PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1 Stylesheet Version v1.2

EPAS ID: PAT2601709

| SUBMISSION TYPE: | NEW ASSIGNMENT |
|-----------------------|----------------|
| NATURE OF CONVEYANCE: | ASSIGNMENT |

CONVEYING PARTY DATA

| Name | Execution Date |
|-----------------------------|----------------|
| LAVAL CHAN CHUN KONG | 10/21/2008 |
| SANJOY KUMAR DAS | 10/21/2008 |
| NGHE NGUYEN-BA | 10/21/2008 |
| LILIANE HALAB | 10/21/2008 |
| BETTINA HAMELIN | 10/13/2008 |
| OSWY Z. PEREIRA | 10/21/2008 |
| CARL POISSON | 10/21/2008 |
| MELANIE PROULX | 10/07/2008 |
| THUMKUNTA JAGADEESWAR REDDY | 10/23/2008 |
| MING-QIANG ZHANG | 10/09/2008 |

RECEIVING PARTY DATA

| Name: | SHIRE BIOCHEM INC. | |
|-------------------|-----------------------------|--|
| Street Address: | 2250 ALFRED-NOBEL BLVD. | |
| Internal Address: | SUITE 500 | |
| City: | VILLE SAINT-LAURENT, QUEBEC | |
| State/Country: | CANADA | |
| Postal Code: | HAS 2C9 | |

PROPERTY NUMBERS Total: 1

| Property Type | Number |
|---------------------|----------|
| Application Number: | 13690290 |

CORRESPONDENCE DATA

502556053

Fax Number:

Email: leslie_garbarczuk@vrtx.com

Correspondence will be sent via US Mail when the email attempt is unsuccessful.

Correspondent Name: VERTEX PHARMACEUTICALS INCORPORATED

Address Line 1: 130 WAVERLY STREET

PATENT

REEL: 031535 FRAME: 0750

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| Address Line 4: CAMBRIDGE, MASSACHUSETTS 02139 | | |
|---|---------------------|--|
| ATTORNEY DOCKET NUMBER: PHAR-135 US CN2 | | |
| NAME OF SUBMITTER: | LESLIE GARBARCZUK | |
| Signature: | /Leslie Garbarczuk/ | |
| Date: | 11/04/2013 | |
| Total Attachments: 4 source=PHAR 135 US CN2 Executed Assignt 2 Invs to Shire from Parent Case#page1 tif | | |

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ATTY. DOCKET NO.: VIRO-5

WHERBAS the below named inventor (if only one inventor is named below) or inventors (if plural inventors are named below) hereinafter referred to as the ASSIGNOR invented a certain improvement(s) relating to

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COMPOUNDS AND METHODS FOR THE TREATMENT OR PREVENTION OF FLAVIVIRUS INFECTIONS

for which an application for Letters Patent to be filed in the United States Patent and Trademark Office was executed on even date.

for which U.S. Application Serial No. 10/730,272 for Letters Patent was filed in the U.S. Patent and Trademark Office on December 9, 2003

for which an International Application was filed on as , designating the United States.

AND WHEREAS

Shire Biochem Inc.
2250 Alfred-Nobel Bivd., Suite 500
Ville Saint-Laurent, Quebec HAS 2C9
CANADA

hereinafter referred to as the ASSIGNEE, was the employer of the below named inventors at the time the invention was made and thus was entitled to the entire right, title, and interest in and to said invention and application(s), including any and all earlier priority rights (U.S. and foreign), divisions and continuations thereof, and any and all Letters Patent which may be granted thereon, including any and all renewals, reissues, reexaminations and extensions thereof.

NOW, WITNESSETTI that for good and valuable consideration, the receipt whereof is hereby acknowledged, ASSIGNOR hereby confirms that they have assigned, sold, and transferred to ASSIGNEE, its assigns and legal representatives; as of the date of the invention, which was prior to the filling of the listant application on December 9, 2003, the entire and exclusive right, title and interest in and to said invention, and application(s), including any and all divisions and continuations thereof, and any and all Letters Patent which may be granted therefor, including any and all renovals, reissues, reexaminations and extensions lifercof, and in and to any and all U.S. (including provisional) or foreign priority and/or convention rights or benefits according to to according to the filing or securing, of patents in the United States and/or any countries foreign thereto concerning said invention. SAID ASSIGNEE, its assigns and logal representatives to have, hold, exercise, and only said invention and application, including any and all carrier priority rights (U.S. and foreign), divisions and continuations thereof, and any and all Letters Patent which may be granted therefor, including any and all renovals, reissues, recyaminations and extensions thereof, with all the rights, powers, privileges and advantages in anywise arising from or appearabiling thereof, for and during the term or terms of any and all such Latters Patent whon granted, including any and all renovals, reissues, recyaminations and extensions discrete, for the use and benefit of ASSIGNOE and its assigns and legal representatives, in as ample and benefited a manner to all interies and purposes as the ASSIGNOR might or could have held and enjoyed the same, if the assignment had not been made.

