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- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))
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(88) Date of publication of the international search report:

9 December 2010

(54) Title: PEPTIDES PROTECTIVE AGAINST *E. FAECALIS*, METHODS AND USES RELATING THERETO

(57) Abstract: The present invention relates to a protective peptide of *Enterococcus faecalis* (*E. faecalis*) or a functional active variant thereof, optionally further consisting of additional amino acid residue(s); a nucleic acid coding for the same; a pharmaceutical composition comprising said peptide or said nucleic acid; an antibody or functional active fragment thereof specifically binding to the antigen; a hybridoma cell line which produces said antibody; a method for producing said antibody; a pharmaceutical composition comprising said antibody; the use of said peptide or said nucleic acid for the manufacture of a medicament for the immunization or treatment of a subject; the use of said antibody or functional fragment thereof for the manufacture of a medicament for the treatment of an infection; a method of diagnosing an *E. faecalis* infection; and the use of said peptide for the isolation and/or purification and/or identification of an interaction partner of the peptide.



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INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2010/051341

A. CLASSIFICATION OF SUBJECT MATTER

INV. C07K14/315 C07K16/12 G01N33/569

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)

C07K G01N

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, BIOSIS, 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	WO 2004/106367 A2 (INTERCELL AG [AT]; MEINKE ANDREAS [AT]; NAGY ESZTER [AT]; HANNER MARKU) 9 December 2004 (2004-12-09) the whole document	1-27
A	MEINKE A ET AL: "Antigenome technology: a novel approach for the selection of bacterial vaccine candidate antigens" VACCINE, ELSEVIER LTD, GB LNKD- DOI:10.1016/J.VACCINE.2005.01.005, vol. 23, no. 17-18, 18 March 2005 (2005-03-18), pages 2035-2041, XP004777495 ISSN: 0264-410X the whole document	1-27

☒ 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.

"&" document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2010/051341

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	NAGY ESZTER ET AL: "Anti-infective antibodies: a novel tool to prevent and treat nosocomial diseases." EXPERT REVIEW OF ANTI-INFECTIVE THERAPY FEB 2008 LNKD- PUBMED:18251661, vol. 6, no. 1, February 2008 (2008-02), pages 21-30, XP009134298 ISSN: 1744-8336 the whole document	1-27
A	WO 2008/003515 A1 (INTERCELL AG [AT]; MEINKE ANDREAS [AT]; NAGY ESZTER [AT]; VON GABAIN A) 10 January 2008 (2008-01-10) the whole document	1-27
A	TENG FANG ET AL: "Importance of gls24 in virulence and stress response of Enterococcus faecalis and use of the GlS24 protein as a possible immunotherapy target" JOURNAL OF INFECTIOUS DISEASES, UNIVERSITY OF CHICAGO PRESS, CHICAGO, IL, vol. 191, no. 3, 1 February 2005 (2005-02-01), pages 472-480, XP009134267 ISSN: 0022-1899 the whole document	1-27
A	HUEBNER J ET AL: "Prophylactic and therapeutic efficacy of antibodies to a capsular polysaccharide shared among vancomycin-sensitive and -resistant enterococci" INFECTION AND IMMUNITY, AMERICAN SOCIETY FOR MICROBIOLOGY, WASHINGTON, US LNKD- DOI:10.1128/IAI.68.8.4631-4636.2000, vol. 68, no. 8, 1 August 2000 (2000-08-01), pages 4631-4636, XP002406506 ISSN: 0019-9567 the whole document	1-27
A	NANNINI ESTEBAN C ET AL: "Decreased virulence of a gls24 mutant of Enterococcus faecalis OG1RF in an experimental endocarditis model" INFECTION AND IMMUNITY, AMERICAN SOCIETY FOR MICROBIOLOGY, WASHINGTON, US, vol. 73, no. 11, 1 November 2005 (2005-11-01), pages 7772-7774, XP009134249 ISSN: 0019-9567 the whole document	1-27

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INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2010/051341

