

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
25 May 2001 (25.05.2001)

PCT

(10) International Publication Number
WO 01/36679 A3

- (51) International Patent Classification⁷: **C12Q 1/68**
- (21) International Application Number: PCT/US00/31096
- (22) International Filing Date:
14 November 2000 (14.11.2000)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/164,932 15 November 1999 (15.11.1999) US
- (71) Applicants and
(72) Inventors: **HARTWELL, John, G.** [US/US]; 3140 Gershwin Lane, Silver Spring, MD 20904 (US). **HOKE, Glenn, D.** [US/US]; 919 Leafy Hollow Circle, Mt. Airy, MD 21771 (US).
- (74) Agents: **GARRETT, Arthur, S.** et al.; Finnegan, Henderson, Farabow, Garrett & Dunner, L.L.P., 1300 I Street, N.W., Washington, DC 20005-3315 (US).
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).
- Published:
— with international search report
- (88) Date of publication of the international search report:
22 November 2001
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHODS FOR GENERATING SINGLE STRANDED cDNA FRAGMENTS

(57) Abstract: New and improved methods are provided for generating amplified DNA fragments from limited quantities of longer DNAs. The methods are robust and reliable, and can be used to provide gene fragments for use in methods of analyzing gene expression patterns.

WO 01/36679 A3

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/31096

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C12Q1/68

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 7 C12Q

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 practical, search terms used)

EPO-Internal, WPI Data, PAJ, CHEM ABS Data, EMBASE, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 39001 A (AMERSHAM PHARM BIOTECH AB ;ULFENDAHL PER JOHAN (SE)) 5 August 1999 (1999-08-05)	1-5,8-17
Y	See page 9 and claims 4-5 the whole document	6,7
Y	WO 96 40901 A (GEN PROBE INC) 19 December 1996 (1996-12-19) the whole document	1-17
Y	WO 99 53087 A (EUROP LAB MOLEKULARBIOLOG ;ANSORGE WILHELM (DE); FAULSTICH KONRAD) 21 October 1999 (1999-10-21) the whole document	1-17
Y	US 5 418 149 A (GELFAND DAVID H ET AL) 23 May 1995 (1995-05-23) the whole document	1-17
	--- -/--	



Further documents are listed in the continuation of box C.



Patent family members are listed in 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 document 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 another 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

18 May 2001

Date of mailing of the international search report

31/05/2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Hagenmaier, S

INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US 00/31096

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C12Q1/68

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 7 C12Q

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 practical, search terms used)

EPO-Internal, WPI Data, PAJ, CHEM ABS Data, EMBASE, BIOSIS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 39001 A (AMERSHAM PHARM BIOTECH AB ;ULFENDAHL PER JOHAN (SE)) 5 August 1999 (1999-08-05)	1-5,8-17
Y	See page 9 and claims 4-5 the whole document	6,7
Y	WO 96 40901 A (GEN PROBE INC) 19 December 1996 (1996-12-19) the whole document	1-17
Y	WO 99 53087 A (EUROP LAB MOLEKULARBIOLOG ;ANSORGE WILHELM (DE); FAULSTICH KONRAD) 21 October 1999 (1999-10-21) the whole document	1-17
Y	US 5 418 149 A (GELFAND DAVID H ET AL) 23 May 1995 (1995-05-23) the whole document	1-17
	--- -/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in 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 document 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 another 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.
 G document member of the same patent family

Date of the actual completion of the international search

18 May 2001

Date of mailing of the international search report

31/05/2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Hagenmaier, S

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/31096

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 95 33070 A (NEW YORK MEDICAL COLLEGE) 7 December 1995 (1995-12-07) the whole document ----	1-17
Y	VAUGHAN PATRICK ET AL: "A novel process for mutation detection using uracil DNA-glycosylase." NUCLEIC ACIDS RESEARCH, vol. 26, no. 3, 1 February 1998 (1998-02-01), pages 810-815, XP002167705 ISSN: 0305-1048 the whole document ----	1-17
Y	D'HAM C ET AL: "Excision of 5,6-dihydroxy-5,6-dihydrothymine, 5,6-dihydrothymine, and 5-hydroxycytosin from defined sequence oligonucleotides by Escherichia coli endonuclease III and fpg proteins: Kinetic and mechanistic aspects" BIOCHEMISTRY, AMERICAN CHEMICAL SOCIETY. EASTON, PA, US, vol. 38, 1999, pages 3335-3344, XP002164194 ISSN: 0006-2960 the whole document ----	6,7
Y	WO 99 47536 A (BERNAUER ANNETTE) 23 September 1999 (1999-09-23) the whole document ----	6,7
A	WO 96 40902 A (TREVIGEN INC) 19 December 1996 (1996-12-19) the whole document ----	
A	WO 91 05065 A (STRATAGENE INC) 18 April 1991 (1991-04-18) the whole document ----	
P,X	WO 00 65088 A (AMERSHAM PHARM BIOTECH AB ;ULFENDAHL PER JOHAN (SE); WONG KIN CHUN) 2 November 2000 (2000-11-02) the whole document ----	1-5,8-17
P,X	US 6 090 553 A (MATSON ROBERT S) 18 July 2000 (2000-07-18) the whole document ----	1-5,8-17
P,Y	DE 198 56 796 A (BIOCHIP TECHNOLOGIES GMBH) 15 June 2000 (2000-06-15) the whole document -----	1-17

INTERNATIONAL SEARCH REPORT

Information on patent family members

Intern: al Application No

PCT/US 00/31096

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9939001 A	05-08-1999	AU 3027699 A EP 1051523 A	16-08-1999 15-11-2000
WO 9640901 A	19-12-1996	US 5739311 A US 5932450 A US 5652126 A AU 5921896 A CA 2222510 A EP 0747479 A JP 11513881 T US 5916777 A	14-04-1998 03-08-1999 29-07-1997 30-12-1996 19-12-1996 11-12-1996 30-11-1999 29-06-1999
WO 9953087 A	21-10-1999	DE 19815864 A EP 1084266 A	14-10-1999 21-03-2001
US 5418149 A	23-05-1995	US 5693517 A US 5561058 A AT 176002 T AU 665338 B AU 8532791 A CA 2087724 A DE 69130800 D DE 69130800 T DK 540693 T EP 0540693 A ES 2128323 T GR 3029987 T JP 6501612 T US 5310652 A WO 9201814 A US 5618703 A US 5641864 A US 5795762 A US 5466591 A	02-12-1997 01-10-1996 15-02-1999 04-01-1996 18-02-1992 25-01-1992 04-03-1999 16-09-1999 13-09-1999 12-05-1993 16-05-1999 30-07-1999 24-02-1994 10-05-1994 06-02-1992 08-04-1997 24-06-1997 18-08-1998 14-11-1995
WO 9533070 A	07-12-1995	AU 2604795 A EP 0711356 A US 5747258 A	21-12-1995 15-05-1996 05-05-1998
WO 9947536 A	23-09-1999	DE 19812103 A AU 3699899 A EP 1047706 A	23-09-1999 11-10-1999 02-11-2000
WO 9640902 A	19-12-1996	US 5656430 A AU 6252796 A EP 0832210 A JP 11506932 T US 5763178 A	12-08-1997 30-12-1996 01-04-1998 22-06-1999 09-06-1998
WO 9105065 A	18-04-1991	US 5354656 A	11-10-1994
WO 0065088 A	02-11-2000	AU 5062500 A	10-11-2000
US 6090553 A	18-07-2000	NONE	
DE 19856796 A	15-06-2000	AU 1657800 A WO 0034299 A	26-06-2000 15-06-2000