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(54) Title: USE OF IMINO SUGARS IN IMMUNOTHERAPY

(57) Abstract: Described are uses for various imino sugars in PRR-mediated immunotherapy or immunoprophylaxis. In particular, the invention relates to the use of imino sugar PRR (particularly C-type lectin) ligands in immune response variegation and/or the stimulation of immune surveillance (for example by the innate immune system) and/or non-specific immunoprophylaxis. The invention therefore finds application in the treatment of pathological variegated states (for example those arising from pathogen-mediated immune system subversion or immune system dysfunction) and for inhibiting or postponing neutrophil apoptosis.



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A. CLASSIFICATION OF SUBJECT MATTER

INV. A61K31/00	A61K31/40	A61K31/407	A61K31/437	A61K31/439
A61K31/445	A61P37/04	A61P7/00	A61P31/00	A61P31/04
A61P31/10	A61P31/12	A61P33/02	A61P35/00	A61P37/00

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)
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 practical, search terms used)

EPO-Internal, WPI Data, BIOSIS, EMBASE, SCISEARCH, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X	WO 2006/077427 A (MNL PHARMA LTD [GB]; NASH ROBERT JAMES [GB]; SLINGSBY JASON H [AT]; CA) 27 July 2006 (2006-07-27) page 36, line 10 - page 40, line 5 claims 2,57-74	1-7,9-16
X	US 2004/110795 A1 (ZITZMANN NICOLE [DE] ET AL) 10 June 2004 (2004-06-10) page 2, paragraph 11 - paragraph 13	1-7,9-16
A	WO 2005/070418 A (M N L PHARMA LTD [GB]; NASH ROBERT JAMES [GB]; WATSON ALISON ANN [GB];) 4 August 2005 (2005-08-04) the whole document	1-7,9-16

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 document 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.
- *Z* document member of the same patent family

Date of the actual completion of the international search

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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	WO 2005/039578 A (AZ UNIV AMSTERDAM [NL]; AERTS JOHANNES MARIA FRANCISCU [NL]) 6 May 2005 (2005-05-06) page 5, line 31 - page 6, line 9 page 7, line 18 - line 24	1-7,9-16
X	DE CLERCQ ERIK: "Toward improved anti-HIV chemotherapy: Therapeutic strategies for intervention with HIV infections" JOURNAL OF MEDICINAL CHEMISTRY, AMERICAN CHEMICAL SOCIETY, WASHINGTON, US, vol. 38, no. 14, 1995, pages 2491-2517, XP002387020 ISSN: 0022-2623 page 2505, right-hand column, paragraph 3 - page 2506, left-hand column, paragraph 1	1-7,9-16
X	WO 01/68093 A (OXFORD GLYCOSCIENCES UK LTD [GB]; UNIV OXFORD [GB]; SEYFRIED THOMAS N) 20 September 2001 (2001-09-20) claims 1-3,5	1-7,9-16
X	US 4 837 237 A (ROHRSCHEIDER LARRY R [US] ET AL) 6 June 1989 (1989-06-06) column 3, line 43 - line 60	1-7,9-16

INTERNATIONAL SEARCH REPORT

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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:

Although claims 1-7, 9-14 and 16 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.
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 allsearchable 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.:

see annex

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/GB2007 /002597

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

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

1. claims: 1-7, 9-16 (all partially)

Use of an imino sugar which is a piperidine (or a pharmaceutically acceptable salt or derivative thereof) for inhibiting or postponing neutrophil apoptosis, for the treatment or prophylaxis of a disease or disorder in which the inhibition or postponement of neutrophil apoptosis is indicated or which is characterized by excessive neutrophil apoptosis or for use in PRR (for example C-type lectin)-mediated immunotherapy or immunoprophylaxis. Use of an imino sugar PRR (for example C-type lectin) ligand which is a piperidine (or a pharmaceutically acceptable salt or derivative thereof) for immune response variegation (for example, in the treatment of pathological variegated states, e.g. arising from immune dysfunction or pathogen-mediated immune system subversion). Use of an imino sugar which is a piperidine (or a pharmaceutically acceptable salt or derivative thereof) for the manufacture of a medicament for use in the defined medical uses. A method for the treatment or prevention of a disease or disorder comprising administering an effective amount of an imino sugar which is a piperidine to a patient in need thereof.

2. claims: 1-7, 9-16 (all partially)

Use of an imino sugar which is a pyrroline (or a pharmaceutically acceptable salt or derivative thereof) for inhibiting or postponing neutrophil apoptosis, for the treatment or prophylaxis of a disease or disorder in which the inhibition or postponement of neutrophil apoptosis is indicated or which is characterized by excessive neutrophil apoptosis or for use in PRR (for example C-type lectin)-mediated immunotherapy or immunoprophylaxis. Use of an imino sugar PRR (for example C-type lectin) ligand which is a pyrroline (or a pharmaceutically acceptable salt or derivative thereof) for immune response variegation (for example, in the treatment of pathological variegated states, e.g. arising from immune dysfunction or pathogen-mediated immune system subversion). Use of an imino sugar which is a pyrroline (or a pharmaceutically acceptable salt or derivative thereof) for the manufacture of a medicament for use in the defined medical uses. A method for the treatment or prevention of a disease or disorder comprising administering an effective amount of an imino sugar which is a pyrroline to a patient in need thereof.

