

(10) International Publication Number
WO 2015/017146 A3(43) International Publication Date
5 February 2015 (05.02.2015)

(51) International Patent Classification:

C07K 16/00 (2006.01) C07K 19/00 (2006.01)
C07K 16/10 (2006.01)

(21) International Application Number:

PCT/US2014/047287

(22) International Filing Date:

18 July 2014 (18.07.2014)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/847,971 18 July 2013 (18.07.2013) US

(71) Applicant: **FABRUS, INC.** [US/US]; 11099 North Torrey Pines Road, Suite 230, La Jolla, CA 92037 (US).(72) Inventors: **DE LOS RIOS, Miguel**; 11099 North Torrey Pines Road, Suite 230, La Jolla, CA 92037 (US). **BAZIRGAN, Omar**; 11099 North Torrey Pines Road, Suite 230, La Jolla, CA 92037 (US).(74) Agents: **MCNICHOLAS, Janet, M.** et al.; Jones Day, 222 East 41st. Street, New York, NY 10017-6702 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,

HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

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))
- with sequence listing part of description (Rule 5.2(a))

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

1 October 2015

(15) Information about Correction:

[Continued on next page]

(54) Title: ANTIBODIES WITH ULTRALONG COMPLEMENTARITY DETERMINING REGIONS

Figure 1

BLV1H12	CTTVHQ	ETTKYQ	SCDGYVFRSFGSNAPAGSTSDSCSVSVFKNCLTLVSYSTNYEN	HVDVMSQGLLVTVSS (SEQ ID NO : 360)
BLV5B8	CTTVHQ	ETTKYQ	SCDGYVFRSFGSNAPAGSTSDSCSVSVFKNCLTLVSYSTNYEN	HVDVMSQGLLVTVSS (SEQ ID NO : 361)
BLV5D3	CTTVHQ	ETTKYQ	SCDGYVFRSFGSNAPAGSTSDSCSVSVFKNCLTLVSYSTNYEN	HVDVMSQGLLVTVSS (SEQ ID NO : 362)
BLV8C11	CTTVHQ	ETTKYQ	SCDGYVFRSFGSNAPAGSTSDSCSVSVFKNCLTLVSYSTNYEN	HVDVMSQGLLVTVSS (SEQ ID NO : 363)
BF4B3	CTTVHQ	ETTKYQ	SCDGYVFRSFGSNAPAGSTSDSCSVSVFKNCLTLVSYSTNYEN	HVDVMSQGLLVTVSS (SEQ ID NO : 364)
BF1H1	CTTVHQ	ETTKYQ	SCDGYVFRSFGSNAPAGSTSDSCSVSVFKNCLTLVSYSTNYEN	HVDVMSQGLLVTVSS (SEQ ID NO : 365)
BF1B	CTTVHQ	ETTKYQ	SCDGYVFRSFGSNAPAGSTSDSCSVSVFKNCLTLVSYSTNYEN	HVDVMSQGLLVTVSS (SEQ ID NO : 366)

(57) Abstract: The present disclosure provides antibodies, including antibodies comprising ultralong CDR3 and uses thereof.

Previous Correction:
see Notice of 9 April 2015

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2014/047287

A. CLASSIFICATION OF SUBJECT MATTER
INV. C07K16/00 C07K16/10 C07K19/00
ADD.

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)
C07K

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)

EP0-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	Hosts: "Unusual Antibodies in Cows Suggest New Ways to Make Medicines for People 16. Non-Invasive First Trimester Blood Test Reliably Detects Down's Syndrome and Other Genetic Fetal Abnormalities 17. Wolbachia Bacteria Evolved to Infect Stem Cell Niches Through Successive Generations of Their", How AIDS Invented Global Health, 1 June 2013 (2013-06-01), XP055190572, Retrieved from the Internet: URL:http://uhaweb.hartford.edu/bugl/Updates/EA-June-2013.pdf [retrieved on 2015-05-20] page 12 - page 14 ----- -/--	1,11,13, 21,22, 28-30, 36-71



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

"E" earlier application or patent but published on or after the international filing date

"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)

"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

"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

"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

"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

"&" document member of the same patent family

Date of the actual completion of the international search

20 May 2015

Date of mailing of the international search report

19/08/2015

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Fellows, Edward

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2014/047287

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	BRYAN S. BRINEY ET AL: "Human Peripheral Blood Antibodies with Long HCDR3s Are Established Primarily at Original Recombination Using a Limited Subset of Germline Genes", PLOS ONE, vol. 7, no. 5, 1 January 2012 (2012-01-01) , page e36750, XP055048579, ISSN: 1932-6203, DOI: 10.1371/journal.pone.0036750 page 1, right-hand column -----	1,11,13, 21,22, 28-30, 36-71
A	FENG WANG ET AL: "Reshaping Antibody Diversity", CELL, vol. 153, no. 6, 1 June 2013 (2013-06-01), pages 1379-1393, XP055169986, ISSN: 0092-8674, DOI: 10.1016/j.cell.2013.04.049 the whole document -----	1,11,13, 21,22, 28-30, 36-71

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/047287

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:
2. ☐ Claims Nos.:
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:
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:

see additional sheet

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 an 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.:

1, 11, 13, 21, 22, 28-30, 36-71(all partially)

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.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1, 11, 13, 21, 22, 28-30, 36-71(all partially)

An antibody heavy chain comprising a sequence of the formula V1-X-V2 wherein V1 is SEQ ID No. 496; X is an ultra long CDR3 and V2 is SEQ ID No. 570 and related subject-matter.

2. claims: 1, 11, 13, 21, 22, 28-30, 36-71(all partially)

An antibody heavy chain comprising a sequence of the formula V1-X-V2 wherein V1 is SEQ ID No. 497; X is an ultra long CDR3 and V2 is SEQ ID No. 571 and related subject-matter.