AND ASSIGNOR hereby agrees to execute all papers that may be necessary to file applications in the United States and foreign countries for said invention and to assign the same to said ASSIGNEE, its assigns and legal representatives and to execute any other papers that may be needed in connection with filing said applications and securing Letters Patents thereon.

AND ASSIGNOR authorizes and requests the Commissioner of Patents and Tradomarks to issue a Letters Patent on said application, and on any and all divisions and continuations thereof, to ASSIGNEE, its assigns and legal representatives, in accordance herewith.

SOME SECTION AND AND ADDRESS OF THE PROPERTY O

The undersigned hereby grant(s) the law firm of Millen, White, Zelano & Branigan, P.C. the power to insert on this assignment any further identification which may be necessary or desirable in order to comply with the rules of the United States Patent and Trademark Office for recordation of this document.

IN TESTIMONY WHERBOF this assignment is executed by ASSIGNOR

| <u> </u> | | |
|---|------------------------|-------------------|
| 201 PULL NAME OF SOLB OR FIRST NAMED INVENTOR | INVENTOR'S SIGNATURE | DATU |
| Laval Chan Chun Kong | My | October 21, 2008 |
| 202 FULL NAME OF SECOND JOINT INVENTOR | INVENTOR'S SIGNATURE | , |
| Sanjoy Kumar Das | Saryon Kumar Das. | October 21-08 |
| 203 FULL NAME OF THIRD JOINT INVENTOR | inventor's signature | DATE |
| Nghe Nguyon-Ba | my | October 21-07 |
| 204 THIL NAME OF FOURTH JOINT INVENTOR | invritor's signature | DATE |
| Lilane Halab | Liliane Holab. | October 21, 2008 |
| 205 FULL NAME OF PIFTH JOINT INVENTOR | inventor's signature | DATE |
| Bettina Hamelin | | |
| 205" PULL NAME OF SIXTH JOINT INVENTOR | INVENTOR'S SIGNATURE . | DATE 1/2 |
| Oswy Z. Pereira | Lowy | Octobre 21-08. |
| 207 FULL NAME OF SEVENTH JOINT INVENTOR | INVENTOR'S SIGNATURE | DATE - |
| Carl Poisson | (al Passon | October 21, 700 8 |
| 208 FULL NAME OF EIGHTH JOINT INVENTOR | INVENTOR'S SIGNATURE | DATE - |
| Melanie Proulx | | |
| · 209 FULL NAME OF NINTH JOINT INVENTOR | INVENTOR'S SIGNATURE | DATE |
| Thumkunta Jagadeeswar Reddy | Lugh Stally | october 23,2008 |
| 210 FULL NAME OF TENTH JOINT INVENTOR | INVENTOR'S SIGNATURE | DATE |
| Ming-Qiang Zhang | | |

ATTY. DOCKET NO.: VIRO-5

WHEREAS the below named inventor (if only one inventor is named below) or inventors (if plural inventors are named below) hereinafter referred to as the ASSIGNOR invented a certain improvement(s) relating to

COMPOUNDS AND METHODS FOR THE TREATMENT OR PREVENTION OF FLAVIVIRUS INFECTIONS

for which an application for Letters Patent to be filed in the United States Patent and Trademark Office was executed on even date.

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for which an International Application was filed on as designating the United States.

AND WHEREAS

Shire Biochem Inc.
2250 Alfred-Nobel Blvd., Suite 500
Ville Saint-Laurent, Quebec HAS 2C9
CANADA

hereinafter referred to as the ASSIGNEE, was the employer of the below named inventors at the time the invention was made and thus was entitled to the entire right, title, and interest in and to said invention and application(s), including any and all earlier priority rights (U.S. and foreign), divisions and continuations thereof, and any and all Letters Patent which may be granted thereon, including any and all renewals, reissues, reexaminations and extensions thereof

NOW, WITNUSSETTI that for good and valuable consideration, the receipt whereof is hereby acknowledged, ASSIGNOR hereby confirms that they have assigned, sold, and transferred to ASSIGNER, its assigns and legal representatives, as of the date of the invention, which was prior to the filting of the instant application on December 9, 2003, the entire and exclusive right, lifte and interest in and to said invention, and application(s), including any and all divisions and continuations thereof, and any and all Letters Patent which may be granted therefor, including any, and all researching or to accumulate respect to the filling or securing of patents in the United States and/or any countries foreign thereto concerning said invention. SAID ASSIGNEE, its assigns and legal representatives to have, hold, exercise, and enjoy said invention and application, including any and all earlier priority rights (U.S. and foreign), divisions and continuations thereof, and any and all Letters Patent which may be granted therefor, including any and all renewals, reissues, recomminations and extensions thereof, with all the rights, powers, privileges and advantages in anywise arising from or appertaining thereof, for the use and benefit of ASSIGNEE and legal representatives, in as ample and all renewals, reissues, recomminations and extensions thereof, for the use and benefit of ASSIGNEE and its assigns and legal representatives, in as ample and benefit of assignment and purposes as the ASSIGNOR might or could have field and enjoyed the same, if the assignment had not been made.

AND ASSIGNOR hereby agrees to execute all papers that may be necessary to file applications in the United States and foreign countries for said invention and to assign the same to said ASSIGNEE, its assigns and legal representatives and to execute any other papers that may be needed in connection with filing said applications and securing Letters Patents thereon.

