

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
28 December 2006 (28.12.2006)

PCT

(10) International Publication Number
WO 2006/138257 A3

- (51) International Patent Classification:
C12Q 1/68 (2006.01) C12M 1/36 (2006.01)
C12M 1/00 (2006.01) C07H 21/04 (2006.01)
- (21) International Application Number: PCT/US2006/022895
- (22) International Filing Date: 13 June 2006 (13.06.2006)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/690,771 15 June 2005 (15.06.2005) US
60/725,116 7 October 2005 (07.10.2005) US
60/776,415 24 February 2006 (24.02.2006) US
- (71) Applicant (for all designated States except US): **CALL-IDA GENOMICS, INC.** [US/US]; 750 North Pastoria Avenue, Sunnyvale, CA 94085 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **DRMANAC, Radoje** [US/US]; 27635 Red Rock Road, Los Altos Hills, CA 94022 (US). **CALLOW, Matthew, J.** [AU/US]; 3 Batten Lane, Redwood City, CA (US). **DRMANAC, Snezana** [US/US]; 27635 Red Rock Road, Los Altos Hills, CA 94022 (US). **HAUSER, Brian, K.** [US/US]; 1005 Virginia Avenue, Campbell, CA 95008 (US). **YEUNG, George** [CN/US]; 102 Magnolia Lane, Mountain View, CA 94043 (US).
- (74) Agent: **MACEVICZ, Stephen, C.**; Complete Genomics, INC., C/O Chief Financial Officer, 750 North Pastoria Avenue, Sunnyvale, CA 94085 (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, 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, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, 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
— with sequence listing part of description published separately in electronic form and available upon request from the International Bureau
- (88) Date of publication of the international search report:
11 December 2008

(54) Title: SINGLE MOLECULE ARRAYS FOR GENETIC AND CHEMICAL ANALYSIS

(57) Abstract: Random arrays of single molecules are provided for carrying out large scale analyses, particularly of biomolecules, such as genomic DNA, cDNAs, proteins, and the like. In one aspect, arrays of the invention comprise concatemers of DNA fragments that are randomly disposed on a regular array of discrete spaced apart regions, such that substantially all such regions contain no more than a single concatemer. Preferably, such regions have areas substantially less than $1 \mu\text{m}^2$ and have nearest neighbor distances that permit optical resolution of on the order of 10^5 single molecules per cm^2 . Many analytical chemistries can be applied to random arrays of the invention, including sequencing by hybridization chemistries, sequencing by synthesis chemistries, SNP detection chemistries, and the like, to greatly expand the scale and potential applications of such techniques.



WO 2006/138257 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US06/22895

A. CLASSIFICATION OF SUBJECT MATTER

IPC: C12Q 1/68(2006.01); C12M 1/00(2006.01); 1/36(2006.01); C07H 21/04(2006.01)

USPC: 435/6,174,283.1,287.2;536/23.1,24.3

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)

U.S. : 435/6, 174, 283.1, 287.2; 536/23.1, 24.3

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)
EAST, GOOGLE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2002/0012930 A1 (ROTHBERG et al) 31 January 2002 (31.01.2002) columns 7-14.	1-89
Y	US 6,316,229 B1 (LIZARDI et al) 13 November 2001 (13.11.2001) Fig. 30, columns 3-4, 32-38.	1-89
Y	WO 2004/076683 A2 (DRMANAC) 10 September 2004 (10.09.2004) pages 14-29, 53-56.	1-89

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	"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
"E" earlier application or patent published on or after the international filing date	"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
"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)	"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
"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	"&"	document member of the same patent family

Date of the actual completion of the international search

23 April 2008 (23.04.2008)

Date of mailing of the international search report

06 MAY 2008

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
Facsimile No. (571) 273-3201

Authorized officer

BJ Forman
Telephone No. (571)272-0600