



UNITED STATES PATENT AND TRADEMARK OFFICE

UNDER SECRETARY OF COMMERCE FOR INTELLECTUAL PROPERTY AND
DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE

SEPTEMBER 14, 2017

PTAS

COOLEY LLP
1299 PENNSYLVANIA AVE NW, SUITE 700
ATTN: ALEX LEUZZI
WASHINGTON, DC 20004

504546482

UNITED STATES PATENT AND TRADEMARK OFFICE NOTICE OF RECORDATION OF ASSIGNMENT DOCUMENT

THE ENCLOSED DOCUMENT HAS BEEN RECORDED BY THE ASSIGNMENT RECORDATION BRANCH OF THE U.S. PATENT AND TRADEMARK OFFICE. A COMPLETE COPY IS AVAILABLE AT THE ASSIGNMENT SEARCH ROOM ON THE REEL AND FRAME NUMBER REFERENCED BELOW.

PLEASE REVIEW ALL INFORMATION CONTAINED ON THIS NOTICE. THE INFORMATION CONTAINED ON THIS RECORDATION NOTICE REFLECTS THE DATA PRESENT IN THE PATENT AND TRADEMARK ASSIGNMENT SYSTEM. IF YOU SHOULD FIND ANY ERRORS OR HAVE QUESTIONS CONCERNING THIS NOTICE, YOU MAY CONTACT THE ASSIGNMENT RECORDATION BRANCH AT 571-272-3350. PLEASE SEND REQUEST FOR CORRECTION TO: U.S. PATENT AND TRADEMARK OFFICE, MAIL STOP: ASSIGNMENT RECORDATION BRANCH, P.O. BOX 1450, ALEXANDRIA, VA 22313.

RECORDATION DATE: 09/13/2017

REEL/FRAME: 043580/0415
NUMBER OF PAGES: 8

BRIEF: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

DOCKET NUMBER: BLUE-079

ASSIGNOR:
QUIGLEY, TRAVIS

DOC DATE: 07/24/2017

ASSIGNOR:
ROSS, ROBERT

DOC DATE: 07/26/2017

ASSIGNEE:
BLUEBIRD BIO, INC.
60 BINNEY ST.
CAMBRIDGE, MASSACHUSETTS 02142

APPLICATION NUMBER: 62417840
PATENT NUMBER:
TITLE: ANTI-BCMA CAR T CELL COMPOSITIONS

FILING DATE: 11/04/2016
ISSUE DATE:

APPLICATION NUMBER: 62514401
PATENT NUMBER:
TITLE: ANTI-BCMA CAR T CELL COMPOSITIONS

FILING DATE: 06/02/2017
ISSUE DATE:

ASSIGNMENT RECORDATION BRANCH
PUBLIC RECORDS DIVISION

ASSIGNMENT

Travis QUIGLEY, residing at 49 Elm Court, Cohasset, MA 02025 and **Robert ROSS**, residing at 9 Somerset Road, Brookline MA 02445 (each referred to as "Assignor") have made an invention(s) (the "Invention(s)") set forth in an application for patent of the United States, entitled **ANTI-BCMA CAR T CELL COMPOSITIONS**, and which is a:

- (1) ☒ provisional application
 - (a) ☐ to be filed herewith; or
 - (b) ☒ bearing Application No. **62/417,840**, and filed on **November 4, 2016**;
- (2) ☒ provisional application
 - (a) ☐ to be filed herewith; or
 - (b) ☒ bearing Application No. **62/514,401**, and filed on June 02, 2017; and/or
- (3) ☐ PCT application
 - (a) ☐ bearing Application No. , and filed on .
- (4) ☐ a patent application bearing Serial No. , and filed on ;
and/or
- (5) ☐ attached hereto.

