifying Party chooses to defend or prosecute any Third Party Claim, the Indemnified Party will, and will cause each other Indemnified Party to, cooperate in the defense or prosecution thereof and will furnish such records, information and testimony, provide such witnesses and attend such conferences, discovery proceedings, hearings, trials and appeals as may be reasonably requested in connection therewith. Such cooperation will include access during normal business hours afforded to indemnifying Party to, and reasonable retention by the Indemnified Party of, records and information that are reasonably relevant to such Third Party Claim, and making Indemnified Parties and other employees and agents available on a mutually convenient basis to provide additional information and explanation of any material provided hereunder, and the indemnifying Party will reimburse the Indemnified Party for all its reasonable out-of-pocket costs and expenses in connection therewith.

(v) *Costs and Expenses*. Except as provided above in this Section 11.6(d), the costs and expenses, including attorneys' fees and expenses, incurred by the Indemnified Party in connection with any claim will be reimbursed on a calendar quarter basis by the indemnifying Party, without prejudice to the indemnifying Party's right to contest the Indemnified Party's right to indemnification and subject to refund in the event the indemnifying Party is ultimately held not to be obligated to indemnify the Indemnified Party.

16.7 Insurance. Each Party will maintain at its sole cost and expense, an adequate liability insurance or self-insurance program (including product liability insurance) to protect against potential liabilities and risk arising out of activities to be performed under this CCPS Agreement, and any agreement related hereto and upon such terms (including coverages, deductible limits and self-insured retentions) as are customary in the U.S. pharmaceutical industry for the activities to be conducted by such Party under this CCPS Agreement. Subject to the preceding sentence, such liability insurance or self-insurance program will insure against all types of liability, including personal injury, physical injury or property damage arising out of the manufacture, sale, use, distribution or marketing of Licensed Product. The coverage limits set forth herein will not create any limitation on a Party's liability to the other under this CCPS Agreement.

16.8 U.S. Administration Liabilities. In the event that either Party (i) incurs any Losses in connection with a Third Party Claim for personal injury or death caused by the use of Licensed Product for U.S. Administration, or (ii) is required to make payments to any Third Party in order to acquire a license or other rights under Patents or Know-How necessary for the Development, Manufacture or Commercialization of Licensed Product for U.S. Administration (collectively, "U.S. Administration Liabilities"), such U.S. Administrative Losses arising from or occurring as a result of the performance, in good faith, of the Development, Manufacture or Commercialization of Licensed Product for U.S. Administration in accordance with this CCPS Agreement will be charged to such Party's Operating Profit or Loss under the Profit & Loss Share, provided that Operating Profit or Loss will not include U.S. Administration Liabilities of a Party or its Affiliates: (1) that are caused by a breach of this CCPS Agreement by such Party or its Affiliates; (2) incurred with respect to or allocable to products other than Licensed Product for U.S. Administration; or (3) that are subject to indemnification by such Party pursuant to Section 16.6 (and for clarity, if a Third Party makes a Third Party Claim directly against Bluebird (or any of its Affiliates) or Celgene (or any of its Affiliates), respectively, that would otherwise be indemnified by Bluebird or Celgene, respectively, if such Third Party Claim had been made against the other Party (or any of its Affiliates), then U.S. Administration Liabilities incurred by Bluebird or Celgene in connection with such direct Third Party Claim will not be included in the calculation of Operating Profit or Loss).

17. Term and Termination.

17.1 Term. This CCPS Agreement will commence as of the CCPS Agreement Effective Date and, unless sooner terminated in accordance with the terms hereof or by mutual written consent, will continue on a country-by-country basis, until there are no more payments owed one or the other Party on Licensed Product in such country (the longest such period of time for any Licensed Product hereunder, the " CCPS Agreement Term"); for clarity, unless sooner terminated in accordance with the terms hereof or by mutual written consent, this CCPS Agreement Term will continue in all events until Licensed Product is no longer being Developed or Commercialized in the United States. Upon there being no more such payments hereunder for any such Licensed Product in such country (other than the United States), the licenses contained in Section 10.1 will become fully paid up and will remain exclusive with respect to such Licensed Product in such country.

17.2 Termination by Bluebird.

(a) *Breach*. Bluebird will have the right to terminate this CCPS Agreement in full upon delivery of written notice to Celgene in the event of any material breach by Celgene of any terms and conditions of this CCPS Agreement in a manner that fundamentally frustrates the transactions contemplated by this CCPS Agreement, provided that such termination will not be effective if such breach, has been cured within [***] after written notice thereof is given by Bluebird to Celgene specifying the nature of the alleged breach (or, if such default cannot be cured within such [***] after such notice if Celgene commences actions to cure such default within such [***] and thereafter diligently continues such actions, but fails to cure the default by the end of such [***]); provided, however, that to the extent such material breach involves the failure to make a payment when due, such breach must be cured within [***] after written notice thereof is given by Bluebird to Celgene.

(b) [***]

(c) *Termination of the Profit & Loss Share.* Bluebird will have the right to terminate the Profit & Loss Share by delivering written notice to Celgene, such termination to be effective [***] following the date of such notice. Promptly following such notice, the Parties will enter into a license agreement with respect to the United States and the ROW, which agreement will be substantially identical to the License Agreement attached as Exhibit A to the Master Collaboration Agreement, with such changes that the Parties may, acting reasonably, mutually agree are required in order to address any specific facts or circumstances existing at the time of such termination. The Parties will enter into such license agreement no later than the effective date of such termination and, if such license agreement is not entered into prior the expiration of such [***], upon execution, the effective date of such license agreement will be deemed to be the effective date of such termination. For clarity, (i) termination of the Profit & Loss Share pursuant to this Section 17.2(c) will not release Bluebird from any obligation or liability which, at the time of the effective date of such termination, has already accrued to Celgene or which is attributable to a period prior to the effective date of such termination, and (ii) any events that have already occurred before the effective date of such termination (such as achievement of any milestones) will not trigger any payment obligation by Celgene to Bluebird under such executed license agreement (other than, for clarity, the Milestone Payment based on the Pivotal Study if not already paid or accrued under this CCPS Agreement).

17.3 Termination by Celgene.

(a) *Breach*. Celgene will have the right to terminate this CCPS Agreement in full upon delivery of written notice to Bluebird in the event of any material breach by Bluebird of any terms and conditions of this CCPS Agreement in a manner that fundamentally frustrates the transactions contemplated by this CCPS Agreement, provided that such termination will not be effective if such breach has been cured within [***] after written notice thereof is given by Celgene to Bluebird specifying the nature of the alleged breach (or, if such default cannot be cured within such [***] period, within [***] after such notice if Bluebird commences actions to cure such default within such [***] period and thereafter diligently continues such actions, but fails to cure the default by the end of such [***]).

(b) *Discretionary Termination.* Beginning with [***], Celgene will have the right to terminate this CCPS Agreement in full, at its discretion for any reason, by delivering written notice to Bluebird, such termination to be effective [***] following the date of such notice.

(c) [***]

(d) *Alternative to Termination Under Section 17.3(a).* If Celgene has the right to terminate this CCPS Agreement under Section 17.3(a) or 17.3(c) (including expiration of all applicable cure periods thereunder), in lieu of exercising such termination right, Celgene may elect once by written notice to Bluebird before the end of such applicable cure period to have this CCPS Agreement continue in full force and effect and instead have, starting immediately after the end of such applicable cure period, any future Milestone Payments set forth in Section 11.2(b) and the royalty rates set forth in the table set forth in Section 11.3(a) be reduced by [***], provided that such reduction will not apply if such future Milestone Payments and royalty rates have already been reduced pursuant to Section 11.4(c) of the Master Collaboration Agreement.

17.4 Effects of Termination or Expiration. Upon termination (but not expiration pursuant to Section 17.1) of this CCPS Agreement for any reason:

(a) *Wind Down*. Celgene will responsibly wind-down, in accordance with accepted pharmaceutical industry norms and ethical practices, any on-going clinical studies for which it has responsibility hereunder in which patient dosing has commenced or, if reasonably practicable and requested by Bluebird, allow Celgene, its Affiliates or its Sublicensees to complete such trials. Celgene will be responsible for any costs associated with such wind-down. Bluebird will pay all costs incurred by either Party to complete such studies should Bluebird request that such studies be completed.

(b) *Sublicenses*. A termination of this CCPS Agreement will not automatically terminate any sublicense granted by Celgene pursuant to Section 10.3 for Commercialization rights with respect to a non-Affiliated Sublicensee, provided that (i) such Sublicensee is not then (a) in material breach of any provision of this CCPS Agreement or (b) in material breach of the applicable sublicense agreement or otherwise in breach of such sublicense agreement in a manner that would give rise to a right of termination on the part of Celgene, (ii) if Bluebird terminates this CCPS Agreement pursuant to Section 17.2(a) for Celgene's failure to fulfill its payment obligations hereunder, such Sublicensee agrees to and does pay to Bluebird all outstanding amounts that accrued as a result of such Sublicensee's activities under the sublicense, (iii) Bluebird will have the right to step into the role of Celgene as sublicensor under any such sublicense executed after the CCPS Agreement Effective Date, with all the rights that Celgene had under such sublicense, solely with respect to the Bluebird Licensed IP, prior to termination of this CCPS Agreement (including the right to receive any payments to Celgene by such Sublicensee that accrue from and after the date of the termination of this CCPS Agreement solely with respect to the Bluebird Licensed IP), (iv) such Sublicensee will pay to Bluebird all amounts that Celgene would have been obligated to pay to Bluebird hereunder with respect to such Sublicensee's activities had this CCPS Agreement not terminated (less any amounts received by Bluebird in clause (iii) above) and (v) the survival of such sublicense will not result in an imposition of any additional obligations on the part of Bluebird that are not included within the scope of this CCPS Agreement. Celgene will include in any sublicense agreement executed after the CCPS Agreement Effective Date that relates solely to the Bluebird Licensed IP a provision in which said Sublicensee acknowledges its obligations to Bluebird under this Section 17.4(b).

