



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁵ : C12N 15/12, C12P 21/02, 21/08, A61K 39/00, C12N 5/10, C07K 13/00, G01N 33/53	A3	(11) International Publication Number: WO 94/12635 (43) International Publication Date: 9 June 1994 (09.06.94)
(21) International Application Number: PCT/US93/11153 (22) International Filing Date: 17 November 1993 (17.11.93) (30) Priority Data: 07/977,452 17 November 1992 (17.11.92) US (71) Applicant: ICOS CORPORATION [US/US]; 22021 20th Avenue S.E., Bothell, WA 98021 (US). (72) Inventors: GODISKA, Ronald; 18076 101st Avenue N.E., Bothell, WA 98011 (US). GRAY, Patrick, W.; 2244 38th Place East, Seattle, WA 98112 (US). SCHWEICKART, Vicki, Louise; 763 Belmont Place e #307, Seattle, WA 98102 (US). (74) Agent: NOLAND, Greta, E.; Marshall, O'Toole, Gerstein, Murray & Borun, 6300 Sears Tower, 233 South Wacker Drive, Chicago, IL 60606-6402 (US).		(81) Designated States: CA, JP, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> (88) Date of publication of the international search report: 13 October 1994 (13.10.94)
(54) Title: NOVEL SEVEN TRANSMEMBRANE RECEPTORS (57) Abstract DNA sequences encoding novel seven transmembrane receptors and variants thereof are disclosed as well as materials and methods for production of the same by recombinant techniques. Antibody substances specific for each of the seven transmembrane receptors are disclosed as useful for the modulation of the ligand/receptor binding reactions of the receptors.		

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.

AT	Austria	GB	United Kingdom	MR	Mauritania
AU	Australia	GE	Georgia	MW	Malawi
BB	Barbados	GN	Guinea	NE	Niger
BE	Belgium	GR	Greece	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IE	Ireland	NZ	New Zealand
BJ	Benin	IT	Italy	PL	Poland
BR	Brazil	JP	Japan	PT	Portugal
BY	Belarus	KE	Kenya	RO	Romania
CA	Canada	KG	Kyrgystan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CI	Côte d'Ivoire	LI	Liechtenstein	SK	Slovakia
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CN	China	LU	Luxembourg	TD	Chad
CS	Czechoslovakia	LV	Latvia	TG	Togo
CZ	Czech Republic	MC	Monaco	TJ	Tajikistan
DE	Germany	MD	Republic of Moldova	TT	Trinidad and Tobago
DK	Denmark	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	US	United States of America
FI	Finland	MN	Mongolia	UZ	Uzbekistan
FR	France			VN	Viet Nam
GA	Gabon				

INTERNATIONAL SEARCH REPORT

 International Application No
 PCT/US 93/11153

A. CLASSIFICATION OF SUBJECT MATTER

 IPC 5 C12N15/12 C12N5/10 C12P21/02 C07K13/00 C12P21/08
 G01N33/53 A61K39/00

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 5 C07K

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.
A	WO,A,92 18641 (THE TRUSTEES OF BOSTON UNIVERSITY) 29 October 1992 *page 13, line 10 - page 17, line 24; Figure 2; claims* ---	1
A	WO,A,92 17497 (GENENTECH, INC.) 15 October 1992 *page 3, line 20 - page 5, line 12; example 2; claims* ---	1,2
A	NATURE vol. 351, 1991 pages 230 - 233 K. SASAKI ET AL.; 'Cloning and expression of a complementary DNA encoding a bovine adrenal angiotensin II type-1 receptor' cited in the application *abstract; Figure 1* ---	1
-/--		

☒ 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

9 August 1994

Date of mailing of the international search report

14 -09- 1994

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

Yeats, S

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EUROPEAN JOURNAL OF PHARMACOLOGY vol. 227 , 1992 pages 1 - 18 J.P.H. BURBACH ET AL.; 'The structure of neuropeptide receptors' *abstract; Figures 1 and 2; Table 1; pages 2-4* ---	1
P,A	CELL vol. 72 , 1993 pages 415 - 425 K. NEOTE ET AL.; 'Molecular cloning, functional expression, and signaling characteristics of a C-C chemokine receptor' *summary; Figure 1* ---	2
P,X	JOURNAL OF VIROLOGY vol. 67 , 1993 M. BIRKENBACH ET AL.; 'Epstein-Barr virus-induced genes: first lymphocyte-specific G protein-coupled peptide receptors' *abstract; Figures 1 and 2; discussion* -----	1,8-15

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 93/ 11153

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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.:
because they relate to subject matter not required to be searched by this Authority, namely:
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 II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See annex.

