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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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(54) **Title:** MICROFLUIDIC DEVICE-BASED NUCLEIC ACID PURIFICATION METHOD

(57) **Abstract:** A method is provided for purifying nucleic acid from a sample in a microfluidic device. The method can be used to purify nucleic acids from any source known in the art that comprises nucleic acids, such as prokaryotic or eukaryotic organisms, viruses, cell, tissues, organs, etc. In a specific example, the tissue is whole blood. The method for purifying nucleic acid may run fully automated in the microfluidic device.



A. CLASSIFICATION OF SUBJECT MATTER*C12N 15/10(2006.01)i, C12Q 1/68(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)

C12N 15/10; C12M 1/00; C12N 15/09; C12N 1/06; C12Q 1/68; C12N 1/08

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

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: purifying nucleic acid, lysed liquid solution

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2004-0029166 A1 (KEJUN FAN) 12 February 2004. See abstract, claims 1-7.	1-16
A	JP 2002-500878 A (AVENTIS PASTEUR) 15 January 2002. See abstract, claims 12-20.	1-16
A	JP 2003-144149 A (TAKARA HOLDINGS INC) 20 May 2003. See abstract, claim 1.	1-16
A	EP 0245945 A2 (APPLIED BIOSYSTEMS, INC.) 19 November 1987. See abstract, claims 1-5.	1-16

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

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"P" document published prior to the international filing date but later than the priority date claimed

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"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

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2004-0029166 A1	12.02.2004	DE 60323579 D1	30.10.2008
		EP 1388588 A1	11.02.2004
		EP 1388588 B1	17.09.2008
		JP 04-196185 B2	17.12.2008
		JP 2004-073193 A	11.03.2004
JP 2002-500878 A	15.01.2002	AU 1999-20604 A1	09.08.1999
		AU 1999-20604 B2	09.01.2003
		CA 2319021 A1	29.07.1999
		EP 1049766 A1	08.11.2000
		FR 2773818 A1	23.07.1999
		FR 2773818 B1	18.02.2000
		US 6664049 B1	16.12.2003
		WO 99-37750 A1	29.07.1999
JP 2003-144149 A	20.05.2003	TW 416867 B	01.01.2001
		WO 98-43724 A1	08.10.1998
EP 0245945 A2	19.11.1987	DE 3788082 D1	16.12.1993
		EP 0215533 A2	25.03.1987
		EP 0215533 A3	22.06.1988
		EP 0215533 B1	15.12.1993
		EP 0245945 A3	26.07.1989
		EP 0245945 B1	10.11.1993
		JP 08015437 B2	21.02.1996
		JP 08015438 B2	21.02.1996
		JP 61-167697 A	29.07.1986
		JP 63-022194 A	29.01.1988
		US 05346999 A	13.09.1994