PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : C12N 5/10, C12Q 1/00 | A3

(11) International Publication Number: **WO 99/45103**

(43) International Publication Date: 10 September 1999 (10.09.99)

(21) International Application Number: PCT/US99/04535

(22) International Filing Date: 2 March 1999 (02.03.99)

(30) Priority Data:

60/076,567	2 March 1998 (02.03.98)	US
09/059,790	13 April 1998 (13.04.98)	US

(71) Applicant: SIGNAL PHARMACEUTICALS, INC. [US/US]; 5555 Oberlin Drive, San Diego, CA 92121 (US).

(72) Inventors: LI, Ronghao; Apartment 302, 9535 Genesee Avenue, San Diego, CA 92121 (US). SAH, Dinah, W., Y.; Apartment L–210, 5210 Fiore Terrace, San Diego, CA 92122 (US).

(74) Agents: MAKI, David, J. et al.; Seed and Berry LLP, 6300 Columbia Center, 701 Fifth Avenue, Seattle, WA 98104–7092 (US).

(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, 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), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, 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 the receipt of amendments.

(88) Date of publication of the international search report: 25 November 1999 (25.11.99)

(54) Title: HUMAN SPINAL CORD CELL LINES AND METHODS OF USE THEREFOR

(57) Abstract

Conditionally-immortalized human spinal cord cell lines are provided. Such cell lines, which may be clonal, may be used to generate neurons, including motoneurons. The cell lines and/or differentiated cells may be used for the development of therapeutic agents to prevent and treat a variety of spinal cord-related diseases and injuries. The cell lines and/or differentiated cells may also be used in assays and for the general study of spinal cord cell development and differentiation.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	**ES**	Spain	**LS**	Lesotho	**SI**	Slovenia
AM	Armenia	**FI**	Finland	**LT**	Lithuania	**SK**	Slovakia
AT	Austria	**FR**	France	**LU**	Luxembourg	**SN**	Senegal
AU	Australia	**GA**	Gabon	**LV**	Latvia	**SZ**	Swaziland
AZ	Azerbaijan	**GB**	United Kingdom	**MC**	Monaco	**TD**	Chad
BA	Bosnia and Herzegovina	**GE**	Georgia	**MD**	Republic of Moldova	**TG**	Togo
BB	Barbados	**GH**	Ghana	**MG**	Madagascar	**TJ**	Tajikistan
BE	Belgium	**GN**	Guinea	**MK**	The former Yugoslav Republic of Macedonia	**TM**	Turkmenistan
BF	Burkina Faso	**GR**	Greece			**TR**	Turkey
BG	Bulgaria	**HU**	Hungary	**ML**	Mali	**TT**	Trinidad and Tobago
BJ	Benin	**IE**	Ireland	**MN**	Mongolia	**UA**	Ukraine
BR	Brazil	**IL**	Israel	**MR**	Mauritania	**UG**	Uganda
BY	Belarus	**IS**	Iceland	**MW**	Malawi	**US**	United States of America
CA	Canada	**IT**	Italy	**MX**	Mexico	**UZ**	Uzbekistan
CF	Central African Republic	**JP**	Japan	**NE**	Niger	**VN**	Viet Nam
CG	Congo	**KE**	Kenya	**NL**	Netherlands	**YU**	Yugoslavia
CH	Switzerland	**KG**	Kyrgyzstan	**NO**	Norway	**ZW**	Zimbabwe
CI	Côte d'Ivoire	**KP**	Democratic People's Republic of Korea	**NZ**	New Zealand		
CM	Cameroon			**PL**	Poland		
CN	China	**KR**	Republic of Korea	**PT**	Portugal		
CU	Cuba	**KZ**	Kazakstan	**RO**	Romania		
CZ	Czech Republic	**LC**	Saint Lucia	**RU**	Russian Federation		
DE	Germany	**LI**	Liechtenstein	**SD**	Sudan		
DK	Denmark	**LK**	Sri Lanka	**SE**	Sweden		
EE	Estonia	**LR**	Liberia	**SG**	Singapore		

INTERNATIONAL SEARCH REPORT

Intern nal Application No
PCT/US 99/04535

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 C12N5/10 C12Q1/00

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 6 C12N 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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 97 30168 A (UNIV CALIFORNIA) 21 August 1997 (1997-08-21) page 10, line 30 -page 11, line 14 page 11, line 28 -page 13, line 8 page 14, line 3 - line 10 page 15, line 28 - line 30 page 24, line 1 -page 226, line 19 claims 17-20 ---	1-23
X	GB 2 294 946 A (STRINGER BRADLEY MICHAEL JOHN) 15 May 1996 (1996-05-15) page 6, line 2 -page 7, line 24 page 12, line 3 - line 10 page 16, line 21 -page 17, line 1 page 27, line 8 -page 30, line 14 claims 1-27 --- -/--	1-23

[X] Further documents are listed in the continuation of box C.

[X] 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	Date of mailing of the international search report
28 September 1999	12/10/1999

Name and mailing address of the ISA	Authorized officer
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	Stein, A

2

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Interr nal Application No
PCT/US 99/04535

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
X	SAH D W Y ET AL: "BIPOTENT PROGENITOR CELL LINES FROM THE HUMAN CNS" NATURE BIOTECHNOLOGY, vol. 15, no. 6, 1 June 1997 (1997-06-01), pages 574-580, XP002049253 ISSN: 1087-0156 the whole document	1-23
P,X	WO 98 10058 A (SIGNAL PHARM INC) 12 March 1998 (1998-03-12) see the whole document, especially p.10 l.27-31	1-23
P,X	LI R ET AL: "Conditionally immortalized neuronal restricted cell lines from human spinal cord" SOCIETY FOR NEUROSCIENCE ABSTRACTS, vol. 24, no. 1-2, 1998, page 1529 XP002116410 the whole document	1-23

INTERNATIONAL SEARCH REPORT

.ormation on patent family members

Interr ›nal Application No
PCT/US 99/04535

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9730168 A	21-08-1997	US 5770414 A	23-06-1998
		AU 2264297 A	02-09-1997
		CA 2242381 A	21-08-1997
		EP 0892851 A	27-01-1999
GB 2294946 A	15-05-1996	AU 3811995 A	31-05-1996
		CA 2203630 A	17-05-1996
		CZ 9701383 A	15-10-1997
		EP 0792351 A	03-09-1997
		WO 9614400 A	17-05-1996
		HU 77078 A	02-03-1998
		JP 10509314 T	14-09-1998
		AU 5905296 A	11-12-1996
		CA 2218817 A	28-11-1996
		CZ 9703650 A	18-02-1998
		EP 0832187 A	01-04-1998
		WO 9637601 A	28-11-1996
		GB 2301114 A	27-11-1996
		HU 9900243 A	28-05-1999
		JP 11505713 T	25-05-1999
WO 9810058 A	12-03-1998	AU 4331597 A	26-03-1998
		EP 0925357 A	30-06-1999