(c) *Cessation of Rights*. Except as otherwise expressly provided in this Section 17, all rights and licenses granted by Bluebird to Celgene in Section 10.1 will terminate, and all rights granted by Celgene to Bluebird in Section 10.2 will terminate, and Celgene and its Affiliates and Sublicensees will cease all use of Bluebird Licensed IP and all Development and Commercialization of Elected Candidate and Licensed Product.

(d) *Regulatory Approvals*. To the extent permitted by applicable Law, and subject to Bluebird paying commercially reasonable compensation to Celgene for the assets to be transferred pursuant to this Section 17.4(d) (such compensation to either be mutually agreed to or determined through arbitration as provided in Section 17.4(h) below, and such compensation to

be reduced by [***] from what would be commercially reasonable compensation if this CCPS Agreement is terminated by Bluebird pursuant to Section 17.2(a)), all Regulatory Approvals and other regulatory filings and communications owned (in whole or in part) or otherwise Controlled by Celgene and its Affiliates and Sublicensees solely relating to the Elected Candidate and/or Licensed Product, and all other documents solely relating to and necessary to further Develop and Commercialize Elected Candidate and Licensed Product, as such items exist as of the effective date of such termination (including all solely related completed and ongoing clinical studies) will be assigned to Bluebird, and Celgene will provide to Bluebird one (1) copy of the foregoing and all documents contained in or referenced in any such items, together with the raw and summarized data for any clinical studies (and where reasonably available, electronic copies thereof). In the event of failure to obtain assignment, subject to the Parties agreeing on commercially reasonable compensation for the right to access and reference, Celgene hereby consents and grants to Bluebird the right to access and reference (without any further action required on the part of Celgene, whose authorization to file this consent with any Regulatory Authority is hereby granted) any such item.

(e) *Licenses*. Subject to Bluebird paying (i) commercially reasonable compensation to Celgene for the licenses to be granted pursuant to subsection (1) of this Section 17.4(e) (such compensation to either be mutually agreed to or determined through arbitration as provided in Section 17.4(h) below, and such compensation to be reduced by [***] from what would be commercially reasonable compensation if this CCPS Agreement is terminated by Bluebird pursuant to Section 17.2(a)), and (ii) amounts payable to Celgene's licensors as set forth below, Celgene will grant to Bluebird and its Affiliates (1) a worldwide, perpetual and irrevocable, nontransferable (except in connection with a permitted assignment of this CCPS Agreement in accordance with Section 18.12), exclusive license, with the right to grant sublicenses through multiple tiers (subject to Section 10.3, *mutatis mutandis*), under Celgene Licensed Product IP, and (2) an exclusive sublicense under the Celgene Licensed Product In-Licensed IP, in each case ((1) and (2)) to the extent such Celgene Licensed Product IP and Celgene Licensed Product In-Licensed IP are used in or Cover the Licensed Product as of the effective date of termination and to the extent such Celgene Licensed Product IP and Celgene Licensed Product In-Licensed IP exist as of the effective date of such termination (including in each case any additions, divisions, continuations, continuations-in-part, invention certificates, substitutions, reissues, reexaminations, extensions, registrations, supplementary protection certificates and renewals of such Celgene Licensed Product IP and Celgene Licensed Product In-Licensed IP), solely to the extent necessary to research, Develop, Manufacture and Commercialize the Elected Candidate and Licensed Product. With respect to grants of a sublicense under subsection (2) above, Bluebird will be responsible for all amounts payable to the applicable licensor that are attributable to Bluebird as a sublicensee thereunder under this CCPS Agreement, and Celgene will pay same and Bluebird will reimburse Celgene for [***] percent ([***]%) of such payments within thirty (30) days of receipt of Celgene's written invoice therefor. Celgene will provide Bluebird with copies of all applicable Celgene Licensed Product In-Licenses promptly following the effective date of the termination of this License Agreement. The Prosecution and Maintenance and enforcement and defense rights and obligations of the Parties with respect to any Patents licensed or sublicensed to Bluebird pursuant to this Section 17.4(e) will be discussed and agreed to by the Parties, with the understanding that such Prosecution and Maintenance and

enforcement and defense rights and obligations will be substantially similar to those set forth in Section 13, with the roles of Bluebird and Celgene reversed (and such other changes as are appropriate from the context, and taking into account any rights retained by a Third Party licensor of Celgene to Prosecute and Maintain or enforce and defend any Patent sublicensed to Bluebird under this Section 17.4(e)).

(f) *Trademarks*. Subject to Bluebird paying commercially reasonable compensation to Celgene for the license to be granted pursuant to this Section 17.4(f) (such compensation to either be mutually agreed to or determined through arbitration as provided in Section 17.4(h) below, and such compensation to be reduced by [***] from what would be commercially reasonable compensation if this CCPS Agreement is terminated by Bluebird pursuant to Section 17.2(a)), Celgene will exclusively license to Bluebird any registered or unregistered trademarks or internet domain names that are specific to and solely used for the Licensed Product worldwide (it being understood that the foregoing will not include any trademarks or internet domain names that contain the corporate or business name(s) of Celgene).

(g) *Baylor Product License*. If the Licensed Product is subject to a Baylor Product License, then Celgene will, at Bluebird's written request, assign to Bluebird the applicable Baylor Product License in accordance with the terms of Section 13.5 thereof, provided that if such Baylor Product License applies to other products, Celgene will assign or sublicense to Bluebird that portion of the Baylor Product License that applies to the Licensed Product, and with the consequences therein stated (that is, Celgene will remain responsible for all payments accruing thereunder before the assignment, and Bluebird will be responsible for all payments accruing thereunder after such assignment).

(h) *Commercially Reasonable Compensation*. If the Parties are unable to agree on the amount of commercially reasonable compensation payable by Bluebird to Celgene pursuant to Sections 17.4(d), 17.4(e) or 17.4(f) within ten (10) days of the effective date of termination of this CCPS Agreement, [***]

(i) *Country Termination*. If this CCPS Agreement is terminated only with respect to a specific country pursuant to Section 11.2(b) or Section 11.3(c), the provisions of this Section 17.4 will apply only with respect to such terminated country.

17.5 Survival. In addition to the termination consequences set forth in Section 17.4, the following provisions will survive termination or expiration of this CCPS Agreement: Sections 1, 4.3, 8.2, 2.3(c)(ii), 10.3(c) (*mutatis mutandis* with respect to licenses granted to Bluebird under Section 17.4, but excluding subsections (i) and (ii) of Section 10.3(c)) 10.6, 10.8, 11.5, 11.6, 12, 15, 16.3, 16.4, 16.6, 16.7, 16.8, 17.4, 17.5, 17.6 and 18, and Appendix F (to the extent required to provide for a true up of Operating Profit and Losses during the term of this CCPS Agreement following termination of this CCPS Agreement). Termination or expiration of this CCPS Agreement will not relieve the Parties of any liability or obligation which accrued hereunder prior to the effective date of such termination or expiration nor preclude either Party from pursuing all rights and remedies it may have hereunder or at law or in equity with respect to any breach of this CCPS Agreement nor prejudice either Party's right to obtain performance of any obligation. All other rights and obligations will terminate upon expiration of this CCPS Agreement.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

17.6 Right to Set-off. Notwithstanding anything to the contrary in this CCPS Agreement, each Party has the right at all times to retain and set off against all amounts due and owing to the other Party as determined in a final judgment any damages recovered by such Party for any Losses incurred by such Party.

18. General Provisions.

18.1 Cumulative Remedies and Irreparable Harm. All rights and remedies of the Parties hereunder will be cumulative and in addition to all other rights and remedies provided hereunder or available by agreement, at law or otherwise. Each Party acknowledges and agrees that breach of any of the terms or conditions of this CCPS Agreement would cause irreparable harm and damage to the other and that such damage may not be ascertainable in money damages and that as a result thereof the non-breaching Party would be entitled to seek from a court equitable or injunctive relief restraining any breach or future violation of the terms contained herein by the breaching Party without the necessity of proving actual damages or posting bond. Such right to equitable relief is in addition to whatever remedies either Party may be entitled to as a matter of law or equity, including money damages.

18.2 Business Combination and IP.

(a) *Bluebird Business Combination*. Notwithstanding anything to the contrary herein, for purposes of this CCPS Agreement, no Know-How, Materials, Patents, Regulatory Data, Regulatory Filings or Regulatory Approvals not Controlled by Bluebird or any of its Affiliates prior to a Business Combination of Bluebird will be Controlled for purposes of this CCPS Agreement after such Business Combination of Bluebird, other than (i) Applicable Bluebird In-Licenses to the extent in effect immediately prior to such Business Combination of Bluebird, (ii) Collaboration IP, and (iii) any Patent that claims priority, directly or indirectly, to any other Patent first Controlled before such Business Combination of Bluebird will be Controlled thereafter no matter when such Patent is filed or issued.