3. claims: 1-7, 9-16 (all partially)

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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Use of an imino sugar which is a pyrrolidine (or a pharmaceutically acceptable salt or derivative thereof) for inhibiting or postponing neutrophil apoptosis, for the treatment or prophylaxis of a disease or disorder in which the inhibition or postponement of neutrophil apoptosis is indicated or which is characterized by excessive neutrophil apoptosis or for use in PRR (for example C-type lectin)-mediated immunotherapy or immunoprophylaxis. Use of an imino sugar PRR (for example C-type lectin) ligand which is a pyrrolidine (or a pharmaceutically acceptable salt or derivative thereof) for immune response variegation (for example, in the treatment of pathological variegated states, e.g. arising from immune dysfunction or pathogen-mediated immune system subversion). Use of an imino sugar which is a pyrrolidine (or a pharmaceutically acceptable salt or derivative thereof) for the manufacture of a medicament for use in the defined medical uses. A method for the treatment or prevention of a disease or disorder comprising administering an effective amount of an imino sugar which is a pyrrolidine to a patient in need thereof.

4. claims: 1-7 (partially), claim 8 (entirely) and 9-16 (partially)

Use of an imino sugar which is a pyrrolizidine (or a pharmaceutically acceptable salt or derivative thereof) for inhibiting or postponing neutrophil apoptosis, for the treatment or prophylaxis of a disease or disorder in which the inhibition or postponement of neutrophil apoptosis is indicated or which is characterized by excessive neutrophil apoptosis or for use in PRR (for example C-type lectin)-mediated immunotherapy or immunoprophylaxis. Use of an imino sugar PRR (for example C-type lectin) ligand which is a pyrrolizidine (or a pharmaceutically acceptable salt or derivative thereof) for immune response variegation (for example, in the treatment of pathological variegated states, e.g. arising from immune dysfunction or pathogen-mediated immune system subversion). Use of an imino sugar which is a pyrrolizidine (or a pharmaceutically acceptable salt or derivative thereof) for the manufacture of a medicament for use in the defined medical uses. A method for the treatment or prevention of a disease or disorder comprising administering an effective amount of an imino sugar which is a pyrrolizidine to a patient in need thereof.

5. claims: 1-7, 9-16 (all partially)

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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Use of an imino sugar which is an indolizidine (or a pharmaceutically acceptable salt or derivative thereof) for inhibiting or postponing neutrophil apoptosis, for the treatment or prophylaxis of a disease or disorder in which the inhibition or postponement of neutrophil apoptosis is indicated or which is characterized by excessive neutrophil apoptosis or for use in PRR (for example C-type lectin)-mediated immunotherapy or immunoprophylaxis. Use of an imino sugar PRR (for example C-type lectin) ligand which is an indolizidine (or a pharmaceutically acceptable salt or derivative thereof) for immune response variegation (for example, in the treatment of pathological variegated states, e.g. arising from immune dysfunction or pathogen-mediated immune system subversion). Use of an imino sugar which is an indolizidine (or a pharmaceutically acceptable salt or derivative thereof) for the manufacture of a medicament for use in the defined medical uses. A method for the treatment or prevention of a disease or disorder comprising administering an effective amount of an imino sugar which is an indolizidine to a patient in need thereof.

6. claims: 1-7, 9-16 (all partially)

Use of an imino sugar which is a nortropane (or a pharmaceutically acceptable salt or derivative thereof) for inhibiting or postponing neutrophil apoptosis, for the treatment or prophylaxis of a disease or disorder in which the inhibition or postponement of neutrophil apoptosis is indicated or which is characterized by excessive neutrophil apoptosis or for use in PRR (for example C-type lectin)-mediated immunotherapy or immunoprophylaxis. Use of an imino sugar PRR (for example C-type lectin) ligand which is a nortropane (or a pharmaceutically acceptable salt or derivative thereof) for immune response variegation (for example, in the treatment of pathological variegated states, e.g. arising from immune dysfunction or pathogen-mediated immune system subversion). Use of an imino sugar which is a nortropane (or a pharmaceutically acceptable salt or derivative thereof) for the manufacture of a medicament for use in the defined medical uses. A method for the treatment or prevention of a disease or disorder comprising administering an effective amount of an imino sugar which is a nortropane to a patient in need thereof.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/GB2007/002597
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WO 2006077427	A	27-07-2006	NONE	
US 2004110795	A1	10-06-2004	NONE	
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