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.:

1,16,23,36 (completely) ; 8-15, 30-35(partially)

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/210

LACK OF UNITY OF INVENTION

1. Claims 1,16,23,36 (completely), 8-15,30-35 (partially):
DNA encoding the V31 seven transmembrane receptor
2. Claims 2,17,24,37 (completely); 8-15,30-35 (partially):
DNA encoding the V28 seven transmembrane receptor
3. Claims 3,18,25,38 (completely); 8-15,30-35 (partially):
DNA encoding the V112 seven transmembrane receptor
4. Claims 4,19,26,39 (completely); 8-15,30-35 (partially):
DNA encoding the R20 seven transmembrane receptor
5. Claims 5,20,27,40 (completely); 8-15,30-35 (partially):
DNA encoding the R2 seven transmembrane receptor
6. Claims 6,21,28,41 (completely); 8-15,30-35 (partially):
DNA encoding the R12 seven transmembrane receptor
7. Claims 7,22,29,42 (completely); 8-15,30-35 (partially):
DNA encoding the RM3 seven transmembrane receptor

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/JS 93/11153

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A-9218641	29-10-92	CA-A- 2107682 EP-A- 0579739	11-10-92 26-01-94
WO-A-9217497	15-10-92	EP-A- 0577752	12-01-94



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁵ : C12N 15/12, C12P 21/02, 21/08, A61K 39/00, C12N 5/10, C07K 13/00, G01N 33/53	A3	(11) International Publication Number: WO 94/12635 (43) International Publication Date: 9 June 1994 (09.06.94)
(21) International Application Number: PCT/US93/11153 (22) International Filing Date: 17 November 1993 (17.11.93) (30) Priority Data: 07/977,452 17 November 1992 (17.11.92) US (71) Applicant: ICOS CORPORATION [US/US]; 22021 20th Avenue S.E., Bothell, WA 98021 (US). (72) Inventors: GODISKA, Ronald; 18076 101st Avenue N.E., Bothell, WA 98011 (US). GRAY, Patrick, W.; 2244 38th Place East, Seattle, WA 98112 (US). SCHWEICKART, Vicki, Louise; 763 Belmont Place e #307, Seattle, WA 98102 (US). (74) Agent: NOLAND, Greta, E.; Marshall, O'Toole, Gerstein, Murray & Borun, 6300 Sears Tower, 233 South Wacker Drive, Chicago, IL 60606-6402 (US).		(81) Designated States: CA, JP, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published <i>With a revised version of the international search report.</i> (88) Date of publication of the international search report: 13 October 1994 (13.10.94) (88) Date of publication of the revised version of the international search report: 24 November 1994 (24.11.94)
(54) Title: NOVEL SEVEN TRANSMEMBRANE RECEPTORS (57) Abstract DNA sequences encoding novel seven transmembrane receptors and variants thereof are disclosed as well as materials and methods for production of the same by recombinant techniques. Antibody substances specific for each of the seven transmembrane receptors are disclosed as useful for the modulation of the ligand/receptor binding reactions of the receptors.		

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.

