502599184 12/11/2013

PATENT ASSIGNMENT COVER SHEET

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EPAS ID: PAT2645489

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

CONVEYING PARTY DATA

| Name | Execution Date |
|---------------------|----------------|
| LAURA SERINO | 10/14/2009 |
| MARIA RITA FONTANA | 10/16/2009 |
| DANILO GOMES MORIEL | 10/14/2009 |

RECEIVING PARTY DATA

| Name: | NOVARTIS VACCINES & DIAGNOSTICS SRL | |
|-----------------|-------------------------------------|--|
| Street Address: | VIA FIORENTINA 1 | |
| City: | SIENA | |
| State/Country: | ITALY | |
| Postal Code: | 53100 | |

PROPERTY NUMBERS Total: 1

| Property Type | Number |
|---------------------|----------|
| Application Number: | 13384224 |

CORRESPONDENCE DATA

 Fax Number:
 (415)268-7522

 Phone:
 (415) 268-7000

 Email:
 lyadao@mofo.com

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

Correspondent Name: MORRISON & FOERSTER LLP

Address Line 1: 425 MARKET ST.

Address Line 4: SAN FRANCISCO, CALIFORNIA 94105

| ATTORNEY DOCKET NUMBER: | 529552004200 |
|-------------------------|---------------------|
| NAME OF SUBMITTER: | OTIS B. LITTLEFIELD |
| Signature: | /Otis Littlefield/ |
| Date: | 12/11/2013 |

Total Attachments: 1

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PATENT

REEL: 031763 FRAME: 0653

0.00 133842

Attorney Docket No.: 223003110100

ASSIGNMENT JOINT

THIS ASSIGNMENT, by Laura SERINO, Maria Rita FONTANA, and Danilo Gomes MORIEL (hereinafter referred to as the assignors), residing in Monticiano, Italy; Siena, Italy; and Monteriggioni, Italy; respectively, witnesseth:

WHEREAS, said assignors have invented cortain new and useful inventions in DETOXIFIED ESCHERICHIA COLI IMMUNOGENS, set forth in a provisional application in the United States Patent and Trademark Office, bearing application number 61/226,219 and filed on July 16, 2009; and

WHEREAS, Novartis Vaccines & Diagnostics Srl., a corporation duly organized under and pursuant to the laws of Italy and having its principal place of business at Via Fiorentina 1, 53100 Siena, Italy (hereinafter referred to as the assignee) is desirous of acquiring the entire right, title and interest in and to said inventions and said provisional application and any application for Letters Patent claiming priority thereto, and in and to any Letters Patent or Patents, United States or foreign, to be obtained therefor and thereon:

NOW, THEREFORE, for good and sufficient consideration, the receipt of which is hereby acknowledged, said assignors have sold, assigned, transferred and set over, and by these presents does sell, assign, transfer and set over, unto said assignee, its successors, legal representatives and assigns, the entire right, title and interest in and to the above-mentioned inventions, provisional patent application and application for Letters Patent, and any and all Letters Patent or Patents in the United States of America and all foreign countries which may be granted therefor and thereon, and in and to any and all conversions, divisions, continuations and continuations-in-part of said application, or reissues or extensions of said Letters Patent or Patents, and all rights under the International Convention for the Protection of Industrial Property, the same to be held and enjoyed by said assignee, for its own use and the use of its successors, legal representatives and assigns, to the full end of the term or terms for which Letters Patent or Patents may be granted, as fully and entirely as the same would have been held and enjoyed by the assignors, had this sale and assignment not been made.

AND for the same consideration, said assignors hereby covenant and agree to and with said assignee its successors, legal representatives and assigns, that, at the time of execution and delivery of these presents, said assignors are the sole and lawful owners of the entire right, title and interest in and to said inventions and the provisional patent application abovementioned, and that the same are unencumbered and that said assignors have good and full right and lawful authority to sell and convey the same in the manner herein set forth.

AND for the same consideration, said assignors hereby covenant and agree to and with said assignee, its successors, legal representatives and assigns, that said assignors will, whenever counsel of said assignee, or the counsel of its successors, legal representatives and assigns, shall advise that any proceeding in connection with said inventions, provisional patent application, or said application for Letters Patent, or any proceeding in connection with Letters Patent for said inventions in any country, including interference proceedings, is lawful and desirable, or that any division, commutation or continuation-in-part of any application for Letters Patent or any reissue or extension of any Letters Patent, to be obtained thereon, is lawful and desirable, sign all papers and documents, take all lawful ooths, and do all acts necessary or required to be done for the procurement, maintenance, enforcement and defense of Letters Patent for said inventions, without charge to said assignee, its successors, legal representatives and assigns, but at the cost and expense of said assignee, its successors, legal representatives and assigns.

AND said assignors hereby request the Commissioner of Patents to issue said Letters Patent of the United States to said assignee as the assignee of said inventions and the Letters Patent to be issued thereon for the sole use of said assignee, its successors, legal representatives and assigns.

Date

Laura SERINO

Laura SERINO

Maria Rita FONTANA

Li/OCI/2003

Date

Danilo Gomes MORIEL

sf-2746836

PATENT REEL: 031763 FRAME: 0654