

**PATENT COOPERATION TREATY**

**PCT**

**INTERNATIONAL SEARCH REPORT**

(PCT Article 18 and Rules 43 and 44)

|   |   |  |
|---|---|--|
| Applicant's or agent's file reference<br>P14552-02  | <b>FOR FURTHER<br/>ACTION</b>   | see Form PCT/ISA/220<br>as well as, where applicable, item 5 below.            |
| International application No.<br>PCT/US 2018/030624 | International filing date ( <i>day/month/year</i> )<br>02 May 2018 (02.05.2018) | (Earliest) Priority Date ( <i>day/month/year</i> )<br>02 May 2017 (02.05.2017) |
| Applicant<br>THE JOHNS HOPKINS UNIVERSITY           |   |  |

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 2 sheets.

It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

a. With regard to the **language**, the international search was carried out on the basis of:

the international application in the language in which it was filed.

a translation of the international application into \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

b.  This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6bis(a)).

c.  With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2.  **Certain claims were found unsearchable** (see Box No. II).

3.  **Unity of invention is lacking** (see Box No. III).

4. With regard to the **title**,

the text is approved as submitted by the applicant.

the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

the text is approved as submitted by the applicant.

the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

a. the figure of the drawings to be published with the abstract is Figure No. \_\_\_\_\_

as suggested by the applicant.

as selected by this Authority, because the applicant failed to suggest a figure.

as selected by this Authority, because this figure better characterizes the invention.

b.  none of the figures is to be published with the abstract.

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 2018/030624

| A. CLASSIFICATION OF SUBJECT MATTER   |   | <p style="text-align: center;"><i>A61L 27/14 (2006.01)</i><br/> <i>A61F 2/06 (2006.01)</i><br/> <i>B82Y 5/00 (2011.01)</i></p> <p>According to International Patent Classification (IPC) or to both national classification and IPC</p> |  |
|---|---|---|--|
| B. FIELDS SEARCHED  |   | Minimum documentation searched (classification system followed by classification symbols)   |  |
|   |   | A61L 27/00, 27/14, A61F 2/06, B82Y 5/00, C12N 5/00, 11/00   |  |
|   |   | Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched   |  |
|   |   | Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  |  |
|   |   | PatSearch (RUPTO internal), USPTO, PAJ, Esp@cenet, Information Retrieval System of FIPS   |  |
| C. DOCUMENTS CONSIDERED TO BE RELEVANT  |   |   |  |
| Category*   | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No.   |  |
| Y   | US 2014/0309726 A1 (UNIVERSITY OF PITTSBURGH - OF THE COMMONWEALTH SYSTEM OF HIGHER EDUCATION) 16.10.2014, abstract, paragraphs [0007]-[0008], [0011]-[0013], [0028], [0033], [0036]-[0039], [0046], [0062], claims 1-6, 8-11, 13, 15, 17-19, 21-25 | 1-17  |  |
| A   |   | 18  |  |
| Y   | US 2015/0118747 A1 (THE JOHNS HOPKINS UNIVERSITY) 30.04.2015, abstract, [0012]-[0014], [0018], [0022]-[0023], [0040], [0050]-[0051], claims 1-2   | 1-17  |  |
| Y   | US 2007/0269481 A1 (THE REGENTS OF THE UNIVERSITY OF CALIFORNIA) 22.11.2007, abstract, paragraphs [0005], [0010], [0111], [0196], [0214]-[0215]   | 1-17  |  |
| <input type="checkbox"/> Further documents are listed in the continuation of Box C.   |   | <input type="checkbox"/> See patent family annex.   |  |
| * Special categories of cited documents:  |   | "T"   | later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention  |
| "A" document defining the general state of the art which is not considered to be of particular relevance  |   | "X"   | document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone   |
| "E" earlier document but published on or after the international filing date  |   | "Y"   | document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art |
| "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)   |   | "&"   | document member of the same patent family  |
| "O" document referring to an oral disclosure, use, exhibition or other means  |   |   |  |
| "P" document published prior to the international filing date but later than the priority date claimed  |   |   |  |
| Date of the actual completion of the international search   | Date of mailing of the international search report  |   |  |
| 14 August 2018 (14.08.2018)   | 06 September 2018 (06.09.2018)  |   |  |
| Name and mailing address of the ISA/RU:<br>Federal Institute of Industrial Property,<br>Berezhkovskaya nab., 30-1, Moscow, G-59,<br>GSP-3, Russia, 125993<br>Facsimile No: (8-495) 531-63-18, (8-499) 243-33-37 | Authorized officer<br><br>E. Rozhkova<br><br>Telephone No. (495) 531-64-81  |   |  |