(b) *Celgene Business Combination*. Notwithstanding anything to the contrary herein, for purposes of this CCPS Agreement, no Know-How, Materials, Patents Regulatory Data, Regulatory Filings or Regulatory Approvals not Controlled by Celgene or any of its Affiliates prior to a Business Combination of Celgene will be Controlled for purposes of this CCPS Agreement after such Business Combination of Celgene, other than Collaboration IP, and except that any Patent that claims priority, directly or indirectly, to any other Patent first Controlled before such Business Combination of Celgene will be Controlled thereafter no matter when such Patent is filed or issued.

18.3 Relationship of Parties. Nothing in this CCPS Agreement is intended or will be deemed to constitute a partnership, agency, employer-employee or joint venture relationship between the Parties. No Party will incur any debts or make any commitments for the other, except to the extent, if at all, specifically provided therein. There are no express or implied Third Party beneficiaries hereunder (except as set forth in Section 10.2 and except for Bluebird Indemnitees and Celgene Indemnitees for purposes of Section 16.6).

18.4 Compliance with Law. Each Party will perform or cause to be performed any and all of its obligations or the exercise of any and all of its rights hereunder in good scientific manner

and in compliance with all applicable Law. Without limiting the foregoing, Bluebird will comply with comply with all applicable Laws and regulations (including U.S. Foreign Corrupt Practices Act and any other applicable anti-bribery or anti-kickback laws or regulations).

18.5 Force Majeure. Neither Party will be liable to the other for failure of or delay in performing obligations set forth in this CCPS Agreement (other than any obligation to pay monies when due), and neither will be deemed in breach of such obligations, if such failure or delay is due to natural disasters or any causes reasonably beyond the control of such Party; provided that the Party affected will promptly notify the other of the force majeure condition and will exert reasonable efforts to eliminate, cure or overcome any such causes and to resume performance of its obligations as soon as possible.

18.6 Governing Law. This CCPS Agreement will be governed by and construed in accordance with the Laws of the State of New York, without respect to its conflict of laws rules, provided that any dispute relating to the scope, validity, enforceability or infringement of any Patents or Know-How will be governed by, and construed and enforced in accordance with, the substantive laws of the jurisdiction in which such Patents or Know-How apply.

18.7 Counterparts; Facsimiles. This CCPS Agreement may be executed in one or more counterparts, each of which will be deemed an original, and all of which together will be deemed to be one and the same instrument. Facsimile or PDF execution and delivery of this CCPS Agreement by either Party will constitute a legal, valid and binding execution and delivery of this CCPS Agreement by such Party

18.8 Headings. All headings in this CCPS Agreement are for convenience only and will not affect the meaning of any provision hereof.

18.9 Waiver of Rule of Construction. Each Party has had the opportunity to consult with counsel in connection with the review, drafting and negotiation of this CCPS Agreement. Accordingly, the rule of construction that any ambiguity in this CCPS Agreement will be construed against the drafting Party will not apply.

18.10 Interpretation. Whenever any provision of this CCPS Agreement uses the term "including" (or "includes"), such term will be deemed to mean "including without limitation" (or "includes without limitations"). "Herein," "hereby," "hereunder," "hereof" and other equivalent words refer to this CCPS Agreement as an entirety and not solely to the particular portion of this CCPS Agreement in which any such word is used. All definitions set forth herein will be deemed applicable whether the words defined are used herein in the singular or the plural. Unless otherwise provided, all references to Sections and Appendices in this CCPS Agreement are to Sections and Appendices of this CCPS Agreement. References to any Sections include Sections and subsections that are part of the related Section (*e.g.*, a section numbered "Section 2.1" would be part of "Section 2", and references to "Section 2.1" would also refer to material contained in the subsection described as "Section 2.1(a)").

18.11 Binding Effect. This CCPS Agreement will inure to the benefit of and be binding upon the Parties, their Affiliates, and their respective lawful successors and assigns.

18.12 Assignment. This CCPS Agreement may not be assigned by either Party, nor may either Party delegate its obligations or otherwise transfer licenses or other rights created by this

CCPS Agreement, except as expressly permitted hereunder or otherwise without the prior written consent of the other Party, which consent will not be unreasonably withheld, delayed or conditioned; provided that without consent (i) Celgene may assign this CCPS Agreement to (x) an Affiliate or (y) its successor in connection with the merger, consolidation, or sale of all or substantially all of its assets, and (ii) Bluebird may assign this CCPS Agreement to (x) an Affiliate or (y) its successor in connection with the merger, consolidation, or sale of all or substantially all of its assets or that portion of its business pertaining to the subject matter of this CCPS Agreement; provided further that, except in the case where a Party is involved in a merger or consolidation where it is the surviving entity and no assets of such Party that are subject to this CCPS Agreement have been transferred as a result of such merger or consolidation, (a) such assigning Party provides the other Party to this Agreement with at least thirty (30) business days advance written notice of such assignment(s) and the assigning Party agrees in a written agreement delivered prior to such assignment(s) to the non-assigning Party (and upon which such non-assigning Party may rely) to remain fully liable for the performance of its obligations under this Agreement by its assignee(s), (b) the assignee(s) agree in a written agreement delivered prior to such assignment(s) to the non-assigning Party (and upon which such non-assigning Party may rely) to assume performance of all such assigned obligations, (c) in the case of any assignment(s) by Bluebird, all Bluebird Licensed IP licensed to Celgene under this CCPS Agreement will be transferred to such assignee(s) effective as of such assignment(s), (d) all of the matters referred to in clauses (a), (b) and (c), as applicable, will be set forth in documentation reasonably acceptable to the non-assigning Party prior to any such assignment(s) (and with such reasonable acceptance not to be unreasonably withheld, conditioned or delayed) and in all cases will provide the non-assigning Party with the full benefits of its rights under this Agreement (after taking into account all risks involving applicable counter-party performance and bankruptcy and insolvency risks, including those involving contractual rejection under 11 USC §365) as if no such assignment(s) had occurred, and (e) in the case of any assignment(s), the assigning Party will reimburse the non-assigning Party for all of the legal fees and expenses incurred by such non-assigning Party in connection with the matters set forth in clause (D) of this sentence in an aggregate amount not to exceed [***], and provided, further, that if Bluebird wishes to assign any Bluebird Licensed IP to its Affiliates, it will be permitted to do so conditioned on each such Affiliate becoming a party to this CCPS Agreement, in the form of an amendment to this CCPS Agreement executed by Celgene, Bluebird and such Affiliate, pursuant to which such Affiliate would agree to assume all obligations hereunder, and grant to Celgene all rights hereunder, with respect to the Bluebird Licensed IP. The terms of this Agreement will be binding upon and will inure to the benefit of the successors, heirs, administrators and permitted assigns of the Parties. Any purported assignment in violation of this Section 18.12 will be null and void *ab initio*.

18.13 Notices. All notices, requests, demands and other communications required or permitted to be given pursuant to this CCPS Agreement will be in writing and will be deemed to have been duly given upon the date of receipt if delivered by hand, recognized international overnight courier, confirmed facsimile transmission, or registered or certified mail, return receipt requested, postage prepaid to the applicable address or facsimile number in Section 13.14 in the Master Collaboration Agreement. Either Party may change its designated address and facsimile number by notice to the other Party in the manner provided in this Section 13.14.

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18.14 Amendment and Waiver. This CCPS Agreement may be amended, supplemented, or otherwise modified only by means of a written instrument signed by both Parties; provided that any unilateral undertaking or waiver made by one Party in favor of the other will be enforceable if undertaken in a writing signed by the Party to be charged with the undertaking or waiver. Any waiver of any rights or failure to act in a specific instance will relate only to such instance and will not be construed as an agreement to waive any rights or fail to act in any other instance, whether or not similar.

18.15 Severability. In the event that any provision of this CCPS Agreement will, for any reason, be held to be invalid or unenforceable in any respect, such invalidity or unenforceability will not affect any other provision hereof, and the Parties will negotiate in good faith to modify this CCPS Agreement to preserve (to the extent possible) their original intent.

18.16 Entire Agreement. This CCPS Agreement, together with the Master Collaboration Agreement, is the sole agreement with respect to the subject matter and supersedes all other agreements and understandings between the Parties with respect to same (including Confidential Agreement). In the event of any conflict between the terms of this CCPS Agreement and the terms of the Master Collaboration Agreement, the terms of this CCPS Agreement will control.

18.17 Force Majeure. Neither Celgene nor Bluebird will be liable for failure of or delay in performing obligations set forth in this CCPS Agreement (other than any obligation to pay monies when due), and neither will be deemed in breach of such obligations, if such failure or delay is due to natural disasters or any causes reasonably beyond the control of Celgene or Bluebird and without the fault or negligence of the Party so failing or delaying; provided that the Party affected will promptly notify the other of the force majeure condition and will exert reasonable efforts to eliminate, cure or overcome any such causes and to resume performance of its obligations as soon as possible.

[*Remainder of this Page Intentionally Left Blank*]

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IN WITNESS WHEREOF, the Parties have caused this Co-Development, Co-Promote and Profit Share Agreement to be executed by their respective duly authorized officers as of the CCPS Agreement Effective Date.

BLUEBIRD BIO, INC.

