

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
29 January 2009 (29.01.2009)

PCT

(10) International Publication Number
WO 2009/014766 A3

(51) International Patent Classification:

C12N 15/10 (2006.01) *C12Q 1/68* (2006.01)
C07H 21/00 (2006.01)

(21) International Application Number:

PCT/US2008/009151

(22) International Filing Date: 28 July 2008 (28.07.2008)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/952,214 26 July 2007 (26.07.2007) US

(71) Applicant (for all designated States except US): **THE UNIVERSITY OF UTAH RESEARCH FOUNDATION** [US/US]; 615 Arapsee Dr, Salt Lake City, Utah 84108 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **KRUEGER, Gerald** [US/US]; 1590 S Devonshire Dr, Salt Lake City, Utah

84108 (US). **BENSON, Nicholas** [US/US]; 9571 Oviedo Street, San Diego, California 92129 (US).

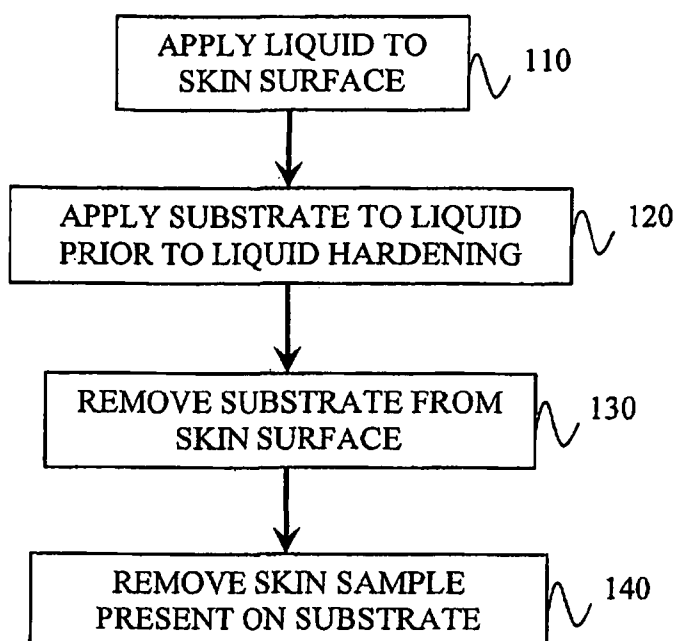
(74) Agent: **MCCALLUM, Jennifer M.**; The McCallum Law Firm, P.C., 685 Briggs Street, P.O. Box 929, Erie, Colorado 80516 (US).

(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, 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, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,

[Continued on next page]

(54) Title: NON-INVASIVE RECOVERY OF RNA AND ANALYSIS OF GENE EXPRESSION IN SKIN



(57) Abstract: A liquid is placed on an area of skin in which an RNA sample is to be extracted. The liquid is configured to harden which allows for the hardened material to be peeled off. In some implementations, a substrate is attached to the liquid before it hardens to facilitate removal of the skin sample.

100

FIG. 1



FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL,
NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG,
CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

Declaration under Rule 4.17:

- *of inventorship (Rule 4.17(iv))*

(88) Date of publication of the international search report:

9 April 2009

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2008/009151**A. CLASSIFICATION OF SUBJECT MATTER***C12N 15/10(2006.01)i, C07H 21/00(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)

IPC C12N 15/10, A61B 10/00, C12Q 1/68

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)

eKIPASS, NCBI PubMed database, Delphion Research Intellectual Property Network database

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 7,267,950 B2 (Belly et al.) Sep. 11, 2007. See the column 2, lines 52-67 and claim 8.	20
A	WO 02-15800 A1 (Matriano, James, A. et al.) Feb. 28, 2002. See the claims 1 - 26.	20
A	US 5,990,302 A (Kuroita et al.) Nov. 23, 1999. See the claim 1 - 26.	20
A	US 5,620,852 A (Lin et al.) Apr. 15, 1997. See the claim 1 - 19.	20



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 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

30 JANUARY 2009 (30.01.2009)

Date of mailing of the international search report

30 JANUARY 2009 (30.01.2009)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 139 Seonsa-ro, Seo-
gu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

JEONG Eui Jun

Telephone No. 82-42-481-5549



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2008/009151**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.: 1 - 19
because they relate to subject matter not required to be searched by this Authority, namely:
Claims 1-19 pertain to methods for treatment of the human by diagnostic method practiced on the human body, and thus relate to a subject matter which this International Searching Authority is not required, under Article 17(2)(a)(i) of the PCT and Rule 39(iv) of the Regulations under the PCT, to search.
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:

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/US2008/009151

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 7267950 B2	11.09.2007	AU 2004-201841 A1	18.11.2004
		BR 0401650 A	12.07.2005
		CA 2463716 A1	01.11.2004
		CN 1680422 A	12.10.2005
		EP 1559784 A2	03.08.2005
		JP 2004-329213 A	25.11.2004
		KR 10-2004-0094649	10.11.2004
		PA 04004243 A	29.11.2004
		US 2004-219534 A1	04.11.2004
WO 02-15800 A1	28.02.2002	AU 8346901 A	04.03.2002
		CA 2420343 A1	28.02.2002
		CN 1471378 A	28.01.2004
		EP 1315459 A1	04.06.2003
		JP 2004-506914 T	04.03.2004
		PA 03001694 A	01.11.2004
		KR 10-2003-0068127	19.08.2003
US 5990302 A	23.11.1999	DE 69734263 D1	09.02.2006
		EP 0818461 A2	14.01.1998
		EP 0818461 B1	28.09.2005
		JP 10-075784 A	24.03.1998
US 5620852 A	15.04.1997	AT 191513 T	15.04.2000
		AU 9058091 A	11.06.1992
		DE 69132098 D1	11.05.2000
		EP 0557448 B1	05.04.2000
		EP 0557448 A1	01.09.1993
		US 5284940 A	08.02.1994
		US 5654179 A	05.08.1997
		WO 92-08807 A1	29.05.1992