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IN TESTIMONY WHEREOF this assignment is executed by ASSIGNOR

| 201 FULL NAME OF SOLE OR FIRST NAMED INVENTOR | INVENTOR'S SIGNATURE | DATE |
|---|---------------------------|-----------|
| Laval Chan Chun Kong | · | •- |
| 202 FOLL NAME OF SECOND JOINT INVENTOR | INVENTOR'S SIGNATURE | DAYB |
| Sanjoy Kumar Das | | |
| 200 FULL NAME OF THIRD JOINT INVENTOR | INVENTOR'S SIGNATURE | DATE |
| Nghe Nguyen-Ba | | |
| 264 FULL NAME OF FOURTH JOINT INVENTOR | INVENTOR'S SIGNATURE | DATE |
| Lilane Halab | | |
| 203 FULL NAME OF FIFTH JOINT INVENTOR | 2010 INVENTOR'S HIGH AURE | DATE |
| Bettina Hamelin | \\ \Sttriced Wallel_ | 0413,2008 |
| 206 FULL NAME OF SIXTH JOINT INVENTOR | INVENTOR'S SIGNATURE | DATU |
| Oswy Z. Pereira | | |
| 207 FULL NAME OF SEVENTH JOINT INVENTOR | INVENTOR'S SIGNATURE | DATE |
| Carl Poisson | | |
| 208 FULL HAME OF EIGHTH JOINT INVENTOR | INVENTOR'S SIGNATURE | DATE |
| Melanie Proulx | | |
| 209 FULL HAME OF NINTH JOINT INVENTOR | INVENTOR'S SIGNATURE | DATE |
| Thumkunta Jagadeeswar Reddy | | |
| 210 FULL NAME OF TENTH JOINT INVENTOR | INVENTOR'S STONATURE | DATE |
| Ming-Qiang Zhang | | |

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Shire Biochem Inc. 2250 Alfred-Nobel Bivd.; Suite 500 Ville Saint-Laurent; Quebec HAS 209 CANADA

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NOW, WITNESSETH that for good and valuable consideration, the needs whereof is fixedy asprovioused. ASSIGNOR berely continue that they have aspect, sold, and transferred to ASSIGNER, its assigns and legal representatives, of at the date of the inventor, which was mire that they have assigned, sold, and transferred to ASSIGNER, its assigns and legal representatives of the date of the inventor, which was mire the filling of the instant application, on December 9, 2013, the antimous statement of the internal property of the continuations thereif, and any and all the series and all the series and all the continuations thereif, and any and all the instantian the filling previously all the property of the filling of securing of parents in the United States makes under one contents and any and all the property of the filling of securing of parents in the United States makes under one contents of the filling of securing of parents in the United States makes under one contents of the filling of securing of parents in the United States makes under one contents and inventor, 5A1D ASSIGNER, its assigns and legal representatives to have, hidd, exercise, and enjoy, and inventor and application, inclinations thereof, and any and all enters in the content and the parents of the content of the parents of the content of the parents of the parents of the content of the parents of the parents of the content of the parents of the content of the parents of the content of the parents of the parents of the content of the content of the parents of the content of the content of the parents of the content of th

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| 201 FULL NAME OF SOLD OR PIEST NAMED INVENTOR | INVENTOR'S STONATURE | DATE |
|---|-------------------------|-------------|
| Laval Chan Chun Kong | | |
| THE PART HAME OF SECOND YOUR INVENTOR | INVENTOR'S SIGNATURE | DATE |
| Sanjoy Kumar Das | | |
| 301 : FUIL HAME OF THIRD KINT INVENTOR | INVENTOR'S SONATURE | DATE |
| Nghe Nguyen-Ba | | |
| 204 FULL NAME OF FOURTH JOINT INVENTOR | HVENTOS SUDATURB | DATII |
| Lilano Halab | | e |
| 201: FULL NAME OF FETH JOINT INVENTOR | INVIDATOR'S SIGNATURE | UATE: |
| Bettina Hamelin | | |
| ANG FULL HAVE OF SIXTH JOINT INVENTOR | "Invantor's signaturii" | DATE |
| Oswy Z. Pereira | | |
| TUT: POLL NAME OF SEVENTH JOINT INVENTOR | INVENTOR'S SIGNATURE | DATE |
| Carl Poisson | | |
| TOU: FULL HAME OF EKHYTH JOINT INVENTOR. | INVENTOR'S SIGNATURE | DATE |
| Melanie Proulx | Molenetics | 4 OCT 2008 |
| 209 FILL NAME OF NINTH JOINT INVENTOR. | inventor's storaturit | DATE |
| Thumkunta Jagadeeswar Reddy | A | |
| 216 : PULC NAME OPTENTH IOINT INVENTOR: | INVENTOR'S SIGNATURE | DATE |
| Ming-Qiang Zhang | | 6.6.6.5.6.6 |

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| Ming-Qiang Zhang | | - 900ct 2008 |

REEL: 031535 FRAME: 0755

RECORDED: 11/04/2013