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(54) Title: ANTI-SIRP $\alpha$  ANTIBODIES AND USES THEREOF

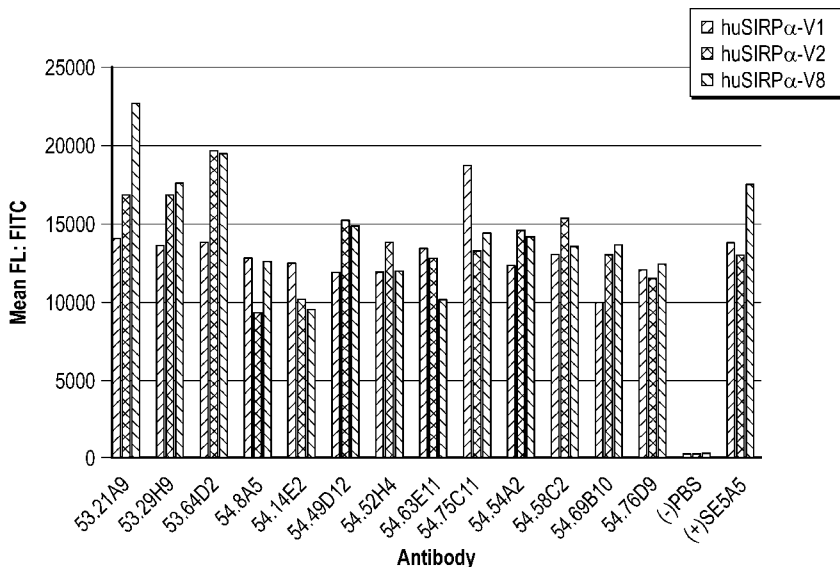


FIG. 1A

(57) Abstract: The present application provides anti-SIRP $\alpha$  constructs that bind to SIRP $\alpha$  (e.g. anti- SIRP $\alpha$  antibodies), nucleic acid molecules encoding amino acid sequences of the anti-SIRP $\alpha$ , vectors comprising the nucleic acid molecules, host cells comprising the vectors, methods of preparing the anti-SIRP $\alpha$  construct, pharmaceutical compositions comprising the anti-SIRP $\alpha$  construct, and methods of using the anti-SIRP $\alpha$  construct or compositions.



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

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17 October 2024 (17.10.2024)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 24/14437

**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:

INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US 24/14437

**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.: 4-43  
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 Supplemental Box ---

- 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.:  
1-3, limited to SEQ ID NOs: 1-8

- 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.

PCT/US 24/14437

A. CLASSIFICATION OF SUBJECT MATTER

IPC - INV. C07K 16/18, C07K 16/28, A61K 39/395, A61P 35/00 (2024.01)  
ADD.

CPC - INV. C07K 16/18, C07K 16/2896, A61K 39/3955, A61P 35/00

ADD. C07K 2317/565, C07K 2317/76, C07K 2317/52, C07K 2317/71, C07K 2317/51

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 data base consulted during the international search (name of data base and, where practicable, search terms used)  
See Search History document

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2021/0171654 A1 (FORTY SEVEN, INC.) 10 June 2021 (10.06.2021); abstract; para [0007]; claim 3, 5	1-3
A	WO 2006/068953 A2 (ASTRAZENECA AB et al.) 29 June 2006 (29.06.2006); abstract; para [0017]	1-3

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

"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

Date of the actual completion of the international search

14 June 2024

Date of mailing of the international search report

JUL 15 2024

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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 24/14437

### 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 searched, the appropriate additional search fees must be paid.

Group I+: Claims 1-3, directed to an anti-SIRPa construct comprising an antibody moiety comprising a heavy chain variable region (VH) and a light chain variable region (VL). The anti-SIRPa construct will be searched to the extent that the anti-SIRPa construct encompasses SEQ ID NOs: 1-8. The first named invention was determined based on first claim VH and VL sequences (claims 1-2). This first named invention has been selected based on the guidance set forth in section 10.54 of the PCT International Search and Preliminary Examination Guidelines. It is believed that claims 1-3, encompass this first named invention, and thus these claims will be searched without fee to the extent that they encompass anti-SIRPa construct comprising an antibody moiety comprising a heavy chain variable region (VH) and a light chain variable region (VL) comprising SEQ ID NOs: 1-8. Additional anti-SIRPa constructs comprising VH and VL sequences will be searched upon the payment of additional fees. Applicants must specify the claims that encompass any additionally elected anti-SIRPa constructs. Applicants must further indicate, if applicable, the claims which encompass the first named invention, if different than what was indicated above for this group. Failure to clearly identify how any paid additional invention fees are to be applied to the "+" group(s) will result in only the first claimed invention to be searched. An exemplary election would be an anti-SIRPa construct comprising an antibody moiety comprising a heavy chain variable region (VH) and a light chain variable region (VL) comprising SEQ ID NOs: 9-16 (claims 1-3).

The inventions listed as Groups I+ 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:

#### Special Technical Features

The technical feature of each of the inventions listed as Group I+ is an anti-SIRPa construct comprising an antibody moiety comprising a heavy chain variable region (VH) and a light chain variable region (VL) with the specific sequences recited therein. Each invention requires a specific set of sequences not required by any of the other inventions.

#### Common Technical Features

Groups I+ share the technical features of an anti-SIRPa construct comprising an antibody moiety comprising a heavy chain variable region (VH) and a light chain variable region (VL), wherein: 1) the VH comprises a HC-CDR1, a HC-CDR2, and a HC-CDR3; and the VL comprises a LC-CDR1, a LC-CDR2, and a LC-CDR3.

However, these shared technical features do not represent a contribution over prior art, because the shared technical features are anticipated by US 2021/0171654 A1 to Forty Seven, Inc. (hereinafter "FSI").

FSI discloses an anti-SIRPa construct (abstract - "Anti-SIRPa antibodies, including multi-specific anti-SIRPa antibodies, are provided, as are related compositions and methods") comprising an antibody moiety comprising a heavy chain variable region (VH) and a light chain variable region (VL) (para [0007] - "the antibody comprises: a VH sequence of SEQ ID NO:7 and a VL sequence of SEQ ID NO:8"), wherein:

1) the VH comprises a HC-CDR1, a HC-CDR2, and a HC-CDR3 (claim 5 - "An isolated humanized, human, or chimeric antibody, comprising: a CDR-H1...a CDR-H2...a CDR-H3"); and the VL comprises a LC-CDR1, a LC-CDR2, and a LC-CDR3 (claim 5 - "a CDR-L1...a CDR-L2...and a CDR-L3").

As the technical features were known in the art at the time of the invention, they cannot be considered special technical features that would otherwise unify the groups.

Groups I+ therefore lack unity of invention under PCT Rule 13 because they do not share a same or corresponding special technical feature.

Continuation of item 4 above: claims 4-43 are held unsearchable because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

**INTERNATIONAL SEARCH REPORT**

International application No.

PCT/US 24/14437

Continuation of: A. CLASSIFICATION OF SUBJECT MATTER

CPC - ADD. C07K 2317/515, C07K 2317/56