



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<p>(51) International Patent Classification ⁶ : C12N 15/12, 15/10, 15/62, 9/22, C07K 14/47, C12Q 1/68, C12Q 1/48</p>	<p>A3</p>	<p>(11) International Publication Number: WO 99/47656</p> <p>(43) International Publication Date: 23 September 1999 (23.09.99)</p>								
<p>(21) International Application Number: PCT/GB99/00816</p> <p>(22) International Filing Date: 17 March 1999 (17.03.99)</p> <p>(30) Priority Data:</p> <table border="0"> <tr> <td>9805576.7</td> <td>17 March 1998 (17.03.98)</td> <td>GB</td> </tr> <tr> <td>9806895.0</td> <td>31 March 1998 (31.03.98)</td> <td>GB</td> </tr> <tr> <td>9807246.5</td> <td>3 April 1998 (03.04.98)</td> <td>GB</td> </tr> </table> <p>(71) Applicant (for all designated States except US): MEDICAL RESEARCH COUNCIL [GB/GB]; 20 Park Crescent, London W1N 4AL (GB).</p> <p>(72) Inventors; and</p> <p>(75) Inventors/Applicants (for US only): CHOO, Yen [GR/GB]; MRC Laboratory of Molecular Biology, Medical Research Council, Hills Road, Cambridge CB2 2QH (GB). ISALAN, Mark [GB/GB]; 24 Shottfield Avenue, East Sheen, London SW14 8EA (GB).</p> <p>(74) Agents: MASCHIO, Antonio et al.; D. Young & Co., 21 New Fetter Lane, London EC4A 1DA (GB).</p>	9805576.7	17 March 1998 (17.03.98)	GB	9806895.0	31 March 1998 (31.03.98)	GB	9807246.5	3 April 1998 (03.04.98)	GB	<p>(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, 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, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, 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).</p> <p>Published</p> <p><i>With international search report.</i></p> <p><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></p> <p>(88) Date of publication of the international search report: 25 November 1999 (25.11.99)</p>
9805576.7	17 March 1998 (17.03.98)	GB								
9806895.0	31 March 1998 (31.03.98)	GB								
9807246.5	3 April 1998 (03.04.98)	GB								
<p>(54) Title: NUCLEIC ACID BINDING PROTEINS</p> <p>(57) Abstract</p> <p>The invention provides a method for producing a zinc finger polypeptide which binds to a target nucleic acid sequence containing a modified base but not to an identical sequence containing an equivalent unmodified base.</p>										

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/00816

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 C12N15/12 C12N15/10 C12N15/62 C12N9/22 C07K14/47
 C12Q1/68 C12Q1/48

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 C07K 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 ^o	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P, X	Y. CHOO: "Recognition of DNA methylation by zinc fingers" NATURE STRUCTURAL BIOLOGY, vol. 5, no. 4, April 1998 (1998-04), pages 264-265, XP002116419 WASHINGTON, DC, US; the whole document ---	1-3, 5-17, 19, 21, 22, 25-27
A	M ISALAN ET AL: "Synergy between adjacent zinc fingers in sequence-specific DNA recognition" PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF USA, no. 94, 27 May 1997 (1997-05-27), page 5617 5621 XP002075337 ISSN: 0027-8424 the whole document --- -/--	1-27

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the international search

24 September 1999

Date of mailing of the international search report

12/10/1999

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International Application No
PCT/GB 99/00816

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 96 06166 A (MEDICAL RES COUNCIL ;CHOO YEN (SG); KLUG AARON (GB); GARCIA ISIDRO) 29 February 1996 (1996-02-29) the whole document ---	1-27
A	Y CHOO ET AL: "Physical basis of a protein-DNA recognition code" CURRENT OPINION IN STRUCTURAL BIOLOGY, vol. 1, no. 7, 1 February 1997 (1997-02-01), page 117 125 XP002075338 ISSN: 0959-440X the whole document ---	1-27
A	F. RADTKE ET AL.: "Differential sensitivity of zinc finger transcription factors MTF-1, Sp1 and Krox-20 to CpG methylation of their binding sites" BIOL. CHEM. HOPPE-SEYLER, vol. 377, January 1996 (1996-01), pages 47-56, XP002116420 WALTER DE GRUYTER & CO., BERLIN, BRD the whole document ---	1-27
A	O. SAKATSUME ET AL.: "Binding of THZif-1, a MAZ-like zinc finger protein to the nuclease-hypersensitive element in the promoter region of the c-myc protooncogene" J. BIOL. CHEM., vol. 271, no. 49, 6 December 1996 (1996-12-06), pages 21322-31333, XP002116421 AM. SOC. BIOCHEM. MOL. BIOL., INC., BALTIMORE, US the whole document ---	1-27
A	G.-L. XU AND T.H. BESTOR: "Cytosine methylation targetted to pre-determined sequences" NATURE GENETICS, vol. 17, no. 4, December 1997 (1997-12), pages 376-378, XP002116422 NATURE PUBLISHING CO., NEW YORK, US the whole document --- -/--	1-27

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/00816

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>Y.-G. KIM ET AL.: "Hybrid restriction enzymes: Zinc finger fusions to Fok I cleavage domain" PROC. NATL. ACAD. SCI., vol. 93, no. 3, 6 February 1996 (1996-02-06), pages 1156-1160, XP002116423 NATL. ACAD. SCI., WASHINGTON, DC, US; cited in the application the whole document</p>	1-27
P,A	<p>WO 98 53057 A (MEDICAL RES COUNCIL ; ISALAN MARK (GB); CHOO YEN (GB); KLUG AARON () 26 November 1998 (1998-11-26) the whole document</p>	
P,A	<p>WO 98 53058 A (MEDICAL RES COUNCIL ; ISALAN MARK (GB); CHOO YEN (GB); KLUG AARON () 26 November 1998 (1998-11-26) the whole document</p>	
P,A	<p>WO 98 53059 A (MEDICAL RES COUNCIL ; ISALAN MARK (GB); CHOO YEN (GB); KLUG AARON () 26 November 1998 (1998-11-26) the whole document</p>	
P,A	<p>WO 98 53060 A (MEDICAL RES COUNCIL ; ISALAN MARK (GB); CHOO YEN (GB); KLUG AARON () 26 November 1998 (1998-11-26) the whole document</p>	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/00816

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9606166 A	29-02-1996	AU 1003799 A	22-04-1999
		AU 698152 B	22-10-1998
		AU 3229195 A	14-03-1996
		CA 2196419 A	29-02-1996
		EP 0781331 A	02-07-1997
		JP 10504461 T	06-05-1998
WO 9853057 A	26-11-1998	AU 7542298 A	11-12-1998
		AU 7542398 A	11-12-1998
		AU 7542698 A	11-12-1998
		WO 9853058 A	26-11-1998
		WO 9853060 A	26-11-1998
WO 9853058 A	26-11-1998	AU 7542298 A	11-12-1998
		AU 7542398 A	11-12-1998
		AU 7542698 A	11-12-1998
		WO 9853057 A	26-11-1998
		WO 9853060 A	26-11-1998
WO 9853059 A	26-11-1998	AU 7542498 A	11-12-1998
WO 9853060 A	26-11-1998	AU 7542298 A	11-12-1998
		AU 7542398 A	11-12-1998
		AU 7542698 A	11-12-1998
		WO 9853057 A	26-11-1998
		WO 9853058 A	26-11-1998