WHEREAS, bluebird bio, Inc., a corporation having its principal place of business at 60 Binney St., Cambridge, MA 02142 its successors, legal representatives and assigns, (the "Assignee"), is desirous of acquiring the entire right, title, and interest in: the Invention(s); the application(s) for patent identified above; the right to file applications for patent of the United States or other countries on the Invention(s); any application(s) for patent of the United States or other countries claiming priority to, and/or the benefit of, these applications; any provisional or other right to recover any and all past, present, and future damages, including royalties, for any and all past, present, and future infringements of these application(s); and any and all patent(s) of the United States or other countries that may be granted therefor or thereon.

NOW, THEREFORE, for good and sufficient consideration, the receipt of which is hereby acknowledged, and to the extent that the Assignor has not done so already via a prior agreement with the Assignee or a predecessor in interest of the Assignee, or if the Assignor has already done so via a prior agreement with the Assignee or a predecessor in interest of the Assignee then in confirmation of any obligation to do so in said prior agreement, the Assignor has sold, assigned, transferred, and set over, and by these presents does sell, assign, transfer, and set over, unto the Assignee, its successors, legal representatives, and assigns, the Assignor's entire right, title, and interest in:

(a) the Invention(s);

(b) the application(s) for patent identified above;

(c) the right to file applications for patent of the United States or other countries on the Invention(s), including all rights under the Hague Convention, the Paris Convention for the Protection of Industrial Property, and under the Patent Cooperation Treaty, and all rights of claiming priority in any country of the world;

(d) any application(s) for patent of the United States or other countries claiming the Invention(s);

(e) any application(s) for patent of the United States or other countries claiming priority to, and/or the benefit of, at least one of the application(s) for patent identified above or any application(s) for patent claiming the Invention(s), including any substitute application(s), division(s), continuation(s), and continuation(s)-in-part;

(f) any provisional or other right to recover any and all past, present, and future damages, including royalties, for any and all past, present, and future infringements of any application for patent identified in the preceding paragraphs (b)-(e) and of any and all patent(s) granted based thereon in the United States and in all other countries; and

(g) any patent(s) of the United States or other countries that may be granted for or on any application for patent identified in the preceding paragraphs (b)-(e), including any reissue(s), reexamination(s), revival(s), renewal(s) and extension(s) of said patent(s).

The above-granted rights, titles, and interests are to be held and enjoyed by the Assignee, for its own use and behalf and the use and behalf of its successors, legal representatives, and assigns, as fully and entirely as the same would have been held and enjoyed by the Assignor had this sale and assignment not been made.

The Assignor hereby represents to the Assignee, its successors, legal representatives, and assigns, that, at the time of execution and delivery of these presents, or if applicable, at such time said prior agreement was executed, the Assignor is a lawful owner of an undivided interest in the entire right, title, and interest in and to the Invention(s), that the Invention(s) are unencumbered, except, if applicable, by obligation to assign in accordance with said prior agreement, and that the Assignor has good and full right and lawful authority to sell and convey the same in the manner set forth herein, and that Assignor will not make or enter into any assignment, sale, agreement or encumbrance which would conflict with these presents.

The Assignor hereby covenants and agrees to and with the Assignee, its successors, legal representatives, and assigns, that the Assignor will sign all papers and

documents, take all lawful oaths, and do all acts necessary or required to be done in connection with any and all proceedings for the procurement, maintenance, enforcement and defense of the Invention(s), said application(s), and said patent(s), including interference and derivation proceedings, and any post-grant proceedings (e.g., opposition proceedings, post-grant reviews, *Inter partes* reviews, supplemental examinations, etc.) without charge to the Assignee, its successors, legal representatives, and assigns, but at the cost and expense of the Assignee, its successors, legal representatives, and assigns.

The Assignor hereby authorizes and requests the attorneys of COOLEY LLP to insert in the spaces provided above the filing date, the application number, and the attorney docket number of the application(s) identified above when known.

The Assignor hereby requests the Commissioner of Patents to issue said patents of the United States to the Assignee for the sole use and behalf of the Assignee, its successors, legal representatives, and assigns.

