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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: *FRANCISELLA TULARENSIS* IMMUNOGENIC PROTEINS AND DNA ENCODING THESE

(57) Abstract: Proteins and nucleic acids for use in producing a protective immune response in a mammal against infection by *Francisella tularensis*, are described and claimed. The proteins are selected from the SEQ ID NO 1-100 as provided in the application, or protective variants thereof, or fragments of either of these.

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 03/02718

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC 7 C07K14/195 C12N15/31 A61K39/02 A61K38/00

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)

IPC 7 C12N C07K 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, EMBL, BIOSIS

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 02 18600 A (TITBALL RICHARD WILLIAM ;GREEN MICHAEL (GB); MACK KERRI ANNE (GB);) 7 March 2002 (2002-03-07) cited in the application the whole document	1-10
X	----- SJOSTEDT A ET AL: "HUMORAL AND CELL-MEDIATED IMMUNITY IN MICE TO A 17-KILODALTON LIPOPROTEIN OF FRANCISELLA-TULARENSIS EXPRESSED BY SALMONELLA-TYPHIMURIUM" INFECTION AND IMMUNITY, vol. 60, no. 7, 1992, pages 2855-2862, XP008022379 ISSN: 0019-9567 cited in the application the whole document -----	1-10
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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

23 September 2003

Date of mailing of the international search report

15. 12. 2003

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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 03/02718

## 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>FULOP MARK ET AL: "Role of two outer membrane antigens in the induction of protective immunity against Francisella tularensis strains of different virulence."  FEMS IMMUNOLOGY AND MEDICAL MICROBIOLOGY, vol. 13, no. 3, 1996, pages 245-247, XP002255306  ISSN: 0928-8244  the whole document</p>	1-10
X	<p>PRIOR R G ET AL: "Preliminary analysis and annotation of the partial genome sequence of Francisella tularensis strain Schu 4."  JOURNAL OF APPLIED MICROBIOLOGY, vol. 91, no. 4, October 2001 (2001-10), pages 614-620, XP002255307  ISSN: 1364-5072  page 619</p>	1-10
P,X	<p>HUBALEK MARTIN ET AL: "Towards proteome database of Francisella tularensis."  JOURNAL OF CHROMATOGRAPHY B, vol. 787, no. 1, 2003, pages 149-177, XP002255308  ISSN: 1387-2273  table 3</p>	1-10
E	<p>WO 03 073351 A (DUFFIELD MELANIE LORRAINE ;ROWE SONYA CLAIRE (GB); TITBALL RICHARD)  4 September 2003 (2003-09-04)  cited in the application  the whole document</p>	1-11

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/GB 03/02718

## 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 claim 11 is 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 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.:

1-10

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
- No protest accompanied the payment of additional search fees.

# INTERNATIONAL SEARCH REPORT

International Application No. PCT/GB 03/02718

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

## INTERNATIONAL SEARCH REPORT

International Application No. PCT/GB 03/02718

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 1-10

A protein identified by SEQ ID NO: 1 for use in producing a protective immune response in a mammal against infection by proteins that are used to initiate a protective immune response against infection by *Francisella tularensis*, a nucleic acid encoding said protein, a pharmaceutical composition comprising said protein.

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### Inventions 2 to 10 : Claims 1-10

A protein identified by SEQ ID NO: 2-10 for use in producing a protective immune response in a mammal against infection by proteins that are used to initiate a protective immune response against infection by *Francisella tularensis*, a nucleic acid encoding said protein, a pharmaceutical composition comprising said protein.

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### Inventions 11 to 50 : Claims 1-3, 5-8, and 10

A protein identified by SEQ ID NO: 11-50 for use in producing a protective immune response in a mammal against infection by proteins that are used to initiate a protective immune response against infection by *Francisella tularensis*, a nucleic acid encoding said protein, a pharmaceutical composition comprising said protein.

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### Inventions 49 to 100 : Claims 1, 2, 5-8 and 10 :

A protein identified by SEQ ID NO: 51-100 for use in producing a protective immune response in a mammal against infection by proteins that are used to initiate a protective immune response against infection by *Francisella tularensis*, a nucleic acid encoding said protein, a pharmaceutical composition comprising said protein.

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 03/02718

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
WO 0218600	A	07-03-2002	AU	8235001 A		13-03-2002
			WO	0218600 A1		07-03-2002
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WO 03073351	A	04-09-2003	WO	03073351 A2		04-09-2003
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