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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

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Published:

— *with international search report (Art. 21(3))*

— *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))*

— *with sequence listing part of description (Rule 5.2(a))*

(88) Date of publication of the international search report:
2 March 2017

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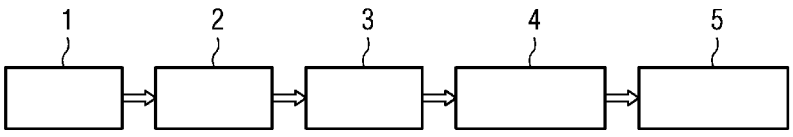
(54) Title: GENETIC TESTING FOR PREDICTING RESISTANCE OF GRAM-NEGATIVE PROTEUS AGAINST ANTIMICROBIAL AGENTS



(57) Abstract: The invention relates to a method of determining an infection of a patient with Proteus species potentially resistant to antimicrobial drug treatment, a method of selecting a treatment of a patient suffering from an antibiotic resistant Proteus infection, and a method of determining an antibiotic resistance profile for bacterial microorganisms of Proteus species, as well as computer program products used in these methods. In an exemplary method, a sample 1, is used for molecular testing 2, and then a molecular fingerprint 3 is taken. The result is then compared to a reference library 4, and the result 5 is reported.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/067440

A. CLASSIFICATION OF SUBJECT MATTER
INV. C12Q1/68
ADD.

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)
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 practicable, 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	L. M. WEIGEL ET AL: "DNA Gyrase and Topoisomerase IV Mutations Associated with Fluoroquinolone Resistance in Proteus mirabilis", ANTIMICROBIAL AGENTS AND CHEMOTHERAPY, vol. 46, no. 8, 1 August 2002 (2002-08-01) , pages 2582-2587, XP055263850, US ISSN: 0066-4804, DOI: 10.1128/AAC.46.8.2582-2587.2002 the whole document ----- -/--	1-11

[X] Further documents are listed in the continuation of Box C.

[X] 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 application or patent 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	Date of mailing of the international search report
17 October 2016	13/01/2017

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Costa Roldán, Nuria

1

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/067440

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	NAKANO R ET AL: "Prevalence and genetic background of fluoroquinolone resistance in clinical isolates of Proteus mirabilis", INTERNATIONAL JOURNAL OF ANTIMICROBIAL AGENTS, vol. 29, no. Suppl. 2, March 2007 (2007-03), page S231, XP002756279, & 17TH EUROPEAN CONGRESS OF CLINICAL MICROBIOLOGY AND INFECTIOUS DISEASES/25TH INTERNATIONAL CONGRESS; MUNICH, GERMANY; MARCH 31 -APRIL 03, 2007 ISSN: 0924-8579 the whole document	1-11
X	SAITO RYOICHI ET AL: "Role of type II topoisomerase mutations and AcrAB efflux pump in fluoroquinolone-resistant clinical isolates of Proteus mirabilis", JOURNAL OF ANTIMICROBIAL CHEMOTHERAPY, vol. 58, no. 3, September 2006 (2006-09), pages 673-677, XP002756280, ISSN: 0305-7453 abstract	1-11
X	SAITO RYOICHI ET AL: "Mutations of DNA gyrase and topoisomerase IV in clinical isolates of fluoroquinolone-resistant Proteus mirabilis", JAPANESE JOURNAL OF ANTIBIOTICS, vol. 59, no. 1, February 2006 (2006-02), pages 41-43, XP009189400, ISSN: 0368-2781 abstract	1-11
X	HU YAN-YAN ET AL: "Emergence of Proteus mirabilis Harboring bla(KPC-2) and qnrD in a Chinese Hospital", ANTIMICROBIAL AGENTS AND CHEMOTHERAPY, vol. 56, no. 5, May 2012 (2012-05), pages 2278-2282, XP002756282, abstract	1-11
A	WO 2012/106432 A2 (BAYLOR COLLEGE MEDICINE [US]; ZECHIEDRICH E LYNN [US]; SWICK MICHELLE) 9 August 2012 (2012-08-09) abstract paragraph [0020]; claims 1-9	1-11

1

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP2016/067440

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.:

1-11(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.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2016/067440

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2012106432 A2	09-08-2012	US 2014030712 A1	30-01-2014
		WO 2012106432 A2	09-08-2012

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-11(partially)

Methods for diagnosis an antimicrobial drug resistant Proteus species and methods for selecting a treatment by determining the presence of at least one mutation in at least two marker genes, wherein the first marker gene is the first gene listed in claim 1 (i.e. parC gene) in combination with at least one other gene as listed in claim 1.

2-14. claims: 1-11(partially)

For the second invention the same as for invention 1, however, wherein the first marker gene is the second gene listed in claim 1 (i.e. secG gene) in combination with at least one other gene as listed in claim 1. The same applies for inventions 3 to 14, i.e. for invention 3 the first gene which corresponds to cyoC is analysed in combination with at least one other gene as listed in claim 1; for invention 4 the first gene which corresponds to pykF gene is analysed in combination with at least one other gene as listed in claim 1 and subsequently until invention 14.

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15. claims: 12-16

Methods for determining genetic sites associated with antimicrobial drug resistance in Proteus by sequence comparison analysis.
