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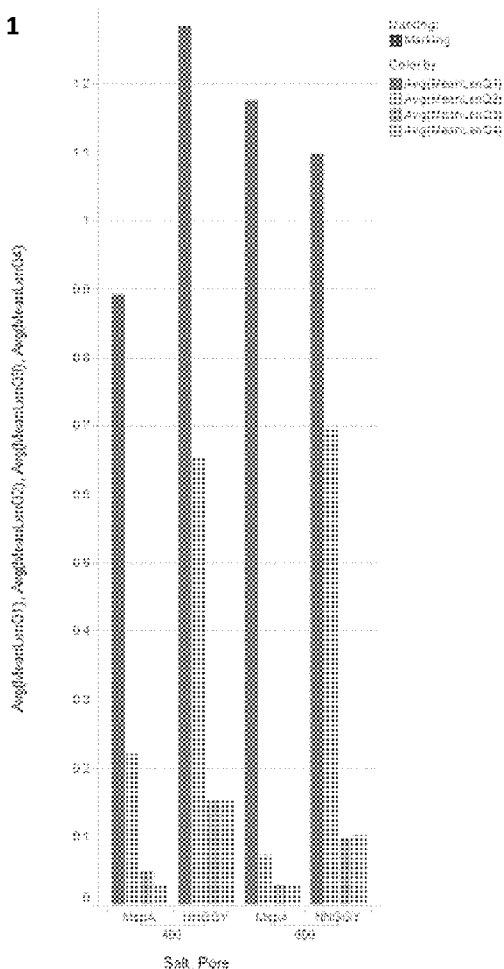
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[Continued on next page]

(54) Title: MUTANT PORES

(57) Abstract: The invention relates to mutant forms of Msp. The invention also relates to nucleic acid characterisation using Msp.

Fig. 1



WO 2012/107778 A3



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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, 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, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, 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:

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29 November 2012

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2012/050301

A. CLASSIFICATION OF SUBJECT MATTER
INV. G01N33/487 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)
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 practicable, search terms used)
EPO-Internal, BIOSIS, WPI Data, Sequence Search

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2010/034018 A2 (UNIV WASHINGTON [US]; UAB RESEARCH FOUNDATION [US]; GUNDLACH JENS H [U] 25 March 2010 (2010-03-25) page 13, line 8 - line 15 page 19, line 17 - page 25, line 18 page 53, line 8 - page 54, line 22 page 76, line 25 - page 78, last line; table 7 claims 80-97, 112-115 ----- -/--	1-9, 17-29

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 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 6 September 2012	Date of mailing of the international search report 24/09/2012
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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 Niebuhr-Ebel, K
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INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2012/050301

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	BUTLER TOM Z ET AL: "Single-molecule DNA detection with an engineered MspA protein nanopore", PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA, vol. 105, no. 52, December 2008 (2008-12), pages 20647-20652, XP007920663, ISSN: 0027-8424 abstract figure 1	1-9, 17-29
X	----- WO 01/16327 A2 (NIEDERWEIS MICHAEL [DE]; BOSSMANN STEFAN [DE]) 8 March 2001 (2001-03-08) sequence 3 -----	1-9, 17-29

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2012/050301

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.:

1-9, 18-29(completely); 17(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:

1. claims: 1-9, 18-29(completely); 17(partially)

A mutant Msp monomer comprising a variant of SEQ ID NO: 2

2. claims: 10-16(completely); 17(partially)

A construct comprising two or more covalently attached monomers derived from Msp

3. claims: 30-52

A method of characterising a target nucleic acid sequence with an Msp pore and a nucleic acid binding protein (Phi29 DNA polymerase)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2012/050301

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2010034018 A2	25-03-2010	CA 2774710 A1	25-03-2010
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