

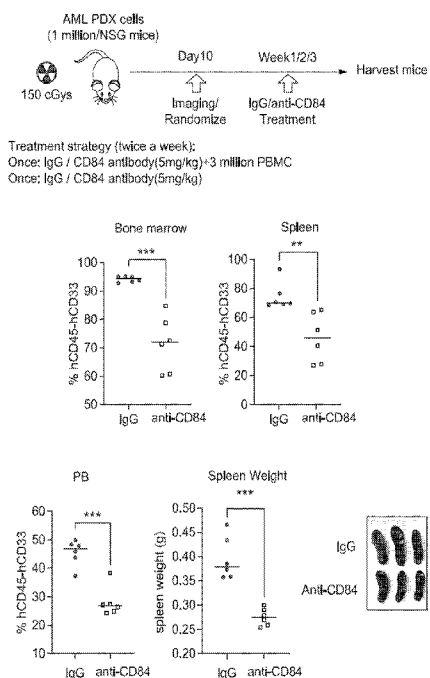


- (51) **International Patent Classification:**
C07K 16/28 (2006.01) A61P 35/02 (2006.01)
- (21) **International Application Number:**
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- (25) **Filing Language:** English
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63/342,521 16 May 2022 (16.05.2022) US
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- (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, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MU, 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, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.
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(54) **Title:** ANTI-CD84 ANTIBODIES AND USES THEREOF

FIG. 17



(57) **Abstract:** Provided herein are, *inter alia*, antibodies (e.g. humanized antibodies, chimeric antibodies, monoclonal antibodies, antibody fragments (e.g. scFvs)), which bind Cluster of Differentiation 84 (CD84) with high efficiency and specificity. The antibodies provided herein include novel light and heavy chain domain CDRs and framework regions and are, *inter alia*, useful for treating cancer and other CD84-related diseases.



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:

04 January 2024 (04.01.2024)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US23/67081

A. CLASSIFICATION OF SUBJECT MATTER IPC - INV. C07K 16/28 (2023.01) ADD. A61P 35/02 (2023.01) CPC - INV. C07K 16/2806; C07K 16/2896 ADD. A61K 2039/505; A61P 35/02; C07K 2317/33; C07K 2317/51; C07K 2317/515; C07K 2317/56; C07K 2317/565 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) See Search History document Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched See Search History document Electronic database consulted during the international search (name of database and, where practicable, search terms used) See Search History document																									
C. DOCUMENTS CONSIDERED TO BE RELEVANT																									
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:10%;">Category*</th> <th style="width:70%;">Citation of document, with indication, where appropriate, of the relevant passages</th> <th style="width:20%;">Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td style="text-align:center;">A</td> <td>US 10,066,014 B2 (YEDA RESEARCH AND DEVELOPMENT CO. LTD.) 04 September 2018; Columns 2 and 9</td> <td>1-8, 44-53/1, 59-61/1, 59-61/57, 63/1, and 63/57</td> </tr> <tr> <td style="text-align:center;">A</td> <td>WO 2020/146359 A1 (ARMAGEN INC.) 16 July 2020; Paragraph [0015]</td> <td>1-8, 44-53/1, 59-61/1, 59-61/57, 63/1, and 63/57</td> </tr> <tr> <td style="text-align:center;">A</td> <td>WO 2021/186056 A1 (INSERM) 23 September 2021; Page 43</td> <td>1-8, 44-53/1, 59-61/1, 59-61/57, 63/1, and 63/57</td> </tr> <tr> <td style="text-align:center;">A</td> <td>US 2017/0029530 A1 (ABBVIE STEMCENTRX LLC) 02 February 2017; Paragraph [0011]</td> <td>1-8, 44-53/1, 59-61/1, 59-61/57, 63/1, and 63/57</td> </tr> <tr> <td style="text-align:center;">A</td> <td>WO 2022/057061 A1 (SUZHOU NEOLOGICS BIOSCIENCE CO. LTD.) 24 March 2022; Paragraph [0011]</td> <td>1-8, 44-53/1, 59-61/1, 59-61/57, 63/1, and 63/57</td> </tr> <tr> <td style="text-align:center;">A</td> <td>US 2022/0135680 A1 (ABZYME THERAPEUTICS LLC) 05 May 2022; Paragraph [0167]</td> <td>1-8, 44-53/1, 59-61/1, 59-61/57, 63/1, and 63/57</td> </tr> <tr> <td style="text-align:center;">A</td> <td>US 2004/0025202 A1 (LAURIE CATHY C) 05 February 2004; Paragraph [0027]</td> <td>1-8, 44-53/1, 59-61/1,</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	A	US 10,066,014 B2 (YEDA RESEARCH AND DEVELOPMENT CO. LTD.) 04 September 2018; Columns 2 and 9	1-8, 44-53/1, 59-61/1, 59-61/57, 63/1, and 63/57	A	WO 2020/146359 A1 (ARMAGEN INC.) 16 July 2020; Paragraph [0015]	1-8, 44-53/1, 59-61/1, 59-61/57, 63/1, and 63/57	A	WO 2021/186056 A1 (INSERM) 23 September 2021; Page 43	1-8, 44-53/1, 59-61/1, 59-61/57, 63/1, and 63/57	A	US 2017/0029530 A1 (ABBVIE STEMCENTRX LLC) 02 February 2017; Paragraph [0011]	1-8, 44-53/1, 59-61/1, 59-61/57, 63/1, and 63/57	A	WO 2022/057061 A1 (SUZHOU NEOLOGICS BIOSCIENCE CO. LTD.) 24 March 2022; Paragraph [0011]	1-8, 44-53/1, 59-61/1, 59-61/57, 63/1, and 63/57	A	US 2022/0135680 A1 (ABZYME THERAPEUTICS LLC) 05 May 2022; Paragraph [0167]	1-8, 44-53/1, 59-61/1, 59-61/57, 63/1, and 63/57	A	US 2004/0025202 A1 (LAURIE CATHY C) 05 February 2004; Paragraph [0027]	1-8, 44-53/1, 59-61/1,	<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input type="checkbox"/> See patent family annex.
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<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%; vertical-align: top;"> * Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "D" document cited by the applicant in the international application "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 </td> <td style="width:50%; vertical-align: top;"> "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 </td> </tr> </table>		* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "D" document cited by the applicant in the international application "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																						
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Date of the actual completion of the international search 05 October 2023 (05.10.2023)	Date of mailing of the international search report <div style="text-align: center; font-size: 1.2em; font-weight: bold;">NOV 14 2023</div>																								
Name and mailing address of the ISA/ Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-8300	Authorized officer <div style="text-align: center; font-weight: bold;">Shane Thomas</div> Telephone No. PCT Helpdesk: 571-272-4300																								

