

## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

|                                                    |                                                                                                  |                                                                                    |
|----------------------------------------------------|--------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Applicant's or agent's file reference<br>PC072954A | <b>FOR FURTHER ACTION</b><br>see Form PCT/ISA/220<br>as well as, where applicable, item 5 below. |                                                                                    |
| International application No.<br>PCT/IB2024/051087 | International filing date ( <i>day/month/year</i> )<br>6 February 2024 (06-02-2024)              | (Earliest) Priority Date ( <i>day/month/year</i> )<br>9 February 2023 (09-02-2023) |
| Applicant<br><br>PFIZER INC.                       |                                                                                                  |                                                                                    |

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 5 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. 14  
☒ 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/IB2024/051087

### Box No. I Nucleotide and/or amino acid sequence(s) (Continuation of item 1.c of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of a sequence listing:
  - a. ☒ forming part of the international application as filed.
  - b. ☐ furnished subsequent to the international filing date for the purposes of international search (Rule 13*ter*.1(a)).

☐ accompanied by a statement to the effect that the sequence listing does not go beyond the disclosure in the international application as filed.
2. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, this report has been established to the extent that a meaningful search could be carried out without a WIPO Standard ST.26 compliant sequence listing.
3. Additional comments:

## INTERNATIONAL SEARCH REPORT

International application No  
PCT/IB2024/051087

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                             |                                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| <b>A. CLASSIFICATION OF SUBJECT MATTER</b><br>INV. <b>A61K39/12 A61K39/145 A61P31/16 C07K14/005 C12N15/86</b><br>ADD.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                             |                                                                         |
| According to International Patent Classification (IPC) or to both national classification and IPC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                             |                                                                         |
| <b>B. FIELDS SEARCHED</b><br>Minimum documentation searched (classification system followed by classification symbols)<br><b>A61K A61P C07K C12N</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                             |                                                                         |
| 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)<br><b>EPO-Internal, WPI Data, BIOSIS, EMBASE</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                             |                                                                         |
| <b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                             |                                                                         |
| Category*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Citation of document, with indication, where appropriate, of the relevant passages                                                                                                                                                                                                                          | Relevant to claim No.                                                   |
| <b>X</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>WO 2020/035609 A2 (GLAXOSMITHKLINE BIOLOGICALS SA [BE])</b><br><b>20 February 2020 (2020-02-20)</b>                                                                                                                                                                                                      | <b>1-9,</b><br><b>15-19</b>                                             |
| <b>Y</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>examples 1-5</b><br>-----                                                                                                                                                                                                                                                                                | <b>10-14</b>                                                            |
| <b>X</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>DILETTA MAGINI ET AL: "Self-Amplifying mRNA Vaccines Expressing Multiple Conserved Influenza Antigens Confer Protection against Homologous and Heterosubtypic Viral Challenge", PLOS ONE, vol. 11, no. 8, 1 January 2016 (2016-01-01), page e0161193, XP055397457, DOI: 10.1371/journal.pone.0161193</b> | <b>1-9,</b><br><b>15-19</b>                                             |
| <b>Y</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>abstract</b><br><b>figure 1</b><br>-----<br>-/-                                                                                                                                                                                                                                                          | <b>10-14</b>                                                            |
| <input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                             |                                                                         |
| <p>* Special categories of cited documents :</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"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</p> <p>"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</p> <p>"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</p> <p>"&amp;" document member of the same patent family</p> |                                                                                                                                                                                                                                                                                                             |                                                                         |
| Date of the actual completion of the international search<br><b>28 March 2024</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                             | Date of mailing of the international search report<br><b>19/04/2024</b> |
| Name and mailing address of the ISA/<br>European Patent Office, P.B. 5818 Patentlaan 2<br>NL - 2280 HV Rijswijk<br>Tel. (+31-70) 340-2040,<br>Fax: (+31-70) 340-3016                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                             | Authorized officer<br><b>Irion, Andrea</b>                              |

## INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2024/051087

| C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT |                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |
|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Category*                                            | Citation of document, with indication, where appropriate, of the relevant passages                                                                                                                                                                                                                                                                                                                                                                                   | Relevant to claim No. |
| X                                                    | WO 2022/118226 A1 (SEQIRUS INC [US])<br>9 June 2022 (2022-06-09)                                                                                                                                                                                                                                                                                                                                                                                                     | 1-9,<br>15-19         |
| Y                                                    | page 91, lines 5-29<br>examples 3, 7, 9<br>figure 6<br>tables 9-12                                                                                                                                                                                                                                                                                                                                                                                                   | 10-14                 |
| Y                                                    | -----<br>LIU YI ET AL: "Messenger RNA translation enhancement by immune evasion proteins: a comparative study between EKB (vaccinia virus) and NS1 (influenza A virus)", SCIENTIFIC REPORTS, vol. 9, no. 1, 1 December 2019 (2019-12-01), page 11972, XP055907045, DOI: 10.1038/s41598-019-48559-6 Retrieved from the Internet: URL:https://www.nature.com/articles/s41598-019-48559-6.pdf> abstract page 1, paragraph 3                                             | 10-14                 |
| X                                                    | -----<br>CHANG CHENG ET AL: "Self-amplifying mRNA bicistronic influenza vaccines raise cross-reactive immune responses in mice and prevent infection in ferrets", MOLECULAR THERAPY- METHODS & CLINICAL DEVELOPMENT, vol. 27, 3 October 2022 (2022-10-03), pages 195-205, XP093088987, GB ISSN: 2329-0501, DOI: 10.1016/j.omtm.2022.09.013 Retrieved from the Internet: URL:https://www.cell.com/molecular-therapy-family/methods/pdfExtended/S2329-0501(22)00138-3> | 1-9,<br>15-19         |
| Y                                                    | the whole document                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 10-14                 |
| X,P                                                  | -----<br>WO 2024/013625 A1 (PFIZER [US])<br>18 January 2024 (2024-01-18)                                                                                                                                                                                                                                                                                                                                                                                             | 1-9,<br>15-19         |
| Y,P                                                  | the whole document                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 10-14                 |
|                                                      | -----                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                       |

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2024/051087

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s)                                                                                                                                         | Publication<br>date                                                                                                        |
|-------------------------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| WO 2020035609 A2                          | 20-02-2020          | AU 2019321186 A1<br>CA 3109165 A1<br>CN 113164584 A<br>EP 3836963 A2<br>JP 2021534182 A<br>US 2021252133 A1<br>WO 2020035609 A2                                    | 18-02-2021<br>20-02-2020<br>23-07-2021<br>23-06-2021<br>09-12-2021<br>19-08-2021<br>20-02-2020                             |
| WO 2022118226 A1                          | 09-06-2022          | AU 2021392077 A1<br>CA 3199996 A1<br>CN 117222415 A<br>EP 4255446 A1<br>IL 303315 A<br>JP 2023551982 A<br>KR 20230120646 A<br>US 2024024455 A1<br>WO 2022118226 A1 | 13-07-2023<br>09-06-2022<br>12-12-2023<br>11-10-2023<br>01-07-2023<br>13-12-2023<br>17-08-2023<br>25-01-2024<br>09-06-2022 |
| WO 2024013625 A1                          | 18-01-2024          | US 2024009296 A1<br>WO 2024013625 A1                                                                                                                               | 11-01-2024<br>18-01-2024                                                                                                   |