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[Continued on next page]

(54) Title: ANTIBODIES SPECIFIC FOR IL-17A FUSED TO HYALURONAN BINDING PEPTIDE TAGS

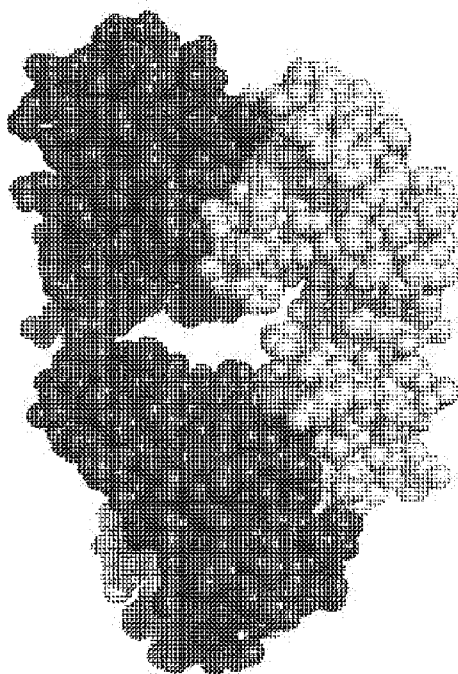


Fig. 1A

(57) Abstract: The present disclosure relates to antibodies and proteins comprising an antigen-binding portion thereof that specifically bind to the pro-inflammatory cytokine IL-17A and a peptide tag that binds hyaluronan (HA). The disclosure more specifically relates to specific antibodies and proteins that are IL-17A antagonists (inhibit the activities of IL-17A and IL-17AF) and are capable of inhibiting IL-17A induced cytokine production in *in vitro* assays, and having an inhibitory effect in an antigen-induced arthritis model in vivo. The disclosure further relates to compositions and methods of use for said antibodies and proteins to treat pathological disorders that can be treated by inhibiting IL-17A or IL17AF mediated activity, such as rheumatoid arthritis, psoriasis, systemic lupus erythematosus (SLE), lupus nephritis, chronic obstructive pulmonary disease, asthma or cystic fibrosis or other autoimmune and inflammatory disorders.



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).

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INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2015/054694

A. CLASSIFICATION OF SUBJECT MATTER

INV. C07K16/24 A61K39/395 C07K14/47
 ADD. A61K39/00

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 A61K

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)

EPO-Internal, EMBASE, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2009/082624 A2 (ZYMOGENETICS INC [US]; LEWIS KATHERINE E [US]; BRENDER TY M [US]; YI E) 2 July 2009 (2009-07-02) example 16, p 155-157; claim 72; example 13; Tab 20; SeqID 2222; claims 60, 61 -----	1-8, 14-39
X	US 2006/239965 A1 (SZOKA FRANCIS C JR [US] ET AL) 26 October 2006 (2006-10-26) par 72-74, par 155, claim 1, 2 -----	1-8, 14-39
X,P	WO 2014/122613 A1 (NOVARTIS AG [CH]; DI PADOVA FRANCO E [CH]; HUBER THOMAS [CH]; RONDEAU) 14 August 2014 (2014-08-14) the whole document ----- -/-	1-8, 14-39



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 October 2015

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INTERNATIONAL SEARCH REPORT

International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,P	WO 2014/099997 A1 (NOVARTIS AG [CH]; GHOSH JOY [US]; ROGUSKA MICHAEL [US]; NGUYEN ANDREW) 26 June 2014 (2014-06-26) claims 1, 8 -----	1-8, 14-39
A	DUMONT F J: "IL-17 cytokine/receptor families: Emerging targets for the modulation of inflammatory responses", EXPERT OPINION ON THERAPEUTIC PATENTS, INFORMA HEALTHCARE, GB, vol. 13, no. 3, 1 March 2003 (2003-03-01), pages 287-303, XP002351568, ISSN: 1354-3776, DOI: 10.1517/13543776.13.3.287 the whole document -----	1-8, 14-39

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2015/054694

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2009082624	A2	02-07-2009	NONE
US 2006239965	A1	26-10-2006	NONE
WO 2014122613	A1	14-08-2014	AU 2014213599 A1 23-07-2015 CA 2897682 A1 14-08-2014 CN 105073775 A 18-11-2015 CR 20150405 A 28-09-2015 EA 201591462 A1 30-12-2015 EP 2953969 A1 16-12-2015 KR 20150113198 A 07-10-2015 PE 12902015 A1 17-09-2015 TW 201431879 A 16-08-2014 US 2015175692 A1 25-06-2015 UY 35315 A 30-09-2014 WO 2014122613 A1 14-08-2014
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2015/054694

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.:

1-8(completely); 14-39(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: 1-8(completely); 14-39(partially)

1. An isolated antibody or protein comprising an antigen-binding portion thereof, comprising a CDR amino acid sequence having at least 95% identity to: a) those encoded by SEQ ID NO: 7, SEQ ID NO: 8 and SEQ ID NO: 3, and a CDR amino acid sequence having at least 64% identity to: b) those encoded by SEQ ID NO: 42, SEQ ID NO: 23 and SEQ ID NO: 11, and wherein said antibody or protein specifically binds to homodimeric IL-17A and heterodimeric IL-17AF, but does not specifically bind to homodimeric IL-17F, and further comprising a peptide tag that binds hyaluronan (HA) selected from the group consisting of: SEQ ID NO:88, SEQ ID NO:89, SEQ ID NO:90, SEQ ID NO:91, SEQ ID NO:92, SEQ ID NO:93, SEQ ID NO:94, SEQ ID NO:95, and SEQ ID NO:96.

2. claims: 9-13(completely); 14-39(partially)

An isolated antibody or protein, which binds to the same epitope as an isolated antibody or protein according to any one of the preceding claims.

An isolated antibody or protein, which comprises an antigen recognition surface having epitope recognition characteristics equivalent to an antibody or protein as defined in any one of the preceding claims.

An isolated antibody or protein, which is cross-blocked from binding to IL-17A or IL-17AF by at least one of the antibodies as defined in any one of the preceding claims.
