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ance Notes on Codes and Abbreviations" appearing at the begin-
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(54) Title: ISOLATED NUCLEIC ACID MOLECULES WHICH ENCODE A SOLUBLE IL-TIF/IL-22 RECEPTOR OR BIND-
ING PROTEIN WHICH BINDS TO IL-TIF/IL-22, AND USES THEREOF

(57) Abstract: The invention relates to soluble proteins which bind to the molecule known as IL-TIF/IL-22. The proteins can
antagonize the effect of IL-TIF/IL-22 on target cells. The nucleic acid molecules encoding the proteins, and uses of the protein, are
also described.



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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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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)

EMBL, EPO-Internal, WPI Data, PAJ, BIOSIS, MEDLINE, CHEM ABS Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DATABASE EMBL 'Online! EMBL; 26 May 1999 (1999-05-26) PHILLIMORE B ET AL.: "Human DNA sequence from clone 503F13 on chromosome 6q24.1-25.2. Contains the IFNGR1 gene for interferon gamma receptor 1 (interferon-gamma receptor alpha chain), ESTs, STSs, GSSs and a putative CpG island." Database accession no. AL050337 XP002206184 Note: 98.0% nt seq identity with SEQ ID NO:10 in 1690 nt overlap (5768-7449:2367-678). the whole document --- -/--	1,27



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Patent family members are listed in annex.

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/29576

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DUMOUTIER L ET AL.: "Human interleukin-10-related T cell-derived inducible factor: Molecular cloning and functional characterization as an hepatocyte-stimulating factor" PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF USA, vol. 97, no. 18, 29 August 2000 (2000-08-29), pages 10144-10149, XP000946025 ISSN: 0027-8424 cited in the application the whole document	13,15, 16, 19-25, 30,31, 33-44
A	KOTENKO S V ET AL.: "Identification and functional characterization of a second chain of the interleukin-10 receptor complex" EMBO JOURNAL, vol. 16, no. 19, 1997, pages 5894-5903, XP002046438 ISSN: 0261-4189 cited in the application the whole document	13, 19-25,33
A	WO 98 02542 A (UNIV NEW JERSEY MED) 22 January 1998 (1998-01-22) the whole document	13, 19-25,33
A	WO 99 07848 A (ZYMOGENETICS INC) 18 February 1999 (1999-02-18) the whole document	13, 19-25,33
A	WO 00 24758 A (RENAULD JEAN CHRISTOPHE ;LOUHED JAMILA (BE); DUMOUTIER LAURE (BE);) 4 May 2000 (2000-05-04) the whole document	13
A	WO 99 61617 A (HUMAN GENOME SCIENCES INC ;EBNER REINHARD (US); RUBEN STEVEN M (US) 2 December 1999 (1999-12-02) the whole document	13
A	WO 00 55204 A (HUMAN GENOME SCIENCES INC ;RUBEN STEVEN M (US); SHI YANGGU (US)) 21 September 2000 (2000-09-21) the whole document example 12	1-44

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/29576

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FERNANDEZ-BOTRAN R: "Soluble cytokine receptors: Basic immunology and clinical applications." CRITICAL REVIEWS IN CLINICAL LABORATORY SCIENCES, vol. 36, no. 3, June 1999 (1999-06), pages 165-224, XP008005929 ISSN: 1040-8363 the whole document ----	
A	HEANEY M L ET AL.: "Soluble cytokine receptors." BLOOD, vol. 87, no. 3, 1996, pages 847-857, XP008005931 ISSN: 0006-4971 the whole document ----	
A	MEAGER A ET AL.: "Assays for measuring soluble cellular adhesion molecules and soluble cytokine receptors" JOURNAL OF IMMUNOLOGICAL METHODS, vol. 191, no. 2, 1996, pages 97-112, XP004020837 ISSN: 0022-1759 paragraphs 1,4,5 ----	
A	KOTENKO S V ET AL.: "Jak-Stat signal transduction pathway through the eyes of cytokine class II receptor complexes." ONCOGENE, vol. 19, no. 21 Review Issue 2, 4 May 2000 (2000-05-04), pages 2557-2565, XP008005927 ISSN: 0950-9232 cited in the application the whole document ----	
A	OPAL S M ET AL.: "Anti-inflammatory cytokines." CHEST, vol. 117, no. 4, April 2000 (2000-04), pages 1162-1172, XP008005928 ISSN: 0012-3692 the whole document ----	
P,X	WO 01 40467 A (ZymoGenetics Inc) 7 June 2001 (2001-06-07) cited in the application the whole document ---- -/--	1-44