Date: 24 July 2017

By:



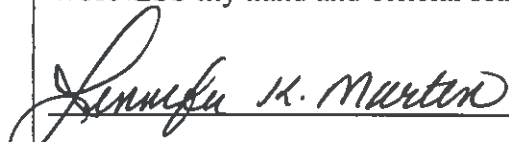
Travis QUIGLEY

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

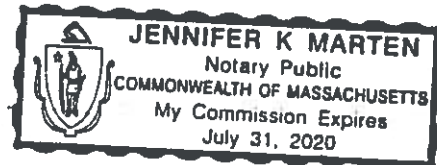
State of MASSACHUSETTS)
) ss.
County of SUFFOLK)

On JULY 24, 2017, before me, JENNIFER K. MARTEN,
Notary Public, personally appeared TRAVIS QUIGLEY,
who proved to me on the basis of satisfactory evidence, to be the person(s) whose
name(s) is/~~are~~-subscribed to the within instrument and acknowledged to me that
he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity(ies), and that by
his/~~her/their~~ signature(s) on the instrument the person(s), or the entity upon behalf of
which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.



Signature of Notary Public



Place Notary Seal Above

My Commission Expires: JULY 31, 2020

Attorney Docket No. BLBD-079/00US BLBD-079/01US

Date: 26 July 2017By: [Signature]

Robert ROSS

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

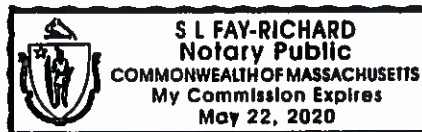
State of Massachusetts)
) ss.
County of Middlesex)

On 26th July, 2017, before me, Sandra Fay Richard,
Notary Public, personally appeared Robert W. Ross,
who proved to me on the basis of satisfactory evidence, to be the person(s) whose
name(s) is/are subscribed to the within instrument and acknowledged to me that
he/she/they executed the same in his/her/their authorized capacity(ies), and that by
his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of
which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

[Signature]

Signature of Notary Public



Place Notary Seal Above

My Commission Expires: 22 May 2020

For and on behalf of ASSIGNEE:

Date: July 31, 2017

By: Jason Cole
Name: Jason Cole
Title: Chief Legal Officer
Company: bluebird bio, Inc.

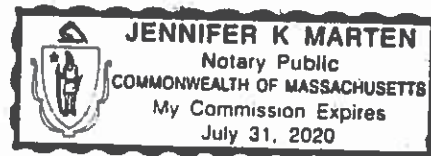
A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of MASSACHUSETTS)
) ss.
County of SUFFOLK)

On JULY 31, 2017, before me, JENNIFER K. MARTEN,
Notary Public, personally appeared JASON F. COLE,
who proved to me on the basis of satisfactory evidence, to be the person(s) whose
name(s) is/~~are~~ subscribed to the within instrument and acknowledged to me that
he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity(ies), and that by
his/~~her/their~~ signature(s) on the instrument the person(s), or the entity upon behalf of
which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Jennifer K. Marten
Signature of Notary Public



Place Notary Seal Above

My Commission Expires: JULY 31, 2020



UNITED STATES PATENT AND TRADEMARK OFFICE

UNDER SECRETARY OF COMMERCE FOR INTELLECTUAL PROPERTY AND
DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE

FEBRUARY 16, 2018

PTAS

COOLEY LLP
1299 PENNSYLVANIA AVE, NW, SUITE 700
ATTN: PATENT DEPT/LAWRENCE J. TEAGUE
WASHINGTON, DC 20004

504780700

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RECORDATION DATE: 02/15/2018

REEL/FRAME: 044947/0186
NUMBER OF PAGES: 7

BRIEF: ASSIGNMENT OF ASSIGNORS INTEREST (SEE DOCUMENT FOR DETAILS).

