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Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(88) Date of publication of the international search report:

8 January 2015

(54) Title: CHARGE-ENGINEERED ANTIBODIES OR COMPOSITIONS OF PENETRATION-ENHANCED TARGETING PROTEINS AND METHODS OF USE

(57) Abstract: The disclosure relates to charge-engineered antibodies and penetration-enhanced targeted proteins and their uses for therapeutic treatment or therapeutics delivery.



WO 2014/145159 A3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/029875

A. CLASSIFICATION OF SUBJECT MATTER

C07K 19/00 (2006.01) C07K 14/00 (2006.01) C07K 16/00 (2006.01) C07K 16/18 (2006.01) C07K 16/44 (2006.01)
C07K 16/28 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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)

MEDLINE, HCA, BIOSIS, GENOMEQUEST, WPI, EPODOC (antibody, charge engineered, isoelectric point, cation, charge variant, S. Bowdish, J. Huston, E. Vogan, H. Cooke, J. Ross, K. Lin)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|--|-----------------------|
| | Documents are listed in the continuation of Box C | |



Further documents are listed in the continuation of Box C



See patent family annex

| | | |
|---|--|--|
| * Special categories of cited documents: | | |
| "A" document defining the general state of the art which is not considered to be of particular relevance | "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 | |
| "E" earlier application or patent but published on or after the international filing date | "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 | |
| "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) | "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 | |
| "O" document referring to an oral disclosure, use, exhibition or other means | "&" document member of the same patent family | |
| "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
3 November 2014Date of mailing of the international search report
03 November 2014

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| INTERNATIONAL SEARCH REPORT | | International application No. |
|---|--|---|
| C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT | | PCT/US2014/029875 |
| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| X | WO 2013/016714 A1 (SEA LANE BIOTECHNOLOGIES) 30 January 2013 (see 0175, claims 1-2, 8, 21-22, 39, 44, 52-60) | 2-32, 39-81, 86-89, 238-282 285, 349 |
| A | WO 2012/020096 A1 (MEDIMMUNE LIMITED) 16 February 2012 (see whole document) | |
| A | Hong, G. ET AL. "Enhanced cellular uptake and transport of polyclonal immunoglobulin G and fab after their cationization" J Drug Target. 2000. Vol. 8, No. 2, pages 67-77. (see whole document) | |
| A | WO 1991/013631 A1 (THE REGENTS OF THE UNIVERSITY OF CALIFORNIA) 19 September 1991 (see whole document) | |

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
the subject matter listed in Rule 39 on which, under Article 17(2)(a)(i), an international search is not required to be carried out, including
2. Claims Nos.: **238**
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
See Supplemental Box
3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

Supplemental Box**Continuation of Box II**

The claim does not comply with Rule 6.2(a) because it relies on references to the description and/or drawings.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2014/029875

This Annex lists known patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

| Patent Document/s Cited in Search Report | | Patent Family Member/s | |
|---|-------------------------|-------------------------------|-------------------------|
| Publication Number | Publication Date | Publication Number | Publication Date |
| WO 2013/016714 A1 | 30 January 2013 | CA 2842860 A1 | 31 Jan 2013 |
| | | EP 2736928 A1 | 04 Jun 2014 |
| | | US 2014308287 A1 | 16 Oct 2014 |
| WO 2012/020096 A1 | 16 February 2012 | AU 2011288412 A1 | 21 Feb 2013 |
| | | CA 2808154 A1 | 16 Feb 2012 |
| | | EP 2603526 A1 | 19 Jun 2013 |
| | | JP 2013537416 A | 03 Oct 2013 |
| | | US 2013177555 A1 | 11 Jul 2013 |
| WO 1991/013631 A1 | 19 September 1991 | CA 2077670 A1 | 07 Sep 1991 |
| | | EP 0518982 A1 | 23 Dec 1992 |
| | | JP H05505606 A | 19 Aug 1993 |
| | | JP 3210662 B2 | 17 Sep 2001 |
| | | US 5130129 A | 14 Jul 1992 |

End of Annex

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

Form PCT/ISA/210 (Family Annex)(July 2009)