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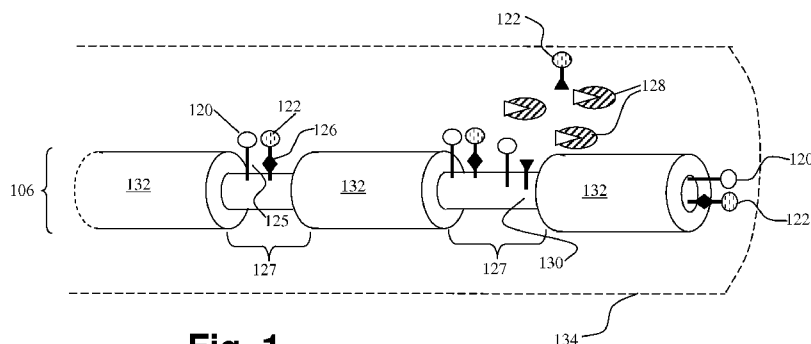
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- with international search report (Art. 21(3))
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(88) Date of publication of the international search report:

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(54) Title: RESONANCE ENERGY TRANSFER BASED DETECTION OF NOSOCOMIAL INFECTION

**Fig. 1**

(57) Abstract: Disclosed herein are methods and devices for detection of hospital acquired infections. Disclosed methods may be utilized for continuous *in vivo* monitoring of a potential infection site or for periodic *in vitro* monitoring of tissue or fluid from a patient and may be utilized to alert patients and/or health care providers to the presence of a pathogen at an early stage of infection. Disclosed methods utilize fluorophore pairs that optically interact with one another according to Forster resonance energy transfer (FRET) or bioluminescence resonance energy transfer (BRET) mechanism. One member of the pair or a cofactor that interacts with an enzyme to form a member of the pair may be tethered to a device by a substrate that is specific for an enzyme expressed by a targeted pathogen. Upon interaction of the enzyme with the substrate, an optically detectable signal may be altered or initiated, detection of which may then provide information as to the existence of the pathogen at the site.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2008/053652**A. CLASSIFICATION OF SUBJECT MATTER***G01N 21/00(2006.01)i, G01N 33/569(2006.01)i, G01N 33/535(2006.01)i*

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 G01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Utility models and applications for Utility models since 1975

Japanese Utility models and applications for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKIPASS (KIPO internal), NDSL

keywords: "pathogen" "optical fiber", "acceptor" and similar terms.

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	Ko, Sungho & Grant, Sheila A., "A novel FRET-based optical biosensor for rapid detection of Salmonella typhimurium", Biosensors and Bioelectronics, 2006, Vol. 21, pp. 1283-1290 see pages 1284-1286; figures 1 and 2	1-5, 9-10, 12-13, 15-17, 20, 24
A	US 2004-0215134 A1 (SOYKAN, ORHAN & DONOVAN, MAURA G.) October 28, 2004 see pages 2-4; figures 1-4 and 6	1-5, 9-10, 12-13, 15-17, 20, 24
A	JP 11-56398 A (HAMAMATSU PHOTONICS K. K.) March 2, 1999 see pages 3 and 4; figure 2	1-5, 9-10, 12-13, 15-17, 20, 24
A	US 07096053 B2 (LOEB, GERALD E & GEORGE, THOMAS) August 22, 2006 see columns 4-7; figure 1	1-5, 9-10, 12-13, 15-17, 20, 24



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

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"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/IB2008/053652

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.: 6-8, 11, 14, 18-19, 21-23
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:

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 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/IB2008/053652

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2004-0215134 A1	28.10.2004	CA 2523645 A1 EP 1618367 A2 JP 2006-525804 A US 2008-0227083 A1 US 07473548 B2 WO 2004-097036 A2 WO 2004-097036 A3	11.11.2004 25.01.2006 16.11.2006 18.09.2008 06.01.2009 11.11.2004 11.11.2004
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US 07096053 B2	22.08.2006	EP 1744664 A2 US 2007-0010726 A1 US 2005-0267326 A1 US 2003-0171666 A1 WO 2005-094285 A2 WO 2005-094285 A3 WO 2006-086578 A1	24.01.2007 11.01.2007 01.12.2005 11.09.2003 13.10.2005 13.10.2005 17.08.2006