DOCKET NUMBER: BLBD-079/02WO 315698-2627

ASSIGNOR:

QUIGLEY, TRAVIS

DOC DATE: 02/14/2018

ASSIGNOR:

ROSS, ROBERT

DOC DATE: 02/14/2018

ASSIGNEE:

BLUEBIRD BIO, INC.
60 BINNEY STREET
CAMBRIDGE, MASSACHUSETTS 02142

APPLICATION NUMBER:

FILING DATE: 11/03/2017

PATENT NUMBER:

ISSUE DATE:

PCT NUMBER: US2017059989

TITLE: ANTI-BCMA CAR T CELL COMPOSITIONS

ASSIGNMENT RECORDATION BRANCH
PUBLIC RECORDS DIVISION

ASSIGNMENT

Travis QUIGLEY, residing at 49 Elm Court, Cohasset, Massachusetts 02025; and Robert ROSS, residing at 9 Somerset Road, Brookline, Massachusetts 02445 (each referred to as "Assignor") have made an invention(s) (the "Invention(s)") set forth in an application for patent entitled ANTI-BCMA CAR T CELL COMPOSITIONS, and which is a:

☒ PCT application

(a) ☒ bearing Application No. PCT/US2017/059989, and filed on November 03, 2017.

WHEREAS, bluebird bio, Inc., a corporation having its principal place of business at 60 Binney Street, Cambridge, Massachusetts 02142, its successors, legal representatives and assigns, (the "Assignee"), is desirous of acquiring the entire right, title, and interest in: the Invention(s); the application(s) for patent identified above; the right to file applications for patent of the United States or other countries on the Invention(s); any application(s) for patent of the United States or other countries claiming priority to, and/or the benefit of, these applications; any provisional or other right to recover any and all past, present, and future damages, including royalties, for any and all past, present, and future infringements of these application(s); and any and all patent(s) of the United States or other countries that may be granted therefor or thereon.

NOW, THEREFORE, for good and sufficient consideration, the receipt of which is hereby acknowledged, and to the extent that the Assignor has not done so already via a prior agreement with the Assignee or a predecessor in interest of the Assignee, or if the Assignor has already done so via a prior agreement with the Assignee or a predecessor in interest of the Assignee then in confirmation of any obligation to do so in said prior agreement, the Assignor has sold, assigned, transferred, and set over, and by these presents does sell, assign, transfer, and set over, unto the Assignee, its successors, legal representatives, and assigns, the Assignor's entire right, title, and interest in:

(a) the Invention(s);

(b) the application(s) for patent identified above;

(c) the right to file applications for patent of the United States or other countries on the Invention(s), including all rights under the Hague Convention, the Paris Convention for the Protection of Industrial Property, and under the Patent Cooperation Treaty, and all rights of claiming priority in any country of the world;

(d) any application(s) for patent of the United States or other countries claiming the Invention(s);

(e) any application(s) for patent of the United States or other countries claiming priority to, and/or the benefit of, at least one of the application(s) for patent identified above or any application(s) for patent claiming the Invention(s), including any priority application(s), substitute application(s), division(s), continuation(s), and continuation(s)-in-part;

(f) any provisional or other right to recover any and all past, present, and future damages, including royalties, for any and all past, present, and future infringements of any application for patent identified in the preceding paragraphs (b)-(e) and of any and all patent(s) granted based thereon in the United States and in all other countries; and

(g) any patent(s) of the United States or other countries that may be granted for or on any application for patent identified in the preceding paragraphs (b)-(e), including any reissue(s), reexamination(s), revival(s), renewal(s) and extension(s) of said patent(s).

The above-granted rights, titles, and interests are to be held and enjoyed by the Assignee, for its own use and behalf and the use and behalf of its successors, legal representatives, and assigns, as fully and entirely as the same would have been held and enjoyed by the Assignor had this sale and assignment not been made.