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 2008/058706 A2 (UNIVERSITAETSKLINIKUM FREIBURG [DE]; HUEBNER JOHANNES [DE]; HOLST OTTO) 22 May 2008 (2008-05-22) the whole document -----	1-27
A	NALLAPAREDDY SREEDHAR R ET AL: "Endocarditis and biofilm-associated pili of Enterococcus faecalis" JOURNAL OF CLINICAL INVESTIGATION, AMERICAN SOCIETY FOR CLINICAL INVESTIGATION, US, vol. 116, no. 10, October 2006 (2006-10), pages 2799-2807, XP009134244 ISSN: 0021-9738 the whole document -----	1-27
A	SINGH KAVINDRA V ET AL: "In vivo testing of an Enterococcus faecalis efaA mutant and use of efaA homologs for species identification" FEMS IMMUNOLOGY AND MEDICAL MICROBIOLOGY, ELSEVIER SCIENCE B.V., AMSTERDAM, NL LNKD-DOI:10.1111/J.1574-695X.1998.TB01180.X, vol. 21, no. 4, 1 August 1998 (1998-08-01), pages 323-331, XP009134245 ISSN: 0928-8244 [retrieved on 2006-01-17] the whole document -----	1-27

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2010/051341

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 all searchable 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.:

1-27(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: 1-27(partially)

A protective peptide consisting of an antigen of *E. faecalis* of the SEQ ID NO: 21 or a functional active variant of the antigen of SEQ ID NO: 21; a nucleic acid coding for the protective peptide, a pharmaceutical composition comprising at least the protective peptide; an antibody or functional active fragment thereof which binds specifically to the protective peptide; a pharmaceutical composition comprising the antibody; a method of diagnosing an *E. faecalis* infection, use of the peptide for the isolation and/or purification and/or identification of an interaction partner of the peptide; and subject-matter related thereto.

Invention: 2; Claims: 1-27(partially)

A protective peptide consisting of an antigen of *E. faecalis* of the SEQ ID NO: 22 or a functional active variant of the antigen of SEQ ID NO:22; a nucleic acid coding for the protective peptide, a pharmaceutical composition comprising at least the protective peptide; an antibody or functional active fragment thereof which binds specifically to the protective peptide; a pharmaceutical composition comprising the antibody; a method of diagnosing an *E. faecalis* infection, use of the peptide for the isolation and/or purification and/or identification of an interaction partner of the peptide; and subject-matter related thereto.

Invention: 3; Claims: 1, 3-27(all partially)

A protective peptide consisting of an antigen of *E. faecalis* of the SEQ ID NO: 23 or a functional active variant of the antigen of SEQ ID NO:23; a nucleic acid coding for the protective peptide, a pharmaceutical composition comprising at least the protective peptide; an antibody or functional active fragment thereof which binds specifically to the protective peptide; a pharmaceutical composition comprising the antibody; a method of diagnosing an *E. faecalis* infection, use of the peptide for the isolation and/or purification and/or identification of an interaction partner of the peptide; and subject-matter related thereto.

Inventions: 4-5; Claims: 1-27(partially)

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

A protective peptide consisting of an antigen of *E. faecalis* of the SEQ ID NO: 24 or 25 or a functional active variant of the antigen of SEQ ID NO: 24 or 25; a nucleic acid coding for the protective peptide, a pharmaceutical composition comprising at least the protective peptide; an antibody or functional active fragment thereof which binds specifically to the protective peptide; a pharmaceutical composition comprising the antibody; a method of diagnosing an *E. faecalis* infection, use of the peptide for the isolation and/or purification and/or identification of an interaction partner of the peptide; and subject-matter related thereto.

Inventions: 6-20; Claims: 1, 3-27(all partially)

A protective peptide consisting of an antigen of *E. faecalis* of the SEQ ID NO: 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39 or 40 or a functional active variant of the antigen of SEQ ID NO: 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39 or 40, a nucleic acid coding for the protective peptide, a pharmaceutical composition comprising at least the protective peptide; an antibody or functional active fragment thereof which binds specifically to the protective peptide; a pharmaceutical composition comprising the antibody; a method of diagnosing an *E. faecalis* infection, use of the peptide for the isolation and/or purification and/or identification of an interaction partner of the peptide; and subject-matter related thereto.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2010/051341

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2004106367 A2	09-12-2004	AU 2004242842 A1	09-12-2004
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