By: _____
(Signature)

Name: _____

Title: _____

Date: _____

CELGENE CORPORATION

By: _____
(Signature)

Name: _____

Title: _____

Date: _____

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Appendix A

Additional Defined Terms

"Elected Candidate"[1] means the Optioned Candidate selected by Celgene under the Master Collaboration Agreement that specifically targets the following Target Antigen: [ ].

[1] ***To be updated by the Parties to specifically identify the candidate that is the subject of the option election*** .

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Appendix B

Applicable New In-Licenses

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Appendix C

Applicable Pre-Existing In-Licenses

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

Appendix D

Certain Manufacturing Definitions

[***]

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Appendix E

Co-Co In-Licenses

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Appendix F

Profit & Loss Share

[***]

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Appendix G

Press Release

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Appendix H

Certain Patents within the Licensed IP Controlled by Bluebird as of the CCPS Agreement Effective Date

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[***]

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Appendix J

Bluebird Agreements

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Appendix K

[***]

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Appendix L

[***]

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Appendix M

Redacted Version of CCPS Agreement

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Schedule 4.3(b)

Cost Allocation

[***]

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Schedule 5.6

Minimum BlueBird Sales Representative Qualifications

- BS in Business or Science; 5+ years sales experience in pharmaceutical/biotechnology industry with at least two years of related hematology/oncology sales strongly preferred (or proven success in medical field).
- May not be debarred or disqualified by the FDA (or subject to a similar sanction by any Regulatory Authority outside the United States), or the subject of an FDA debarment or disqualification investigation or proceeding (or similar proceeding by any Regulatory Authority outside the United States), or convicted, indicted or charged with any crime that would constitute grounds for FDA debarment or disqualification (or similar sanctions by any Regulatory Authority outside the United States).
- Proven track record that demonstrates top sales accomplishments.
- Demonstrated ability to understand and communicate technical clinical material clearly and effectively.
- Demonstrated ability to develop critical relationships with physicians, nurses and ancillary staff within academic hospitals, clinics, and private practice facilities.
- Demonstrated understanding of oncology therapeutic area, products and marketplace.
- Demonstrated knowledge of healthcare system processes including reimbursement.

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Schedule 16.2

Exceptions to Bluebird's Representations and Warranties in Section 16.2

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[***]

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[***]

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Exhibit F

Additional Celgene Option Information

Celgene will provide to Bluebird, along with the Option Exercise Notice:

- The clinical Development plan and commercial launch plan that Celgene is contemplating to achieve Regulatory Approval for such Optioned Candidate, together with the cost estimates for such a clinical program;
- The U.S. Development Budget, which for purposes of this Exhibit F will be for the first twelve (12) months of the Co-Development, Co-Promote and Profit Share Agreement. Celgene may update such U.S. Development Budget within ten (10) business days of first providing the same; and
- Such other supporting information related to the items listed in the foregoing bullet points as Bluebird may reasonably request, to the extent such information is in Celgene's possession (for clarity, without any obligation to create or generate new information.)

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Exhibit H

Redacted Master Collaboration Agreement

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Exhibit I

Press Release

bluebird bio Announces Global Strategic Collaboration with Celgene to Advance Gene Therapy in Oncology

- Separately, Celgene and bluebird bio to collaborate with the Center for Cell and Gene Therapy to advance new and existing CAR T cell programs

CAMBRIDGE, Mass.—March XX, 2013 — bluebird bio, a privately-held biotechnology company focused on gene therapy, today announced the formation of a broad, global strategic collaboration with Celgene Corporation to discover, develop and commercialize novel disease-altering gene therapies in oncology. The collaboration will focus on applying gene therapy technology to genetically modify a patient's own T-cells, known as chimeric antigen receptor (CAR) T-cells, to target and destroy cancer cells. The multi-year research and development collaboration has the potential to lead to the development and commercialization of multiple CAR T-cell products. Celgene has an option to license any products resulting from the collaboration after the completion of a Phase 1 clinical study for each such product. bluebird will be responsible for research and development activity through Phase 1 studies.

Simultaneous with this announcement, Celgene and bluebird bio also announced a related strategic collaboration in the CAR T-cell field with the Center for Cell and Gene Therapy at Baylor College of Medicine, Texas Children's Hospital and The Methodist Hospital, Houston led by Malcolm Brenner, M.D., Ph.D., professor, Department of Molecular and Human Genetics and the director, Center for Cell and Gene Therapy. bluebird bio, Celgene and Dr. Brenner's team will work collaboratively to advance and develop existing and new products and programs in the CAR T cell field.

"The genetic manipulation of autologous T cells is a new frontier in oncology, one that shows early promise in emerging clinical trials," said Tom Daniel, President, Research & Early Development at Celgene. "We see strong prospects for this collaboration between Celgene, bluebird bio and Baylor College of Medicine's experienced leaders in this emerging field, led by Dr. Brenner, to advance this innovative approach to intractable problems in oncology."

"We believe that our recent advances in the industrialization of our gene therapy platform will drive improvements in the potency, purity, efficiency and scalability of our lentiviral gene therapy programs. These advances provide us with an opportunity to apply our platform, intellectual property and know-how to the development of additional product candidates in indications such as CAR T-cells for cancer," stated Jeff Walsh, chief operating officer of bluebird bio. "Celgene is a global leader in oncology and, combined with Baylor's expertise in the CAR T-cell field, we have created a great opportunity to drive innovation in a new and exciting area."

Financial terms of the agreement include a substantial upfront payment and up to $225 million per product in potential option fees and clinical and regulatory milestones. bluebird bio also has the right to participate in the development and commercialization of any licensed products resulting from the collaboration through a 50/50 co-development and profit share in the United States in exchange for a reduction of milestones. Royalties would also be paid in regions where there is no profit share including in the United States if bluebird declines to exercise their co-development and profit sharing rights.

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The gene therapy products currently in clinical development at bluebird bio for the treatment of childhood cerebral adrenoleukodystrophy, beta-thalassemia and sickle cell disease are independent of this collaboration.

Cowen and Company contributed as a strategic advisor to bluebird bio on this transaction.

About CAR T-Cell Therapy

CAR T-cell therapy represents a promising, emerging approach to treating cancer. Blood is withdrawn from a patient and the T-cells are then extracted from a patient's blood. These cells are then genetically modified to recognize and attack cancer cells and then re-introduced into the patient's blood. The patient's genetically modified cells are intended to bind to and kill the target cancer cells.

About bluebird bio

bluebird bio is developing potentially transformative gene therapies for severe genetic and orphan diseases. bluebird bio has two clinical-stage programs in development for childhood cerebral adrenoleukodystrophy (CCALD) and beta-thalassemia/sickle cell disease. Led by a management team with extensive industry experience, bluebird bio is privately held and backed by top-tier life sciences investors. Its operations are located in Cambridge, Mass., San Francisco and Paris, France. For more information, please visit www.bluebirdbio.com.

About Celgene

Celgene Corporation, headquartered in Summit, New Jersey, is an integrated global biopharmaceutical company engaged primarily in the discovery, development and commercialization of novel therapies for the treatment of cancer and inflammatory diseases through gene and protein regulation. For more information, please visit www.celgene.com.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

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Exhibit L

Call Option

1. Call Option.

1.1 Notice. In the event that, during the Call Option Period, a Call Option Triggering Event occurs, then Bluebird will give Celgene written notice of such Call Option Triggering Event (a "Call Option Triggering Event Notice"). In the event that such Call Option Triggering Event occurring during the Call Option Period is a Bluebird Call Option Triggering Event, Bluebird will not commence a process intended to result in (or does result in) a Corporate Event until after delivery of the Call Option Triggering Event Notice to Celgene. For purposes of this Exhibit L, the " Call Option Period" means the period, if any, beginning on the date of termination of provisions set forth in Section 6.1 through 6.8 of the Agreement and, unless earlier terminated pursuant to Section 1.11 below, ending on the earliest to occur of: (i) expiration of the Initial Collaboration Term, unless Celgene has elected to extend the Initial Collaboration for the First Collaboration Program Extension pursuant to Section 2.1(d), and (ii) expiration of the First Collaboration Program Extension if Celgene has elected to extend the Initial Collaboration for the First Collaboration Program Extension pursuant to Section 2.1(d), even if Celgene has elected to extend the Collaboration Term for Second Collaboration Term Extension; provided that the Parties understand and agree that if the Call Option Period would otherwise terminate prior to the expiration of the applicable Call Option Exercise Period (as such Call Option Exercise Period may be extended by Bluebird from time to time) then the Call Option Period shall automatically be extended such that it shall expire on the same day as the expiration of the applicable Call Option Exercise Period (as such Call Option Exercise Period may be extended by Bluebird from time to time).

1.2 Exercise; Diligence Process. Celgene shall have the right, but not the obligation, to exercise the Call Option by delivery of written notice to Bluebird (the "Call Option Exercise Notice") at any time prior to the expiration of the Call Option Exercise Period. Upon request made by Celgene during the Call Option Exercise Period, Bluebird will use its commercially reasonable efforts to provide Celgene with reasonable access to such scientific, technical, clinical, manufacturing, regulatory and other information and such personnel, at reasonable times and on a reasonable number of occasions, as may be reasonably necessary for Celgene to determine its own internal estimate of the Call Option Exercise Price. For clarity, Bluebird shall be under no obligation to share with Celgene its own internal estimate of the Call Option Exercise Price, if any. If Celgene fails to exercise the Call Option by delivery of written notice to Bluebird or otherwise delivers written notice to Bluebird of its decision not to exercise the Call Option, in either case, prior to the expiration of the Call Option Exercise Period, then (a) the procedures specified in Section 1.6 below will automatically terminate

without any obligation on either Party to consummate the Call Option and (b) Bluebird shall be free to consummate a Corporate Event without any further obligation to Celgene under this Exhibit L, provided that, if a Corporate Event is not publicly announced within nine (9) months following the Call Option Triggering Event Notice described above, then, if during the remaining portion of the Call Option Period, a subsequent Call Option Triggering Event occurs, the procedures set forth in this Exhibit L will apply with respect to such subsequent Call Option Triggering Event.

