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(54) Title: ADVANCED DETECTION OF SEPSIS

(57) Abstract: The present invention relates to methods, monitors and systems measuring lysophosphatidylcholine, its derivatives and/or procalcitonin as well as at least one clinical marker (e.g. temperature or respiration rate) and/or at least one biomarker for the early detection of sepsis in a subject.



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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2009/002065

A. CLASSIFICATION OF SUBJECT MATTER		
INV. G01N33/53	G01N33/68	G01N33/74 C12Q1/68
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) G01N C12Q		
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, 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	LISSAUER, E ET AL: "decreased lysophosphatidylcholine levels are associated with sepsis compared to uninfected inflammation prior to onset of sepsis" JOURNAL OF SURGICAL RESEARCH, vol. 137, no. 2, 2007, page 206, XP002533397 abstract ----- -/--	1-12, 30-33, 44-47
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> 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. *&* document member of the same patent family		
Date of the actual completion of the international search 23 June 2009		Date of mailing of the international search report 04/11/2009
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Landré, Julien

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2009/002065

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 2007/038758 A (BECTON DICKINSON CO [US]; SHI SONG [US]; GENTLE THOMAS [US]; MOORE RIC) 5 April 2007 (2007-04-05) paragraphs [0008] - [0011], [0016], [0014], [0023], [0026] - [0028], [0064], [0070], [0072], [0089], [0092], [0093]; examples 1,2,6,7 paragraphs [0103], [0106], [0108], [0117], [0119]	1-12, 30-33, 40-47
X	----- DROBNIK W ET AL: "Plasma ceramide and lysophosphatidylcholine inversely correlate with mortality in sepsis patients" JOURNAL OF LIPID RESEARCH, BETHESDA, MD, US, vol. 44, no. 4, 1 April 2003 (2003-04-01), pages 754-761, XP002350628 ISSN: 0022-2275 the whole document	1-12, 30-33, 44-47
X	----- JACKSON S K ET AL: "Lysophospholipid acyltransferases in monocyte inflammatory responses and sepsis" IMMUNOBIOLOGY, URBAN UND FISCHER VERLAG, DE, vol. 209, no. 1-2, 23 August 2004 (2004-08-23), pages 31-38, XP004954234 ISSN: 0171-2985 the whole document	1-12, 30-33, 44-47
L	----- TANG ET AL: "Accuracy of procalcitonin for sepsis diagnosis in critically ill patients: systematic review and meta-analysis" LANCET INFECTIOUS DISEASES, XX, US, vol. 7, no. 3, 1 March 2007 (2007-03-01), pages 210-217, XP005895884 ISSN: 1473-3099 the whole document	1-12, 30-33, 44-47

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/002065

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 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.:

claims 1-12 completely; claims 30-33 and 44-47 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:

Invention 1 (Claims 1-12 completely; claims 30-33 and 44-47 partially)

A method for the detection of sepsis comprising measuring Phosphatidylcholine and one or more clinical markers.

Invention 2 (Claims 13-29 completely; claims 30-33 and 44-47 partially)

A method for the detection of sepsis comprising measuring a compound according to formula I and one or more clinical markers

Invention 3 (Claims 34-43 completely; claims 44-47 partially)

A method for the detection of sepsis comprising measuring procalcitonin and one or more clinical markers

Invention 4 (Claims 48-72 completely)

A monitor suitable for the detection of sepsis. Potential a posteriori non-unity could arise during search/examination of this invention.

Invention 5 (Claim 73-84 completely)

A system suitable for the detection of sepsis. Potential a posteriori non-unity could arise during search/examination of this invention.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2007038758 A	05-04-2007	AU 2006294481 A1	05-04-2007
		CA 2623523 A1	05-04-2007
		EP 1940231 A2	09-07-2008
		JP 2009510450 T	12-03-2009
		KR 20080068824 A	24-07-2008