3. claims: 1, 11, 13, 21, 22, 28-30, 36-71(all partially)

An antibody heavy chain comprising a sequence of the formula V1-X-V2 wherein V1 is SEQ ID No. 498; X is an ultra long CDR3 and V2 is SEQ ID No. 572 and related subject-matter.

4. claims: 1, 11, 13, 21, 22, 28-30, 36-71(all partially)

An antibody heavy chain comprising a sequence of the formula V1-X-V2 wherein V1 is SEQ ID No. 499; X is an ultra long CDR3 and V2 is SEQ ID No. 573 and related subject-matter.

5. claims: 1, 11, 13, 21, 22, 28-30, 36-71(all partially)

An antibody heavy chain comprising a sequence of the formula V1-X-V2 wherein V1 is SEQ ID No. 500; X is an ultra long CDR3 and V2 is SEQ ID No. 574 and related subject-matter.

6. claims: 2, 10, 11, 13, 19-22, 28-30, 36-50(all partially)

An antibody heavy chain comprising a sequence of the formula V1-X-V2 wherein V1 is SEQ ID No. 496; X is any sequence of (i) of claim 2 and V2 is SEQ ID No. 570 and related subject-matter.

7. claims: 2, 11, 13, 19-22, 28-30, 36-50(all partially)

An antibody heavy chain comprising a sequence of the formula V1-X-V2 wherein V1 is SEQ ID No. 497; X is any sequence of (ii) of claim 2 and V2 is SEQ ID No. 571 and related subject-matter.

8. claims: 2, 11, 13, 19-22, 28-30, 36-50(all partially)

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

An antibody heavy chain comprising a sequence of the formula V1-X-V2 wherein V1 is SEQ ID No. 498; X is any sequence of (iii) of claim 2 and V2 is SEQ ID No. 572 and related subject-matter.

9. claims: 2, 10, 11, 13, 19-22, 28-30, 36-50(all partially)

An antibody heavy chain comprising a sequence of the formula V1-X-V2 wherein V1 is SEQ ID No. 499; X is any sequence of (iv) of claim 2 and V2 is SEQ ID No. 573 and related subject-matter.

10. claims: 2, 10, 11, 13, 19-22, 28-30, 36-50(all partially)

An antibody heavy chain comprising a sequence of the formula V1-X-V2 wherein V1 is SEQ ID No. 500; X is any sequence of (v) of claim 2 and V2 is SEQ ID No. 574 and related subject-matter.

11. claims: 3, 10, 11, 13, 19-22, 28-30, 36-50(all partially)

An antibody heavy chain comprising a sequence of the formula V1-X-V2 wherein V1 is SEQ ID No. 496; X is any sequence of (i) of claim 3 and V2 is SEQ ID No. 570 and related subject-matter.

12. claims: 3, 11, 13, 19-22, 28-30, 36-50(all partially)

An antibody heavy chain comprising a sequence of the formula V1-X-V2 wherein V1 is SEQ ID No. 497; X is any sequence of (ii) of claim 3 and V2 is SEQ ID No. 571 and related subject-matter.

13. claims: 3, 11, 13, 19-22, 28-30, 36-50(all partially)

An antibody heavy chain comprising a sequence of the formula V1-X-V2 wherein V1 is SEQ ID No. 498; X is any sequence of (iii) of claim 3 and V2 is SEQ ID No. 572 and related subject-matter.

14. claims: 3, 10, 11, 13, 19-22, 28-30, 36-50(all partially)

An antibody heavy chain comprising a sequence of the formula V1-X-V2 wherein V1 is SEQ ID No. 499; X is any sequence of (iv) of claim 3 and V2 is SEQ ID No. 573 and related subject-matter.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

15. claims: 3, 10, 11, 13, 19-22, 28-30, 36-50(all partially)

An antibody heavy chain comprising a sequence of the formula V1-X-V2 wherein V1 is SEQ ID No. 500; X is any sequence of (v) of claim 3 and V2 is SEQ ID No. 574 and related subject-matter.

16. claims: 5, 14, 23, 31(completely); 4, 11, 13, 19-22, 28-30, 36-50(partially)

An antibody heavy chain comprising a sequence of the formula V1-X-V2 wherein V1 is SEQ ID No. 496; X is any sequence of (i) of claim 4 and V2 is SEQ ID No. 570 and related subject-matter.

17. claims: 6, 12, 15, 24, 32(completely); 4, 11, 13, 19-22, 28-30, 36-50(partially)

An antibody heavy chain comprising a sequence of the formula V1-X-V2 wherein V1 is SEQ ID No. 497; X is any sequence of (ii) of claim 4 and V2 is SEQ ID No. 571 and related subject-matter.

18. claims: 7, 16, 25, 33(completely); 4, 11, 13, 19-22, 28-30, 36-50(partially)

An antibody heavy chain comprising a sequence of the formula V1-X-V2 wherein V1 is SEQ ID No. 498; X is any sequence of (iii) of claim 4 and V2 is SEQ ID No. 572 and related subject-matter.

19. claims: 8, 17, 26, 34(completely); 4, 11, 13, 19-22, 28-30, 36-50(partially)

An antibody heavy chain comprising a sequence of the formula V1-X-V2 wherein V1 is SEQ ID No. 499; X is any sequence of (iv) of claim 4 and V2 is SEQ ID No. 573 and related subject-matter.

20. claims: 9, 18, 27, 35(completely); 4, 11, 13, 19-22, 28-30, 36-50(partially)

An antibody heavy chain comprising a sequence of the formula V1-X-V2 wherein V1 is SEQ ID No. 500; X is any sequence of (v) of claim 4 and V2 is SEQ ID No. 574 and related subject-matter.