AT	Austria	GB	United Kingdom	MR	Mauritania
AU	Australia	GE	Georgia	MW	Malawi
BB	Barbados	GN	Guinea	NE	Niger
BE	Belgium	GR	Greece	NL	Netherlands
BF	Burkina Faso	HU	Hungary	NO	Norway
BG	Bulgaria	IE	Ireland	NZ	New Zealand
BJ	Benin	IT	Italy	PL	Poland
BR	Brazil	JP	Japan	PT	Portugal
BY	Belarus	KE	Kenya	RO	Romania
CA	Canada	KG	Kyrgyzstan	RU	Russian Federation
CF	Central African Republic	KP	Democratic People's Republic of Korea	SD	Sudan
CG	Congo	KR	Republic of Korea	SE	Sweden
CH	Switzerland	KZ	Kazakhstan	SI	Slovenia
CI	Côte d'Ivoire	LI	Liechtenstein	SK	Slovakia
CM	Cameroon	LK	Sri Lanka	SN	Senegal
CN	China	LU	Luxembourg	TD	Chad
CS	Czechoslovakia	LV	Latvia	TG	Togo
CZ	Czech Republic	MC	Monaco	TJ	Tajikistan
DE	Germany	MD	Republic of Moldova	TT	Trinidad and Tobago
DK	Denmark	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	US	United States of America
FI	Finland	MN	Mongolia	UZ	Uzbekistan
FR	France			VN	Viet Nam
GA	Gabon				

A. CLASSIFICATION OF SUBJECT MATTER

IPC 5 C12N15/12 C12N5/10 C12P21/02 C07K13/00 C12P21/08
G01N33/53 A61K39/00

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 5 C07K

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.
A	WO,A,92 18641 (THE TRUSTEES OF BOSTON UNIVERSITY) 29 October 1992 *page 13, line 10 - page 17, line 24; Figure 2; claims* ---	1
A	WO,A,92 17497 (GENENTECH, INC.) 15 October 1992 *page 3, line 20 - page 5, line 12; example 2; claims* ---	1,2
A	NATURE vol. 351, 1991 pages 230 - 233 K. SASAKI ET AL.; 'Cloning and expression of a complementary DNA encoding a bovine adrenal angiotensin II type-1 receptor' cited in the application *abstract; Figure 1* ---	1
-/--		

☒ 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

9 August 1994

Date of mailing of the international search report

14 -09- 1994

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

Yeats, S

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 93/11153

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EUROPEAN JOURNAL OF PHARMACOLOGY vol. 227 , 1992 pages 1 - 18 J.P.H. BURBACH ET AL.; 'The structure of neuropeptide receptors' *abstract; Figures 1 and 2; Table 1; pages 2-4*	1
P,A	CELL vol. 72 , 1993 pages 415 - 425 K. NEOTE ET AL.; 'Molecular cloning, functional expression, and signaling characteristics of a C-C chemokine receptor' *summary; Figure 1*	2
P,X	JOURNAL OF VIROLOGY vol. 67 , 1993 M. BIRKENBACH ET AL.; 'Epstein-Barr virus-induced genes: first lymphocyte-specific G protein-coupled peptide receptors' *abstract; Figures 1 and 2; discussion*	1,8-15

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 93/ 11153

Box I Observations where certain claims were found unsearchable (Continuation of item 1 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.:
because they relate to subject matter not required to be searched by this Authority, namely:

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 II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See annex.

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.:
2, 8-15 (partially); 17, 24, 30-35 (partially) and 37
relating to the 28 seven transmembrane receptor = group 1 & 2
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.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/210

LACK OF UNITY OF INVENTION

1. Claims 1,16,23,36 (completely), 8-15,30-35 (partially):
DNA encoding the V31 seven transmembrane receptor
2. Claims 2,17,24,37 (completely); 8-15,30-35 (partially):
DNA encoding the V28 seven transmembrane receptor
3. Claims 3,18,25,38 (completely); 8-15,30-35 (partially):
DNA encoding the V112 seven transmembrane receptor
4. Claims 4,19,26,39 (completely); 8-15,30-35 (partially):
DNA encoding the R20 seven transmembrane receptor
5. Claims 5,20,27,40 (completely); 8-15,30-35 (partially):
DNA encoding the R2 seven transmembrane receptor
6. Claims 6,21,28,41 (completely); 8-15,30-35 (partially):
DNA encoding the R12 seven transmembrane receptor
7. Claims 7,22,29,42 (completely); 8-15,30-35 (partially):
DNA encoding the RM3 seven transmembrane receptor

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/JS 93/11153

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A-9218641	29-10-92	CA-A- 2107682 EP-A- 0579739	11-10-92 26-01-94
WO-A-9217497	15-10-92	EP-A- 0577752	12-01-94