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US23/67081

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
		59-61/57, 63/1, and 63/57
A	US 2016/0347814 A1 (COMPUGEN LTD.) 01 December 2016; Paragraphs [0034], [0125], [1060]	64
A	US 2017/0002054 A1 (ONCOMED PHARMACEUTICALS INC.) 05 January 2017; Paragraph [0096]	64
A	US 2017/0291937 A1 (REGENERON PHARMACEUTICALS INC.) 12 October 2017; Paragraph [0094]	64

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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 13ter.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:

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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.: 62, 65-67
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:
-***-Please See Supplemental Page-***-

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.:
Group I, Claims 1-8, 44-53, 57, 59-61, and 63-64

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.

INTERNATIONAL SEARCH REPORT

International application No.

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*-***-Continued From Box No. III: Observations where unity of invention is lacking-***-*

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, Claims 1-8, 44-53, 57, 59-61, and 63-64, is directed to an anti-CD84 antibody comprising SEQ ID NO:75 (CDR H1), SEQ ID NO:76 (CDR H2), SEQ ID NO:77 (CDR H3), SEQ ID NO:78 (CDR L1), SEQ ID NO:79 (CDR L2), and SEQ ID NO:80 (CDR L3).

Group II, Claims 9-19, 44-53, 54, 59-61, and 63, is directed to an anti-CD84 antibody comprising SEQ ID NO:19 (CDR H1), SEQ ID NO:20 (CDR H2), SEQ ID NO:21 (CDR H3), SEQ ID NO:22 (CDR L1), SEQ ID NO:23 (CDR L2), and SEQ ID NO:24 (CDR L3).

Group III, Claims 20-27, 44-53, 55, 59-61, and 63, is directed to an anti-CD84 antibody comprising SEQ ID NO:39 (CDR H1), SEQ ID NO:40 (CDR H2), SEQ ID NO:41 (CDR H3), SEQ ID NO:42 (CDR L1), SEQ ID NO:43 (CDR L2), and SEQ ID NO:44 (CDR L3).

Group IV, Claims 28-35, 44-53, 56, 59-61, and 63, is directed to an anti-CD84 antibody comprising SEQ ID NO:57 (CDR H1), SEQ ID NO:58 (CDR H2), SEQ ID NO:59 (CDR H3), SEQ ID NO:60 (CDR L1), SEQ ID NO:61 (CDR L2), and SEQ ID NO:62 (CDR L3).

Group V, Claims 36-53, 58-61, and 63, is directed to an anti-CD84 antibody comprising SEQ ID NO:93 (CDR H1), SEQ ID NO:94 (CDR H2), SEQ ID NO:95 (CDR H3), SEQ ID NO:96 (CDR L1), SEQ ID NO:97 (CDR L2), and SEQ ID NO:98 (CDR L3).

The inventions listed as Groups I-V do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

No technical features are shared between the sequences of Groups I-V and, accordingly, these groups lack unity a priori.

Additionally, even if Groups I-V were considered to share the technical features including: anti-CD84 antibody; these shared technical features are previously disclosed by US 10,066,014 B2 to Yeda Research and Development Co. (hereinafter "Yeda").

Yeda discloses anti-CD84 antibody (antibody specifically binding to CD84; column 2, lines 45-50).

Since none of the special technical features of the Groups I-V inventions is found in more than one of the inventions, and since all of the shared technical features are previously disclosed by the Yeda reference, unity of invention is lacking.