1.3 Payment. If the Call Option has been exercised as of the expiration of the Call Option Exercise Period, then, effective as of the expiration of the Call Option Exercise Period, Celgene will be required to pay Bluebird at the Call Option Closing (defined below) an amount in cash equal to the Call Option Exercise Price determined in accordance with the procedures specified in Section 1.6 below which Call Option Exercise Price will be binding on both Parties (unless otherwise mutually agreed in accordance with Section 1.6(i)), subject only to the conditions and exceptions specified in Section 1.4 and Section 1.10 below. Subject to satisfaction of the conditions and exceptions specified in Section 1.4 and Section 1.10 below and final determination of the Call Option Exercise Price, Celgene will make such payment, and Bluebird will consummate the matters it is contemplated by this Exhibit L to perform on the date of such payment, all on the later of (a) the date of consummation of the applicable Corporate Event involving Bluebird (the " Other Closing"), and (b) ten (10) business days advance written notice by Bluebird to Celgene of such Other Closing (such later date, the " Call Option Closing").

1.4 Government Approvals. The Call Option Closing and all payment obligations of Celgene set forth in Section 1.3 shall be conditioned upon Receipt of Regulatory Approvals. As used herein, "Receipt of Regulatory Approvals" means that all regulatory approvals required to consummate the transactions contemplated by the Call Option Closing shall have been obtained and shall remain in full force and effect through the Call Option Closing and all statutory waiting periods applicable to the Call Option Closing shall have expired or been terminated. Except for any Non-Required Remedy (defined below), each of Celgene and Bluebird shall use its commercially reasonable good faith efforts to obtain all requisite consents of any court or government authority regarding the exercise of the Call Option, including, if required by federal or state antitrust authorities, promptly taking all steps to secure government antitrust clearance, including cooperating in good faith with any government investigation including the prompt production of documents and information demanded by a second request for documents and of witnesses if requested, to the same extent and in the same manner (including with respect to the payment by Celgene of all fees required to be paid to any government authority in connection with any HSR Filing) as provided in Section 5.9 of this Agreement with respect to any proposed Development & Commercialization Agreement, *mutatis mutandis*. In the event that the Parties make an HSR Filing under this Section 1.4, then the Call Option shall terminate (i) at the election of either Party, immediately upon notice to the other Party, in the event that the United States of America Federal Trade Commission or the United States of America Department of Justice obtains a preliminary injunction under the HSR Act against the Parties to enjoin the

transactions contemplated by this Exhibit L, or (ii) at the election of either Party, immediately upon written notice to the other Party, in the event that either the Call Option HSR Clearance Date or the Receipt of Regulatory Approvals shall not have occurred on or prior to one hundred twenty (120) days after the effective date of the HSR Filing (including expiration or termination of the applicable waiting period under the HSR Act or the inability to eliminate any Non-Required Remedy as part of any consent or approval). Notwithstanding anything to the contrary in this Agreement, in connection with the obligations contained in this Exhibit L, neither Party nor any of its respective Affiliates shall be required to sell, divest, hold separate, license or agree to any other structural or conduct remedy with respect to, any operations, divisions, businesses, product lines, customers, assets or relationships of such Party or any of its respective Affiliates (any such action, a "Non-Required Remedy").

1.5 Fully Paid-Up, Non-Terminable Exclusive Licenses; Expense Reimbursement. Upon effectiveness of the Call Option Closing, the Parties covenant and agree that the following shall apply:

a. This Agreement will terminate, provided that the provisions of Sections 12.4(a) and 12.4(c) will not apply with respect to such termination.

b. On the six-month anniversary of the Call Option Closing, each Co-Development, Co-Promote and Profit Share Agreement in effect at the time of the Call Option Closing will terminate (provided that, notwithstanding the foregoing, neither Party shall be responsible for any Profit & Loss Share payments that would otherwise have accrued from and after the Call Option Closing, the JGC and all subcommittees shall terminate as of the Call Option Closing and Celgene shall have sole discretion to make (and refrain from making) all decisions of the JGC and all subcommittees as of such date, and Bluebird shall have no further rights or obligations with respect to the performance of Development or Commercialization activities under the U.S. Development Plan or Worldwide Commercialization Plan), and, effective upon such termination, the Parties will enter into a License Agreement in the form attached hereto as Exhibit A with respect to the Optioned Candidate that was the subject of such Co-Development, Co-Promote and Profit Share Agreement, provided that (i) no royalties will be payable under Section 4.3 of the License Agreement and no Milestone Payments will be payable under Section 4.2 of the License Agreement, (ii) with respect to any In-License Payment that becomes due from and after the Call Option Closing, Celgene will reimburse Bluebird for one hundred percent (100%) of such payments within thirty (30) days of receipt of Bluebird's written invoice therefor, (iii) all recovery-sharing provisions in Section 5.2 and Section 7.2 shall terminate, other than with respect to the provisions of Section 7.2(e) regarding reimbursement of Bluebird, and any other Third Party licensees of Bluebird, on a *pro rata* basis for each of their out-of-pocket costs and expenses incurred as a result of cooperating with Celgene as reasonably requested by Celgene in connection with the action (provided that, for clarity, the rest of the provisions in Section 5.2 and Section 7.2 shall remain in full force and effect, including Bluebird's right to

indemnification and reimbursement of Patent Costs if joined as a party to any action controlled by Celgene under Section 7.2), (iv) all of the licenses granted to Celgene to Licensed IP thereunder will become fully-paid up other than as set forth in subjection (ii) above, (v) all of the licenses granted to Celgene to Licensed IP thereunder will become perpetual and non-terminable other than with respect Bluebird In-Licensed IP if, as a result of a breach by Celgene of its obligations under Section 2.8(c), the applicable Third Party licensor has the right to terminate an Applicable Bluebird In-License pursuant to which such Bluebird In-Licensed IP is licensed to Bluebird, (vi) all obligations of Celgene to commercialize any product will terminate, (vii) neither Celgene nor its Affiliates shall be subject to the exclusivity provision contained in Section 3.4, provided that if Celgene or its Affiliates are no longer pursuing the Development or Commercialization of the applicable Licensed Product (including any reasonable periods of customary delay), then the exclusivity provision contained in Section 3.4 shall no longer apply to Bluebird and its Affiliates (and Celgene will provide notice of same to Bluebird upon Bluebird's written request), and after such time Celgene will not have any enforcement rights under clause (viii) below with respect to activities under clause (iii) of such "Competitive Infringement" definition, (viii) Celgene will have the exclusive right to institute and prosecute all enforcement claims under Section 7.2 with respect to "Competitive Infringement" (as defined in Section 7.1) for which Celgene has the first right to institute such claims (provided that, for clarity, the rest of the provisions in Section 7.2 shall remain in full force and effect, including Bluebird's right to participate and be involved in any action controlled by Celgene under Section 7.2, but not a secondary right for Bluebird to institute any such enforcement claim with respect to Competitive Infringement), (ix) the technology transfer obligations under Section 2.3 of the License Agreement will include, but not be limited to, the obligation to transfer to Celgene complete and fully annotated Vector maps and sequences, including details of Payloads and any and all nucleic acid constructs, plasmids, cell lines and associated methodologies and production protocols, and (x) such License Agreement will be appropriately tailored to reflect the above. For clarity, and notwithstanding anything to the contrary herein, no license to Bluebird In-Licensed IP under any License Agreement described in this Section 1.5(b) shall be deemed to be fully-paid up, it being understood and agreed that in no event shall Celgene be relieved of any obligation to reimburse Bluebird for any In-License Payment within thirty (30) days of receipt of Bluebird's written invoice therefor or any obligation to provide Bluebird with written reports pursuant to Section 4.4 in order to confirm any such required payments.

c. The Parties will amend each License Agreement to provide that (i) no royalties will be payable under Section 4.3 of the License Agreement and no Milestone Payments will be payable under Section 4.2 of the License Agreement, (ii) with respect to any In-License Payment that becomes due from and after the Call Option Closing, Celgene will reimburse Bluebird for one hundred percent (100%) of such payments within thirty (30) days of receipt of Bluebird's written invoice therefor, (iii) all recovery-sharing provisions in Section 5.2 and Section 7.2 shall terminate, other than with respect to the provisions of Section 7.2(e) regarding reimbursement of Bluebird, and any other Third

