

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
28 June 2001 (28.06.2001)

PCT

(10) International Publication Number  
WO 01/46225 A3

(51) International Patent Classification<sup>7</sup>: C12N 15/31,  
C07K 14/295, C12N 15/62, C07K 19/00, C12N 15/63,  
5/10, C07K 16/12, A61K 39/118, G01N 33/53, C12Q 1/68

(21) International Application Number: PCT/CA00/01535

(22) International Filing Date:  
20 December 2000 (20.12.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/171,539 22 December 1999 (22.12.1999) US

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(81) Designated States (national): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ,  
DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR,  
HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,  
LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ,

[Continued on next page]

(54) Title: CHLAMYDIA ANTIGENS AND CORRESPONDING DNA FRAGMENTS AND USES THEREOF

Nucleotide and amino acid sequences of *C. pneumoniae*  
outer membrane protein gene.

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ttctaagata taaattaagg acctatcgaa ggaaatcttt gttgttttca gaaaaggctt 60
ttggtaccct tttctatac ccaagttagt acaggttaatt atg aaa aaa tta tta 115
                                         Met Lys Lys Leu Leu
                                         1           5
ttt tct aca ttt ctt ctt gtt tta gga tca aca agc gca gct cat gca 163
Phe Ser Thr Phe Leu Leu Val Leu Gly Ser Thr Ser Ala Ala His Ala
                10                15                20
aat tta ggc tat gtt aat tta aag cga tgt ctt gaa gaa tcc gat cta 211
Asn Leu Gly Tyr Val Asn Leu Lys Arg Cys Leu Glu Glu Ser Asp Leu
                25                30                35
ggt aaa aag gaa act gaa gaa ttg gaa gct atg aaa cag cag ttt gta 259
Gly Lys Lys Glu Thr Glu Glu Leu Glu Ala Met Lys Gln Gln Phe Val
                40                45                50
aaa aat gct gag aaa ata gaa gaa gaa ctc act tct att tat aat aag 307
Lys Asn Ala Glu Lys Ile Glu Glu Glu Leu Thr Ser Ile Tyr Asn Lys
                55                60                65
ttg caa gat gaa gat tac atg gaa agc cta tcg gat tct gcc tct gaa 355
Leu Gln Asp Glu Asp Tyr Met Glu Ser Leu Ser Asp Ser Ala Ser Glu
                70                75                80                85
gag ttg cga aag aaa ttc gaa gat ctt tca gga gag tac aat gcg tac 403
Glu Leu Arg Lys Lys Phe Glu Asp Leu Ser Gly Glu Tyr Asn Ala Tyr
                90                95                100
cag tct cag tac tat caa tct atc aat caa agt aat gta aaa cgc att 451
Gln Ser Gln Tyr Tyr Gln Ser Ile Asn Gln Ser Asn Val Lys Arg Ile
                105                110                115
caa aaa ctc att caa gaa gta aaa ata gct gca gaa tca gtg cgg tcc 499
Gln Lys Leu Ile Gln Glu Val Lys Ile Ala Ala Glu Ser Val Arg Ser
                120                125                130
aaa gaa aaa cta gaa gct atc ctt aat gaa gaa gct gtc tta gca ata 547
Lys Glu Lys Leu Glu Ala Ile Leu Asn Glu Glu Ala Val Leu Ala Ile
                135                140                145
gca cct ggg act gat aaa aca acc gaa att att gct att ctt aac gaa 595
Ala Pro Gly Thr Asp Lys Thr Thr Glu Ile Ile Ala Ile Leu Asn Glu
                150                155                160                165
tct ttc aaa aaa caa aac tagtccaagt ttaaggagtt tctctatgtcc 643
Ser Phe Lys Lys Gln Asn
                170
gaagcaccag tctacactct taaacagtta gctgagctac tacaagtcga agttcaagga 703
aatatagaaa ctc 716

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(57) Abstract: The present invention provides a method of nucleic acid, including DNA, immunization of a host, including humans, against disease caused by infection by a strain of *Chlamydia*, specifically *C. pneumoniae*, employing a vector containing a nucleotide sequence encoding an outer membrane protein of a strain of *Chlamydia pneumoniae* and a promoter to effect expression of the outer membrane protein in the host. Modifications are possible within the scope of this invention.



