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60/251,747 5 December 2000 (05.12.2000) US
- (71) Applicant (for all designated States except US): **THE BRIGHAM AND WOMEN'S HOSPITAL, INC.** [US/US]; 75 Francis Street, Boston, MA 02115 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **WANG, Ying** [CN/US]; 22 Parkway Road, #6, Brookline, MA 02445 (US). **ROEHL, Michael, H.** [DE/US]; 22 Parkway Road, Brookline, MA 02445 (US). **KASPER, Dennis, L.** [US/US]; 48 Monument Avenue, Charlestown, MA 02129 (US).
- (74) Agent: **STEELE, Alan, W.**; Wolf, Greenfield & Sacks, P.C., 600 Atlantic Avenue, Boston, MA 02210 (US).
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- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.



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(54) Title: USE OF ZWITTERIONIC POLYSACCHARIDES FOR THE SPECIFIC MODULATION OF IMMUNE PROCESSES

(57) Abstract: The invention relates to three-dimensional molecular structure determination of polymers, three-dimensional computer molecular modeling, rational drug design, and immunomodulatory polymers. In particular the invention is directed to immunomodulatory polymers, as well as to methods for designing, selecting, and screening therapeutic agents having immunomodulatory activity. Furthermore, the invention relates to immunomodulatory polysaccharides, including those bacterial origin such as *B. fragilis* capsular polysaccharide PS A2, and preparations thereof.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/47251

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61K31/7008 A61K31/702 C07H5/06 A61P37/02

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)

IPC 7 A61K C07H

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, PAJ, MEDLINE, BIOSIS, EMBASE, PASCAL, 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.
X	US 5 700 787 A (TZIANABOS ARTHUR O ET AL) 23 December 1997 (1997-12-23) abstract column 2, line 56 - line 65 column 3, line 5 - line 22 column 4, line 1 - line 11 column 15, line 1 - column 16, line 4 chemical structures tables --- -/--	1-17,19, 22-40

 Further documents are listed in the continuation of box C. Patent family members are listed in 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.

"&" document member of the same patent family

Date of the actual completion of the international search

18 July 2002

Date of mailing of the international search report

11 October 2002

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Villa Riva, A

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>TZIANABOS A O ET AL: "T cells activated by zwitterionic molecules prevent abscesses induced by pathogenic bacteria." THE JOURNAL OF BIOLOGICAL CHEMISTRY. UNITED STATES 10 MAR 2000, vol. 275, no. 10, 10 March 2000 (2000-03-10), pages 6733-6740, XP002206685 ISSN: 0021-9258 abstract page 6733, right-hand column, line 27 - line 47 figure 1 page 6738, line 49 -page 6739, line 8 ---</p>	1-17,19, 22-40
X	<p>KALKA-MOLL W M ET AL: "Effect of molecular size on the ability of zwitterionic polysaccharides to stimulate cellular immunity." JOURNAL OF IMMUNOLOGY (BALTIMORE, MD.: 1950) UNITED STATES 15 JAN 2000, vol. 164, no. 2, 15 January 2000 (2000-01-15), pages 719-724, XP002206686. ISSN: 0022-1767 abstract; figures 1,5 page 723, last paragraph ---</p>	1-17,19, 22-43
X	<p>BRUBAKER J O ET AL: "Mitogenic activity of purified capsular polysaccharide A from Bacteroides fragilis: differential stimulatory effect on mouse and rat lymphocytes in vitro." JOURNAL OF IMMUNOLOGY (BALTIMORE, MD.: 1950) UNITED STATES 15 FEB 1999, vol. 162, no. 4, 15 February 1999 (1999-02-15), pages 2235-2242, XP002206687 ISSN: 0022-1767 page 2235, right-hand column, line 1 - line 7 page 2235, right-hand column, last line -page 2236, left-hand column, line 3 figures 8,9 --- -/--</p>	1-17,19, 22-43

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/47251

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,A	WANG Y ET AL: "Structural basis of the abscess-modulating polysaccharide A2 from Bacteroides fragilis." PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA. UNITED STATES 5 DEC 2000, vol. 97, no. 25, 5 December 2000 (2000-12-05), pages 13478-13483, XP002206688 ISSN: 0027-8424 the whole document -----	1-43

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 01/47251

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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 40-43 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.: 22-39 (partially)
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:

see FURTHER INFORMATION sheet. PCT/ISA/210
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 II Observations where unity of invention is lacking (Continuation of item 2 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 fee, this Authority did not invite payment of any additional fee.
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.:

1-43

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- 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: 1-43

Immunomodulatory polymers, in particular bacterial polysaccharides, and preparations thereof

2. Claims: 44-61

Computer-assisted methods and systems for in silico analysing, predicting, simulating and selecting immunomodulatory polymer candidates .

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 22-39 (partially)

Present claims 22-39 relate to a compound defined by reference to the following parameter(s):
3D conformation in solution and geometric-functional features of the same. The use of these parameters in the present context is considered to lead to a lack of clarity within the meaning of Article 6 PCT. It is impossible to compare the parameters the applicant has chosen to employ with what is set out in the prior art. The lack of clarity is such as to render a meaningful complete search impossible. Consequently, the search has been restricted to the polymers disclosed in claims 1-21 in combination with the description, in particular bacterial polysaccharides.

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/47251

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5700787	A	23-12-1997	US 5679654 A	21-10-1997
			AU 1321799 A	18-03-1999
			AU 702325 B2	18-02-1999
			AU 3543995 A	27-03-1996
			CA 2197563 A1	14-03-1996
			EP 0778780 A1	18-06-1997
			JP 10507746 T	28-07-1998
			WO 9607427 A1	14-03-1996