Party licensees of Bluebird, on a *pro rata* basis for each of their out-of-pocket costs and expenses incurred as a result of cooperating with Celgene as reasonably requested by Celgene in connection with the action (provided that, for clarity, the rest of the provisions in Section 5.2 and Section 7.2 shall remain in full force and effect, including Bluebird's right to indemnification and reimbursement of Patent Costs if joined as a party to any action controlled by Celgene under Section 7.2), (iv) all of the licenses granted to Celgene to Licensed IP thereunder will become fully-paid up other than as set forth in subjection (ii) above, (v) all of the licenses granted to Celgene to Licensed IP thereunder will become perpetual and non-terminable other than with respect Bluebird In-Licensed IP if, as a result of a breach by Celgene of its obligations under Section 2.8(c), the applicable Third Party licensor has the right to terminate an Applicable Bluebird In-License pursuant to which such Bluebird In-Licensed IP is licensed to Bluebird, (vi) all obligations of Celgene to commercialize any product will terminate, (vii) neither Celgene nor its Affiliates shall be subject to the exclusivity provision contained in Section 3.4, provided that if Celgene or its Affiliates are no longer pursuing the Development or Commercialization of the applicable Licensed Product (including any reasonable periods of customary delay), then the exclusivity provision contained in Section 3.4 shall no longer apply to Bluebird and its Affiliates (and Celgene will provide notice of same to Bluebird upon Bluebird's written request), and after such time Celgene will not have any enforcement rights under clause (viii) below with respect to activities under clause (iii) of such "Competitive Infringement" definition, (viii) Celgene will have the exclusive right to institute and prosecute all enforcement claims under Section 7.2 with respect to "Competitive Infringement" (as defined in Section 7.1) for which Celgene has the first right to institute such claims (provided that, for clarity, the rest of the provisions in Section 7.2 shall remain in full force and effect, including Bluebird's right to participate and be involved in any action controlled by Celgene under Section 7.2, but not a secondary right for Bluebird to institute any such enforcement claim with respect to Competitive Infringement), (ix) the technology transfer obligations under Section 2.3 of the License Agreement will include, but not be limited to, the obligation to transfer to Celgene complete and fully annotated Vector maps and sequences, including details of Payloads and any and all nucleic acid constructs, plasmids, cell lines and associated methodologies and production protocols, and (x) such License Agreement will be appropriately tailored to reflect the above. For clarity, and notwithstanding anything to the contrary herein, no license to Bluebird In-Licensed IP under any License Agreement described in this Section 1.5(c) shall be deemed to be fully-paid up, it being understood and agreed that in no event shall Celgene be relieved of any obligation to reimburse Bluebird for any In-License Payment within thirty (30) days of receipt of Bluebird's written invoice therefor or any obligation to provide Bluebird with written reports pursuant to Section 4.4 in order to confirm any such required payments

d. The Parties will enter into a License Agreement in the form attached hereto as Exhibit A with respect to each IND Product Candidate, Declined Product Candidate and Pre-IND Product Candidate, provided that (i) no royalties will be payable under Section 4.3 of the License Agreement and no Milestone Payments will be payable under Section 4.2 of the

License Agreement, (ii) with respect to any In-License Payment that becomes due from and after the Call Option Closing, Celgene will reimburse Bluebird for one hundred percent (100%) of such payments within thirty (30) days of receipt of Bluebird's written invoice therefor, (iii) all recovery-sharing provisions in Section 5.2 and Section 7.2 shall terminate, other than with respect to the provisions of Section 7.2(e) regarding reimbursement of Bluebird, and any other Third Party licensees of Bluebird, on a *pro rata* basis for each of their out-of-pocket costs and expenses incurred as a result of cooperating with Celgene as reasonably requested by Celgene in connection with the action (provided that, for clarity, the rest of the provisions in Section 5.2 and Section 7.2 shall remain in full force and effect, including Bluebird's right to indemnification and reimbursement of Patent Costs if joined as a party to any action controlled by Celgene under Section 7.2), (iv) all of the licenses granted to Celgene to Licensed IP thereunder will become fully-paid up other than as set forth in subjection (ii) above, (v) all of the licenses granted to Celgene to Licensed IP thereunder will become perpetual and non-terminable other than with respect Bluebird In-Licensed IP if, as a result of a breach by Celgene of its obligations under Section 2.8(c), the applicable Third Party licensor has the right to terminate an Applicable Bluebird In-License pursuant to which such Bluebird In-Licensed IP is licensed to Bluebird, (vi) all obligations of Celgene to commercialize any product will terminate, (vii) neither Celgene nor its Affiliates shall be subject to the exclusivity provision contained in Section 3.4, provided that with respect to any Pre-IND Candidates any such exclusivity as applied to Bluebird and its Affiliates will be as provided in Section 12.4(c) of this Agreement, and provided further that if Celgene or its Affiliates are no longer pursuing the Development or Commercialization of the applicable Licensed Product (including any reasonable periods of customary delay), then the exclusivity provision contained in Section 3.4 shall no longer apply to Bluebird and its Affiliates (and Celgene will provide notice of same to Bluebird upon Bluebird's written request), and after such time Celgene will not have any enforcement rights under clause (viii) below with respect to activities under clause (iii) of such "Competitive Infringement" definition, (viii) Celgene will have the exclusive right to institute and prosecute all enforcement claims under Section 7.2 with respect to "Competitive Infringement" (as defined in Section 7.1) for which Celgene has the first right to institute such claims (provided that, for clarity, the rest of the provisions in Section 7.2 shall remain in full force and effect, including Bluebird's right to participate and be involved in any action controlled by Celgene under Section 7.2, but not a secondary right for Bluebird to institute any such enforcement claim with respect to Competitive Infringement), (ix) the technology transfer obligations under Section 2.3 of the License Agreement will include, but not be limited to, the obligation to transfer to Celgene complete and fully annotated Vector maps and sequences, including details of Payloads and any and all nucleic acid constructs, plasmids, cell lines and associated methodologies and production protocols, and (x) such License Agreement will be appropriately tailored to reflect the above. For clarity, and notwithstanding anything to the contrary herein, no license to Bluebird In-Licensed IP under any License Agreement described in this Section 1.5(d) shall be deemed to be fully-paid up, it being understood and agreed that in no event shall Celgene be relieved of any obligation to reimburse

Bluebird for any In-License Payment within thirty (30) days of receipt of Bluebird's written invoice therefor or any obligation to provide Bluebird with written reports pursuant to Section 4.4 in order to confirm any such required payments Celgene will reimburse Bluebird for all costs and expenses incurred by Bluebird in connection with transitioning clinical development responsibilities for such IND Product Candidates and Pre-IND Product Candidates from Bluebird to Celgene, within thirty (30) days of Celgene's receipt of an invoice and a reasonably detailed invoice of such costs and expenses from Bluebird therefore.

1.6 Process for Determination of Call Option Exercise Price . The determination of the Call Option Exercise Price (which determination shall be binding in the event Celgene exercises the Call Option as provided in Section 1.2 above unless otherwise mutually agreed in accordance with Section 1.6(i)) will be made in accordance with the following process:

a. A panel of three (3) independent third party firms each of which is either (i) a nationally-recognized investment banking firm or (ii) a nationally-recognized valuation firm (each a "Valuation Firm") will be selected by Bluebird and Celgene as promptly as practicable in accordance with the procedures set forth below, but in no event more than five (5) calendar days after Celgene's receipt of the Call Option Triggering Event Notice. The Parties will share equally in the costs of the Valuation Firms in this process (regardless of outcome).

b. Bluebird and Celgene will mutually appoint one Valuation Firm who (A) in the prior two (2) years has not had, does not have and does not anticipate having any material commercial or other business relationship with Bluebird or Celgene or any of their respective Affiliates and (B) with the respect to the lead representative in charge of such assignment contemplated by this Section 1 on behalf of such Valuation Firm (the "Valuation Manager"), such Valuation Manager has at least ten (10) years professional experience in the valuation of biopharmaceutical development programs as an investment banker, valuation expert or healthcare consultant (such experience referenced in this clause (B), the " Requisite Experience"), which Valuation Firm shall be proposed by Bluebird and approved by Celgene (which approval shall not be unreasonably withheld or delayed) (the "Bluebird Designee").

c. Celgene and Bluebird will mutually appoint one Valuation Firm who (A) in the prior two (2) years has not had, does not have and does not anticipate having any material commercial or other business relationship with Bluebird or Celgene or any of their respective Affiliates, and (B) with respect to the applicable Valuation Manager, such Valuation Manager has the Requisite Experience, which Valuation Firm shall be proposed by Celgene and approved by Bluebird (which approval shall not be unreasonably withheld or delayed) (the "Celgene Designee").

d. Celgene and Bluebird will mutually appoint a third Valuation Firm who (A) in the prior two (2) years has not had, does not have and does not anticipate having any material

commercial or other business relationship with Bluebird or Celgene or any of their respective Affiliates, and (B) with respect to the applicable Valuation Manager, such Valuation Manager has the Requisite Experience, which Valuation Firm must be mutually approved by both Bluebird and Celgene (which approval shall not be unreasonably withheld or delayed by either Party) (the "Final Designee").

e. The engagement of the Valuation Firms selected shall be limited to the determination of the Call Option Exercise Price. In determining the Call Option Exercise Price, the Valuation Firms shall render their judgment as to what an independent Third Party would pay to Bluebird to acquire its rights and assume its obligations (including the unilateral exclusivity afforded to Celgene under the agreements referenced above and the In-License Payments that become due and payable by Celgene from and after the Call Option Closing, but excluding the Target Antigen License and all other rights described in Section 1.8 below), including without limitation the right to receive future payments and perform obligations under any existing Co-Development, Co-Promote and Profit Share Agreement or License Agreement for Licensed Products (which shall take into account the rights and obligations associated solely with the co-promotion of Licensed Products by such independent Third Party and not any other products such Third Party may have the right to promote or sell) as well as for any IND Product Candidate, Declined Product Candidate or Pre-IND Product Candidate that is not the subject of an existing Co-Development, Co-Promote and Profit Share Agreement or License Agreement, as set forth in Section 1.5; it being understood that in no event will the Call Option Exercise Price include any value attributable to the Target Antigen License or other rights described in Section 1.8 below. Each of the Valuation Firms selected shall agree to complete the terms of its engagement within the time period prescribed hereunder. Each of Bluebird and Celgene shall provide reasonable access to its information and personnel, at reasonable times and on a reasonable number of occasions, to the Valuation Firms as may be reasonably necessary for the Valuation Firms to determine the Call Option Exercise Price, upon such Valuation Firm entering into a confidentiality agreement on terms reasonably satisfactory to the disclosing Party.