The Assignor hereby represents to the Assignee, its successors, legal representatives, and assigns, that, at the time of execution and delivery of these presents, or if applicable, at such time said prior agreement was executed, the Assignor is a lawful owner of an undivided interest in the entire right, title, and interest in and to the Invention(s), that the Invention(s) are unencumbered, except, if applicable, by obligation to assign in accordance with said prior agreement, and that the Assignor has good and full right and lawful authority to sell and convey the same in the manner set forth herein, and that Assignor will not make or enter into any assignment, sale, agreement or encumbrance which would conflict with these presents.

The Assignor hereby covenants and agrees to and with the Assignee, its successors, legal representatives, and assigns, that the Assignor will sign all papers and documents, take all lawful oaths, and do all acts necessary or required to be done in connection with any and all proceedings for the procurement, maintenance, enforcement and defense of the Invention(s), said application(s), and said patent(s), including interference and derivation proceedings, and any post-grant proceedings (e.g., opposition proceedings, post-grant reviews, *Inter partes* reviews, supplemental examinations, etc.) without charge to the Assignee, its successors, legal representatives, and assigns, but at the cost and expense of the Assignee, its successors, legal representatives, and assigns.

The Assignor hereby requests the Commissioner of Patents to issue said patents of the United States to the Assignee for the sole use and behalf of the Assignee, its successors, legal representatives, and assigns.

Date: 14 Feb. 2018

By: [Signature]
Travis Quigley

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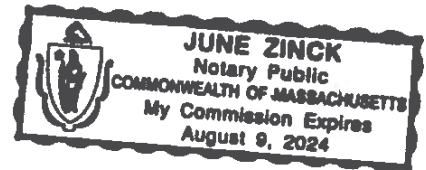
State of Massachusetts)
County of Suffolk) ss.

On Feb. 14 2018, before me, June Zinck, Notary Public, personally appeared Travis Quigley, who proved to me on the basis of satisfactory evidence, to be the person(s) whose name(s) is/~~are~~ subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity(~~ies~~), and that by his/~~her/their~~ signature(~~s~~) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

~~REQUIRED SENTENCE IF NOTARIZED IN CALIFORNIA: I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.~~

WITNESS my hand and official seal.

[Signature]
Signature of Notary Public



Place Notary Seal Above

My Commission Expires: August 9, 2024

Date: 14 Feb 2018

By: [Signature]
Robert Ross

A notary public or other officer completing this certificate verifies only the identity of the individual who signed the document to which this certificate is attached, and not the truthfulness, accuracy, or validity of that document.

State of Massachusetts)
County of Middlesex) ss.

On 14 Feb 2018, before me, S. L. Fay-Richard, Notary Public, personally appeared Robert Ross, who proved to me on the basis of satisfactory evidence, to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument. REQUIRED SENTENCE IF NOTARIZED IN CALIFORNIA: I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

[Signature]
Signature of Notary Public



Place Notary Seal Above

My Commission Expires: 22 May 2020

Date: Feb. 15, 2018

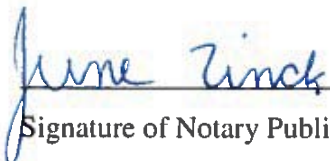
By: 
Name: Jason Cole
Title: Chief Legal Officer
Company: bluebird bio, Inc.

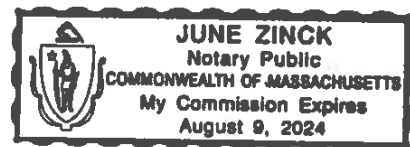
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State of Massachusetts)
County of Suffolk) ss.

On Feb. 15 2018, before me, JUNE ZINCK, Notary Public, personally appeared JASON COLE, who proved to me on the basis of satisfactory evidence, to be the person(s) whose name(s) is/~~are~~ subscribed to the within instrument and acknowledged to me that he/~~she/they~~ executed the same in his/~~her/their~~ authorized capacity(ies), and that by his/~~her/their~~ signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.


Signature of Notary Public



Place Notary Seal Above

My Commission Expires: August 9, 2024