

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
12 March 2009 (12.03.2009)

PCT

(10) International Publication Number
WO 2009/031831 A3(51) International Patent Classification:
C12N 5/06 (2006.01)(KR). XYZ BIO INC [US/US]; 1029 Greene Terrace,
Davis, CA 95618 (US).(21) International Application Number:
PCT/KR2008/005211

(72) Inventors; and

(22) International Filing Date:
4 September 2008 (04.09.2008)(75) Inventors/Applicants (for US only): SON, Jung ho
[KR/KR]; 102 dong 1104 ho Byuksantaeyoung APT,
1538 Ssangyong-dong, Cheonahn, Chungcheongnamdo
330-782 (KR). WHANG, Jay hong [KR/KR]; 102 dong
901 ho, Geonyoung APT, 90 Songjeong-dong, Seong-
dong-gu, Seoul 133-757 (KR). GANG, Young seok
[KR/KR]; 8-203, Gaepo 1 cha Woosong APT, 503 32/2,
Daechi-dong, Gangnam-gu, Seoul 135-280 (KR).

(25) Filing Language: Korean

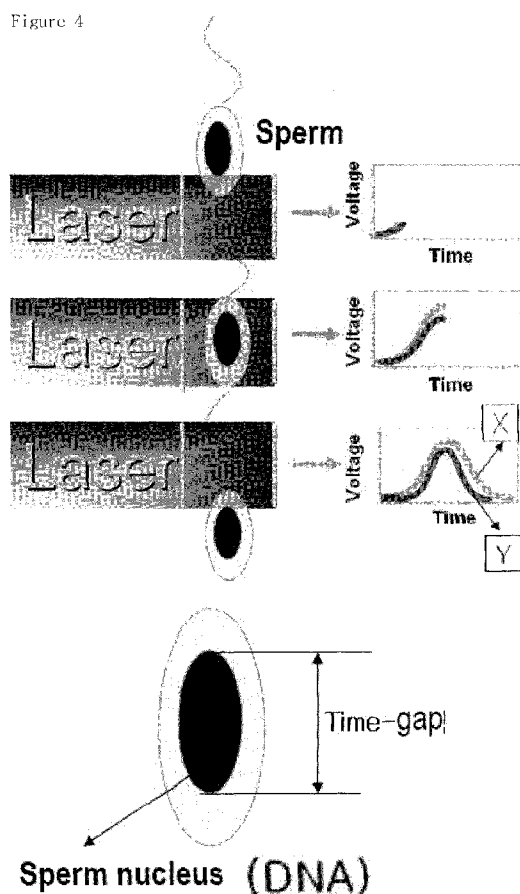
(26) Publication Language: English

(30) Priority Data:
10-2007-0089269 4 September 2007 (04.09.2007) KR
10-2008-0032903 9 April 2008 (09.04.2008) KR(74) Agent: PARK, Jin ho; 9th floor, Daelim Building, 1600-3
Seocho-dong, Seocho-gu, Seoul 137-877 (KR).(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, KZ, LA, LC, LK, LR,
LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX,(71) Applicants (for all designated States except US): NOAH
BIOTECH. INC [KR/KR]; B-126 BI Center, DanKook
University, San 29, Ahnseo-dong, Cheonahn 330-180

[Continued on next page]

(54) Title: THE NEW PARAMETER FOR X- AND Y- CHROMOSOME BEARING SPERM SORTING WITH HIGH DEGREE
OF PURITY

Figure 4



(57) Abstract: Current invention is about the sex-specific separation of sperm in high purity. For more details, this invention is about the methods for improving the separation efficiency of sperm by removing factors deteriorating separation efficiency by utilizing several parameters and adjusting few conditions for the purpose of separating sperm into X-chromosome bearing and Y-chromosome bearing groups in high purity. Current invention, for the purpose of separating X-chromosome bearing and Y-chromosome bearing sperm based on physiological characteristics, utilize the difference of sperm's nucleus width as a parameter to recognize the difference in DNA content between X and Y chromosome. Current invention is about the sex-specific separation of sperm in high purity. This invention, unlike any known conventional methods, requires neither special conditions nor special treatments, can be conducted in a more realistic environment and, as a results, sex-specific sorting of sperm can be conducted without losing viability or motility. Therefore, the limitation conferred on sorting efficiency by the motility can be overcome by our invention.



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, 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*
- *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:**
7 May 2009

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2008/005211**A. CLASSIFICATION OF SUBJECT MATTER***C12N 5/06(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, A01N, G01N

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)

PubMed (key words: sperm, separation, sex chromosome)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,514,537 A (BOARD OF SUPERVISORS OF LOUISIANA STATE UNIVERSITY AND AGRICULTURAL AND MECHANICAL COLLEGE) 7 May 1996 See abstract and claims	1 - 15
X	WO 01/85913 A2 (XY, INC.) 15 Nov. 2001 See abstract, figures and claims	1 - 15
X	WO 2004/088283 A2 (MONSANTO TECHNOLOGY LLC) 14 Oct. 2004 See abstract, pages 137-144, 169-173, 239-280	1 - 15



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

20 MARCH 2009 (20.03.2009)

Date of mailing of the international search report

20 MARCH 2009 (20.03.2009)

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

KIM, KYOUNG MI

Telephone No. 82-42-481-8161



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2008/005211

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5514537 A	07.05.1996	None	
WO 01-85913 A2	15.11.2001	AU 2001-263039 B2 AU 2001-63039 A1 AU 2006-230651 A1 AU 6303901 A BR 0110731 A CA 2408939 A1 CN 1433267 A EP 1298991 A2 HU 0302232 A2 IL 152714 D0 JP 2003-532411 KR 10-2003-0032950 NO 20025370 D0 NO 20025370 A RU 2297198 C2 US 7371517 ZA 200209139 A	20.11.2001 20.11.2001 09.11.2006 20.11.2001 27.04.2004 15.11.2001 30.07.2003 09.04.2003 28.10.2003 24.06.2003 05.11.2003 26.04.2003 08.11.2002 07.01.2003 20.04.2007 13.05.2008 03.02.2004
WO 2004-088283 A2	14.10.2004	AT 369867 T AU 2004-225436 A1 AU 2004-226343 A1 AU 2004-226343 B2 AU 2004-226343 A1 PI 0408852 A PI 0408857 A CA 2518882 A1 CN 1795004 A CN 1795382 A DE 602004008241 D1 EP 1608382 A1 EP 1608382 B1 EP 1608963 A2 JP 2006-524054 JP 2006-525019 T PA 05010492 A WO 2004-087177 A1 WO 2004-088283 A3	15.09.2007 14.10.2004 14.10.2004 14.10.2004 14.10.2004 04.04.2006 11.04.2006 14.10.2004 28.06.2006 28.06.2006 27.09.2007 28.12.2005 15.08.2007 28.12.2005 26.10.2006 09.11.2006 25.05.2006 14.10.2004 11.08.2005