f. In the event that Celgene fails to exercise the Call Option by delivery of the Call Option Exercise Notice to Bluebird or otherwise delivers written notice to Bluebird of its decision not to exercise the Call Option, in either case, prior to the expiration of the Call Option Exercise Period, then the procedures specified in this Section 1.6 will automatically terminate, without any obligation on either Party to consummate the Call Option.

g. In the event that Celgene exercises the Call Option by delivery of the Call Option Exercise Notice to Bluebird prior to the expiration of the Call Option Exercise Period, then no later than the expiration of the Call Option Exercise Period, each Party will have the opportunity to provide the Valuation Firms, on a confidential basis, with a written memorandum (not to exceed [***] words), including supporting analysis and documentary evidence where appropriate, which such Party deems appropriate to assist

the Valuation Firms in determining the Call Option Exercise Price, provided that neither Party shall submit a proposed Call Option Exercise Price. Neither Party shall be entitled to review any such memorandum or supporting analysis and documentary evidence submitted by the other Party.

h. The Valuation Firms will have the right to meet with the Parties as necessary to inform the Valuation Firms' determination of the Call Option Exercise Price. Upon the expiration of the Valuation Period (the "Initial Valuation Determination Date"), each of the Bluebird Designee and the Celgene Designee will provide to both Parties their respective determinations of the Call Option Exercise Price. The final Call Option Price will be the average of these two amounts, unless one of the Call Option Prices submitted exceeds the other Call Option Price by [***] or more, in which case both Call Option Prices shall then be submitted to the Final Designee which Valuation Firm shall determine, no later than two (2) business days after the Initial Valuation Determination Date (the "Final Valuation Determination Date"), a final Call Option Price [***]. The final Option Price, as determined in accordance with the foregoing process, will be binding and enforceable on the Parties.

i. Notwithstanding any other provision of this Section 1.6, the Parties may at any time following Celgene's receipt of the Call Option Triggering Event Notice and during the valuation process but prior to the Initial Valuation Determination Date or the Final Valuation Date, as applicable, engage in negotiations to determine a mutually-satisfactory Call Option Exercise Price. In the event the Parties agree in writing as to the amount of the Call Option Exercise Price, the valuation process described in this Section 1.6 shall terminate and the Call Option Exercise Price shall be the amount agreed to in writing by the Parties which amount shall be binding and enforceable on the Parties.

1.7 Miscellaneous Provisions Relating to Exercise of the Call Option . In connection with the exercise and consummation of the Call Option as contemplated herein:

a. The Parties will take or cause to be taken all such actions as may be reasonably necessary or desirable in order to give effect to the actions described in this Exhibit L and any related transactions, including executing, acknowledging and delivering consents, assignments, waivers and other documents and instruments; furnishing information and copies of documents; filing applications, reports, returns, filings and other documents or instruments with governmental authorities; and otherwise cooperating with the other Party as applicable. For clarity, Bluebird covenants and agrees to transfer all of its rights to receive payments contemplated to be transferred to Celgene at the Call Option Closing free of all liens, charges and other encumbrances (and Bluebird shall be financially responsible for eliminating and satisfying all such liens, charges and encumbrances).

b. Except as otherwise expressly provided in this Exhibit L (including the requirement of Celgene to pay all fees required to be paid to any government authority in connection

with any HSR Filing as set forth in Section 1.4 above), each of the Parties will be responsible for its own costs and expenses incurred in connection with the transactions contemplated by this Exhibit L (whether or not consummated), including all attorneys' fees and charges, all accounting fees and charges and all investment banking fees, charges or commissions.

c. Any information disclosed to Celgene or Bluebird in accordance with this Exhibit L, including the information provided in accordance with Section 1.2 above, and the existence of a Call Option Triggering Event or the fact that discussions or negotiations are taking place concerning the Call Option, or any of the terms, conditions or other facts with respect thereto, or the outcome thereof, shall (i) be deemed to be the Confidential Information of the disclosing Party, (ii) be used by the recipient Party solely for purposes of evaluating and exercising its interest and obligations regarding the Call Option and the matters referred to in this Exhibit L and for no other purpose, and (iii) shall otherwise be subject to the restrictions on disclosure and exceptions thereto set forth in Section 10 of this Agreement.

1.8 Target Antigen License if Call Option Exercised Prior to Third Anniversary of the Effective Date . In the event that Celgene exercises the Call Option by delivering the Call Option Exercise Notice to Bluebird prior to the expiration of the applicable Call Option Exercise Period and prior to the third anniversary of the Effective Date of the Agreement, then upon the effectiveness of the Call Option Closing, if any, in addition to the consummation of the matters contemplated by Section 1.5 above in consideration of the payment required to be made as contemplated by Section 1.3 above, the Parties will also enter into a License Agreement in the form attached hereto as Exhibit A, modified as follows:

a. Bluebird will grant Celgene a perpetual, non-terminable, worldwide, exclusive (even as to Bluebird and its Affiliates) license, with the right to sublicense as permitted by Section 3.4 of such License Agreement, under Licensed IP to Develop and Commercialize Licensed Products in the Field, provided that such license will not be non-terminable with respect to Bluebird In-Licensed IP if, as a result of a breach by Celgene of its obligations under Section 2.8(c), the applicable Third Party licensor has the right to terminate an Applicable Bluebird In-License pursuant to which such Bluebird In-Licensed IP is licensed to Bluebird;

i. "Licensed IP" will be defined to mean Patents, Materials and Know-How Controlled by Bluebird or any of its Affiliates (including any applicable Collaboration IP and Bluebird Technology), including Bluebird In-Licensed IP, that are necessary or useful to Develop and Commercialize Licensed Products;

ii. "Licensed Products" will be defined to mean any and all therapeutic candidates in the Field; and

iii. "Target Antigens" will be defined to mean any and all oncology associated antigens, provided that from and after the third anniversary of the Effective Date of the Agreement, "Target Antigens" will be limited to the oncology associated antigens designated by Celgene in a written notice to Bluebird as those oncology associated antigens for which Celgene reasonably intends to Develop Licensed Products, which written notice will be delivered to Bluebird within thirty (30) days after the third anniversary of the Effective Date of the Agreement, provided further that from and after the fifth anniversary of the Effective Date of the Agreement, "Target Antigens" will be limited to the oncology associated antigens "in development" and identified as such by Celgene in a written notice to Bluebird, which written notice will be delivered to Bluebird within thirty (30) days after the fifth anniversary of the Effective Date of the Agreement. For purposes of this Section 1.8(a)(iii), an oncology associated antigen will be deemed "in development" when at least one in vitro assay of a chimeric antigen receptor (CAR) construct targeting such oncology associated antigen, or of a genetically modified T cell targeting such oncology associated antigen, has been initiated;

b. with respect to each Licensed Product, (i) Celgene will pay a royalty of [***] percent ([***]%) of worldwide Net Sales of such Licensed Product under Section 4.3(a) of the License Agreement (subject to the provisions of Sections 4.3(b)-(f)), and no other royalties will be payable under Section 4.3 of the License Agreement, (ii) Celgene will pay a milestone payment of [***] (U.S.$[***]) under Section 4.2 of the License Agreement upon the earlier of (A) Regulatory Approval of a BLA in the United States by the FDA for such Licensed Product or (B) Regulatory Approval of an MAA by the EMA for such Licensed Product, and no other milestone payments will be payable under Section 4.2 of the License Agreement (including for any Licensed Product that is approved for multiple indications), provided that it is further agreed that no milestone payment will be payable for any improved or modified version of a Licensed Product for which the [***] (U.S.$[***]) previously had been paid;

c. with respect to any In-License Payment that becomes due from and after the Call Option Closing, Celgene will reimburse Bluebird for one hundred percent (100%) of such payments within thirty (30) days of receipt of Bluebird's written invoice therefor;

d. all recovery-sharing provisions in Section 5.2 and Section 7.2 shall terminate, other than with respect to the provisions of Section 7.2(e) regarding reimbursement of Bluebird, and any other Third Party licensees of Bluebird, on a pro rata basis for each of their out-of-pocket costs and expenses incurred as a result of cooperating with Celgene as reasonably requested by Celgene in connection with the action (provided that, for clarity, the rest of the provisions in Section 5.2 and Section 7.2 shall remain in full force and effect, including Bluebird's right to indemnification and reimbursement of Patent Costs if joined as a party to any action controlled by Celgene under Section 7.2);

e. all obligations of Celgene to develop and/or commercialize any product will terminate, and Sections 2.6 (Annual Update Meetings), 2.7 (Reports by Celgene) and 2.8(b) (Maintenance of Celgene Licensed Product In-Licenses) will not apply;

