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27 August 1998 (27.08.98)

(54) Title: COMPOSITIONS AND METHODS FOR POLYNUCLEOTIDE DELIVERY

(57) Abstract

This invention relates to compositions and methods for increasing the uptake of polynucleotides into cells. Specifically, the invention relates to vectors, targeting ligands, and polycationic agents. The polycationic agents are capable of (1) increasing the frequency of uptake of polynucleotides into a cell, (2) condensing polynucleotides; and (3) inhibiting serum and/or nuclease degradation of polynucleotides.

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INTERNATIONAL SEARCH REPORT

Inter nal Application No
PCT/US 97/14465

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A61K47/48

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 A61K

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,P	US 5 679 559 A (KIM JIN-SEOK ET AL) 21 October 1997 see column 2, line 1-20; figure 1 see column 3, line 55-68; claims 1-3,6-8,17; examples 1,3,5,8 ---	1,4,5, 10-29
X	WO 94 06451 A (CHIRON CORP) 31 March 1994 cited in the application see page 34, line 10-20 see page 18; claims 12-22; example 9; tables 1,5 see page 25, line 22-33 ---	1-29
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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
11 June 1998	02.07.98

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	Gonzalez Ramon, N

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 545 016 A (BOEHRINGER INGELHEIM INT ;GENENTECH INC (US); UNIV NORTH CAROLINA) 9 June 1993 see page 17, line 35-55; claims 3,31,33,49,50,55; figure 6; examples 6,13,34 ---	1,4,5, 10-29
X	EP 0 544 292 A (BOEHRINGER MANNHEIM GMBH) 2 June 1993 see page 2, line 45-55; claims 1,2 see page 3, line 24-34 - line 44-55 ---	1-5, 10-28
X	WO 95 02397 A (UNIV CALIFORNIA) 26 January 1995 see page 24 - page 25 see page 29, line 25-30; claims 1,6-8,15,26-28; examples 1,8,11-13,15 ---	1,2,4-7, 10-20,29
X	MERWIN J R ET AL: "TARGETED DELIVERY OF DNA USING YEE(GALNACAH)3, A SYNTHETIC GLYCOPEPTIDE LIGAND FOR THE ASIALOGLYCOPROTEIN RECEPTOR" BIOCONJUGATE CHEMISTRY, vol. 5, no. 6, 1 November 1994, pages 612-620, XP000484176 see page 612, column 2, paragraph 2; figure 2 see page 616, column 2 ---	1-5, 10-20
Y	TOMLINSON E ET AL: "Controllable gene therapy Pharmaceutics of non-viral gene delivery systems" JOURNAL OF CONTROLLED RELEASE, vol. 39, no. 2, May 1996, page 357-372 XP004037341 see page 367, column 2 - page 369, column 1 ---	1,4,5, 10-20
Y	RICHTER L S ET AL: "SYNTHESIS OF PEPTIDE NUCLEIC ACIDS (PNA) BY SUBMONOMER SOLID-PHASE SYNTHESIS" BIOORGANIC & MEDICINAL CHEMISTRY LETTERS, vol. 5, no. 11, 1 January 1995, pages 1159-1162, XP000566512 see abstract; figure 1 ---	1,4,5, 10-20
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INTERNATIONAL SEARCH REPORT

Inter onal Application No
PCT/US 97/14465

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	HONG K. ET AL: "Stabilization of cationic liposome-plasmid DNA complexes by polyamines and poly (ethylene glycol)-phospholipid conjugates for efficient in vivo gen delivery" FEBS LETTERS, vol. 400, 1997, pages 233-237, XP002067585 see abstract -----	1-29

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

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 97/14465

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. [X] Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

Although claims 16,17,21-29 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.

2. [X] Claims Nos.: 1-4
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:

see FURTHER INFORMATION sheet PCT/ISA/210

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:

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.:

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

Claims Nos.: 1-4

In view of the large number of compounds, which are defined by the general definition in the independent claims, the search had to be restricted for economic reasons. The search was limited to the compounds for which pharmacological data was given and/or the compounds mentioned in the claims, and to the general idea underlying the application. (see Guidelines, Chapter III, paragraph 2.3).

INTERNATIONAL SEARCH REPORT

Information on patent family members

Intern ıal Application No
PCT/US 97/14465

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