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NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM,  
TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

**Published:**

— with international search report

**(84) Designated States (regional):** ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

**(88) Date of publication of the international search report:**

6 December 2001

*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.*

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/CA 00/01535

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 7 C12N15/31 C07K14/295 C12N15/62 C07K19/00 C12N15/63 C12N5/10 C07K16/12 A61K39/118 G01N33/53 C12Q1/68		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) IPC 7 C07K		
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, BIOSIS		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X  X  X	WO 99 27105 A (GENSET SA ;GRIFFAIS REMY (FR)) 3 June 1999 (1999-06-03) abstract; claims -& "Nucleotide sequence of the complete genome of Chlamydia pneumoniae" GENESEQ NUCLEIC ACID SEQUENCE DATABASE, 13 September 1999 (1999-09-13), XP002168446 Ac X91990 the whole document -& "Chlamydia pneumoniae transmembrane protein sequence" GENESEQ AMINO ACID SEQUENCE DATABASE, 13 September 1999 (1999-09-13), XP002168461 Ac Y34897 the whole document --- -/--	1-34  1-34  1-34
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C.		
<input checked="" type="checkbox"/> 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	"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	
"E" earlier document but published on or after the international filing date	"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	
"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)	"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.	
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	
"P" document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the international search  <p style="text-align: center; font-size: 1.2em;">7 June 2001</p>	Date of mailing of the international search report  <p style="text-align: center; font-size: 1.5em;">19. 6. 01</p>	
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  <p style="text-align: center; font-size: 1.2em;">Ceder, O</p>	

## INTERNATIONAL SEARCH REPORT

Internal Application No

PCT/CA 00/01535

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KALMAN ET AL.: "Chlamydia pneumoniae section 31 of 103 of the complete genome" EMBL SEQUENCE DATABASE, 15 March 1999 (1999-03-15), XP002168462 HEIDELBERG DE	1,2,7, 13-16
A	Ac AE001615 the whole document	32
X	-& KALMAN ET AL.: "OMPH-like outer membrane protein (cationic outer membrane protein OMPH, putative)" SWISSPROT SEQUENCE DATA BASE, 1 May 1999 (1999-05-01), XP002168463 Ac Q9Z8N7 the whole document	1,2,7, 13-16
A	-& KALMAN ET AL.: "Comparative genomes of Chlamydia pneumoniae and C. trachomatis" NATURE GENETICS, vol. 21, April 1999 (1999-04), pages 385-389, XP000853883 ---	
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A	WO 95 12411 A (SMITHKLINE BEECHAM CORP ;SABARA MARTA IRIS (US); SANDBULTE JAMES E) 11 May 1995 (1995-05-11) ---	
A	NAIDU B R ET AL: "MOMP-BASED PCR REVEALS PRESENCE OF CHLAMYDIA PNEUMONIAE DNA IN RESPIRATORY AND SERUM SAMPLES OF PATIENTS WITH ACUTE C. PNEUMONIAE-ASSOCIATED INFECTIONS" JOURNAL OF MICROBIOLOGICAL METHODS,NL,ELSEVIER, AMSTERDAM,, vol. 28, no. 1, 1997, pages 1-9, XP000853724 ISSN: 0167-7012 ---	
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A	WIEDMANN-AL-AHMAD ET AL: "Reactions of polyclonal and neutralizing anti-p54 monoclonal antibodies with an isolated, species-specific 54-kilodalton protein of Chlamydia pneumoniae" CLINICAL AND DIAGNOSTIC LABORATORY IMMUNOLOGY,US,AMERICAN SOCIETY FOR MICROBIOLOGY, vol. 4, no. 6, November 1997 (1997-11), pages 700-704, XP002132124 ISSN: 1071-412X -----	

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/CA 00/01535

## 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:  
see FURTHER INFORMATION sheet PCT/ISA/210
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 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:

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.:

### 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

Continuation of Box I.1

As far as claims 27 and 30 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.

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Continuation of Box I.1

Rule 39.1(iv) PCT - Method for treatment of the human or animal body by therapy

# INTERNATIONAL SEARCH REPORT

Information on patent family members

Internat	Application No
PCT/CA 00/01535	

Patent document cited in search report	A	Publication date	Patent family member(s)	Publication date
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