f. Bluebird and its Affiliates will be subject to the exclusivity provision contained in Section 3.4 with respect to all Target Antigens and products that target the Target Antigens (removing the reference to Elected Candidates), provided that if, after five (5) years from the Effective Date, Celgene or its Affiliates are no longer pursuing the Development (it being understood that if a Licensed Product is "in development" (as defined in Section 1.8(a)(iii)), then Celgene will be deemed to be pursuing the Development of such Licensed Product) or Commercialization of the applicable Licensed Product (including any reasonable periods of customary delay), then the exclusivity provision contained in Section 3.4 shall no longer apply to Bluebird and its Affiliates with respect to such applicable Licensed Product and the Target Antigen targeted by such applicable Licensed Product (but only if Celgene is not pursuing the Development or Commercialization of other Licensed Products targeting such Target Antigen) (and Celgene will provide notice of same to Bluebird upon Bluebird's written request), and after such time Celgene will not have any enforcement rights under clause (g) below with respect to activities under clause (iii) of such "Competitive Infringement" definition, and neither Celgene nor its Affiliates shall be subject to the exclusivity provision contained in Section 3.4;

g. Celgene will have the exclusive right to institute and prosecute all enforcement claims under Section 7.2 with respect to "Competitive Infringement" (as defined in Section 7.1) for which Celgene has the first right to institute such claims (provided that, for clarity, the rest of the provisions in Section 7.2 shall remain in full force and effect, including Bluebird's right to participate and be involved in any action controlled by Celgene under Section 7.2, but not a secondary right for Bluebird to institute any such enforcement claim with respect to Competitive Infringement);

h. the technology transfer obligations under Section 2.3 of the License Agreement will include, but not be limited to, the obligation to transfer to Celgene complete and fully annotated Vector maps and sequences, including details of Payloads and any and all nucleic acid constructs, plasmids, cell lines and associated methodologies and production protocols;

i. such License Agreement will be appropriately tailored to reflect the above; and

j. For clarity, and notwithstanding anything to the contrary herein, no license to Bluebird In-Licensed IP under any License Agreement described in this Section 1.8 shall be deemed to be fully-paid up, it being understood and agreed that in no event shall Celgene be relieved of any obligation to reimburse Bluebird for any In-License Payment within thirty (30) days of receipt of Bluebird's written invoice therefor or any obligation to provide Bluebird with written reports pursuant to Section 4.4 in order to confirm any such required payments.

CERTAIN CONFIDENTIAL PORTIONS OF THIS EXHIBIT WERE OMITTED AND REPLACED WITH "[***]". A COMPLETE VERSION OF THIS EXHIBIT HAS BEEN FILED SEPARATELY WITH THE SECRETARY OF THE SECURITIES AND EXCHANGE COMMISSION PURSUANT TO AN APPLICATION REQUESTING CONFIDENTIAL TREATMENT PURSUANT TO RULE 406 PROMULGATED UNDER THE SECURITIES ACT OF 1933, AS AMENDED.

For avoidance of doubt, the License Agreement contemplated by this Section 1.8 is separate from any amended License Agreement executed pursuant to Section 1.5(c) above or License Agreement entered into pursuant to Sections 1.5(b) or 1.5(d) above, and the terms of this Section 1.8 shall not apply to any License Agreement amended pursuant to Section 1.5(c) above or entered into pursuant to Sections 1.5(b) or 1.5(d) above.

1.9 License Agreements. Further, with respect to any License Agreement amended pursuant to Section 1.5(c) above or entered into pursuant to Sections 1.5(b), 1.5(d) or 1.8(a) above, (i) Bluebird will have no obligation to continue the performance of any Phase 1 Study under Section 2.1 (a) of such License Agreement, (ii) Section 11.2(a) of such License Agreement will apply to the items listed therein based on the applicable Corporate Event, and (iii) the exclusivity restrictions in Section 3.4 of such License Agreement will continue to be subject to the exceptions set forth in such Section 3.4.

1.10 Expiration of Call Right Exercise. In the event that Celgene exercises the Call Option by delivery of written notice to Bluebird prior to the expiration of the Call Option Exercise Period and (1) Bluebird gives Celgene written notice that the applicable Call Option Triggering Event is no longer in effect or (2) a Corporate Event is not publicly announced within nine (9) months following the applicable Call Option Triggering Event Notice, then (a) the above-mentioned Call Option Exercise Notice shall be deemed rescinded, null and void, and (b) if during the remaining portion of the Call Option Period, a subsequent Call Option Triggering Event occurs, the procedures set forth in this Exhibit L will apply with respect to such subsequent Call Option Triggering Event.

1.11 Termination. Celgene's right to exercise the Call Option as set forth in this Exhibit L will terminate upon the earlier of:

a. the consummation of a Corporate Event unless a Call Option Exercise Notice has been timely delivered by Celgene in accordance with Section 1.2 following a Call Option Triggering Event, prior to the expiration or termination of the Call Option Exercise Period and prior to consummation of such Corporate Event, in which case Celgene's right to exercise the Call Option shall continue as contemplated by this Exhibit L (it being understood and agreed that, in the event of any failure by Bluebird to comply with the terms and conditions of Sections 1.1 and 1.2, Celgene's right to exercise the Call Option shall not terminate);

b. the expiration or termination of the Call Option Period unless a Call Option Exercise Notice has been timely delivered by Celgene in accordance with Section 1.2 following a Call Option Triggering Event and prior to the expiration or termination of the Call Option Exercise Period, in which case Celgene's right to exercise the Call Option shall continue as contemplated by this Exhibit L; and

c. the expiration or termination of this Agreement unless a Call Option Exercise Notice has been timely delivered by Celgene in accordance with Section 1.2 following a Call Option Triggering Event, prior to the expiration or termination of the Call Option Exercise Period and prior to the expiration or termination of this Agreement, in which case Celgene's right to exercise the Call Option shall continue as contemplated by this Exhibit L.

1.12 Attorneys' Fees. In any suit or proceeding between the Parties brought in accordance with Section 13.1 of the Agreement that relates to an allegation that a Party has breached its obligations under this Exhibit L in a manner that adversely affects the other Party's rights hereunder with respect to the exercise and execution of the Call Option, the prevailing Party will have the right to recover from the other Party its documented costs and reasonable fees and expenses of attorneys, accountants, and other professionals incurred in connection with the suit or proceeding. For clarity, this Section 1.12 will apply solely with respect to suits or proceedings relating to the exercise and execution of the Call Option, and does not apply with respect to any other suit or proceeding related to or arising out of (i) this Agreement, (ii) any Development & Commercialization Agreement, or (iii) any License Agreement entered into pursuant to Section 1.8 above, amended License Agreement executed pursuant to Section 1.5(c) above or License Agreement entered into pursuant to Sections 1.5(b) or 1.5(d) above.

1.13 Definitions. For purposes of this Exhibit L:

a. "Bluebird Call Option Triggering Event" means any determination by the board of directors of Bluebird to commence a process reasonably intended to result (or does then result) in a Corporate Event.

b. "Call Option" means (i) Celgene's right to acquire the licenses together with the other matters described in Section 1.5 in consideration of the payment by Celgene of the Call Option Exercise Price in accordance with the procedures described in this Exhibit L and (ii) if, and only if, the Call Option is exercised prior to the third anniversary of the Effective Date of the Agreement, Celgene's right to acquire the Target Antigen License together with the other matters described in Section 1.8 in consideration of the payment obligations set forth in Section 1.8 in accordance with the procedures described in this Exhibit L.

c. "Call Option Exercise Period" means the twelve (12) calendar day period following Celgene's receipt of the Call Option Triggering Event Notice, provided that Bluebird may extend the Call Option Exercise Period as follows: (i) in ten (10) day increments following the end of the then-existing "Call Option Exercise Period" by delivery of written notice to Celgene at any time prior to the fifth (5 th) day prior to the expiration of such Call Option Exercise Period (as it may be extended from time to time), and (ii) the extensions, when aggregated together, may not exceed 240 days in the aggregate. In the event the Call Option Exercise Period is extended as provided in the immediately

preceding sentence, the Valuation Period will also be extended for a like number of calendar days. In the event that the Call Option Exercise Period is scheduled to expire on a calendar day that is not a business day, then the Call Option Exercise Period shall automatically be extended until the next business day.

d. "Call Option HSR Clearance Date" means the earliest date on which the Parties have actual knowledge that all applicable waiting periods under the HSR Act with respect to the transactions contemplated by the Call Option have expired or have been terminated.

e. "Call Option Triggering Event" means (i) a Bluebird Call Option Triggering Event or (ii) a Third Party Call Option Triggering Event.

f. "Third Party Call Option Triggering Event" means (i) the receipt by Bluebird of a *bona fide* written offer by a Third Party with respect to a Corporate Event subsequent to which the board of directors of Bluebird determines, subject to compliance with this Agreement, to enter into negotiations with such Third Party with respect to such Corporate Event or (ii) the public announcement by a Third Party of an intention to effect a Corporate Event.

g. "Valuation Period" means the fifteen (15) calendar day period following Celgene's receipt of the Call Option Triggering Event Notice, subject to extension as set forth in Section 1.13(c) above, provided that Bluebird may further extend the Valuation Period by delivery of written notice to Celgene at any time prior to the expiration of the Valuation Period (as it may be extended from time to time) as and to the extent permitted by Section 1.13(c) above. In the event that the Valuation Period is scheduled to expire on a calendar day that is not a business day, then the Valuation Period shall automatically be extended until the next business day.