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/29576

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	DUMOUTIER L ET AL.: "Cloning and characterization of IL-22 binding protein, a natural antagonist of IL-10-related T cell-derived inducible factor/IL-22." JOURNAL OF IMMUNOLOGY, vol. 166, no. 12, 15 June 2001 (2001-06-15), pages 7090-7095, XP002206182 ISSN: 0022-1767 the whole document ---	1-44
P,X	KOTENKO S V ET AL: "Identification, cloning, and characterization of a novel soluble receptor that binds IL-22 and neutralizes its activity" JOURNAL OF IMMUNOLOGY, vol. 166, no. 12, 15 June 2001 (2001-06-15), pages 7096-7103, XP002186668 ISSN: 0022-1767 the whole document ---	1-44
P,X	XU W ET AL.: "A soluble class II cytokine receptor, IL-22RA2, is a naturally occurring IL-22 antagonist" PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF USA, vol. 98, no. 17, 14 August 2001 (2001-08-14), pages 9511-9516, XP002206183 ISSN: 0027-8424 the whole document ---	1-44
E	WO 02 12345 A (ZYMOGENETICS INC) 14 February 2002 (2002-02-14) the whole document ---	13,15, 16, 19-25, 30,31, 33-35
T	EP 1 191 035 A (SCHERING AG) 27 March 2002 (2002-03-27) the whole document ---	1-44
T	GRUENBERG B H ET AL.: "A novel, soluble homologue of the human IL-10 receptor with preferential expression in placenta" GENES AND IMMUNITY, vol. 2, no. 6, October 2001 (2001-10), pages 329-334, XP001040302 ISSN: 1466-4879 the whole document ---	1-44
	---	-/--

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 01/29576

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
T	XIE M-H ET AL.: "Interleukin (IL)-22, a novel human cytokine that signals through the interferon receptor-related proteins CRF2-4 and IL-22R" JOURNAL OF BIOLOGICAL CHEMISTRY, vol. 275, no. 40, 6 October 2000 (2000-10-06), pages 31335-31339, XP002164307 ISSN: 0021-9258 cited in the application the whole document	13
T	KOTENKO S V ET AL.: "Identification of the functional interleukin-22 (IL-22) receptor complex. The IL-10R2 chain (IL-10Rbeta) is a common chain of both the IL-10 and IL-22 (IL-10-related T cell-derived inducible factor, IL-TIF) receptor complexes" JOURNAL OF BIOLOGICAL CHEMISTRY, vol. 276, no. 4, 26 January 2001 (2001-01-26), pages 2725-2732, XP002186669 ISSN: 0021-9258 the whole document	13

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 01/29576

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9802542	A	22-01-1998	US 5843697 A AU 3668797 A WO 9802542 A1	01-12-1998 09-02-1998 22-01-1998
WO 9907848	A	18-02-1999	US 5965704 A AU 8673798 A EP 1003863 A1 JP 2001512680 T WO 9907848 A1	12-10-1999 01-03-1999 31-05-2000 28-08-2001 18-02-1999
WO 0024758	A	04-05-2000	US 6274710 B1 US 6359117 B1 AU 6520699 A BR 9914777 A CN 1332748 T EP 1131333 A1 WO 0024758 A1 US 6331613 B1 US 2001024652 A1	14-08-2001 19-03-2002 15-05-2000 03-07-2001 23-01-2002 12-09-2001 04-05-2000 18-12-2001 27-09-2001
WO 9961617	A	02-12-1999	AU 4208799 A CA 2329274 A1 EP 1082433 A1 JP 2002516103 T US 6075319 A WO 9961617 A1 US 2001023070 A1	13-12-1999 02-12-1999 14-03-2001 04-06-2002 13-06-2000 02-12-1999 20-09-2001
WO 0055204	A	21-09-2000	AU 3725300 A AU 6496699 A CN 1335884 T EP 1114142 A1 WO 0055204 A1 WO 0015759 A1	04-10-2000 03-04-2000 13-02-2002 11-07-2001 21-09-2000 23-03-2000
WO 0140467	A	07-06-2001	AU 2253301 A WO 0140467 A1 US 2002012669 A1	12-06-2001 07-06-2001 31-01-2002
WO 0212345	A	14-02-2002	AU 9052401 A WO 0212345 A2	18-02-2002 14-02-2002
EP 1191035	A	27-03-2002	DE 10048626 A1 DE 10058907 A1 DE 10064906 A1 EP 1191035 A2	25-04-2002 06-06-2002 20-06-2002 27-03-2002