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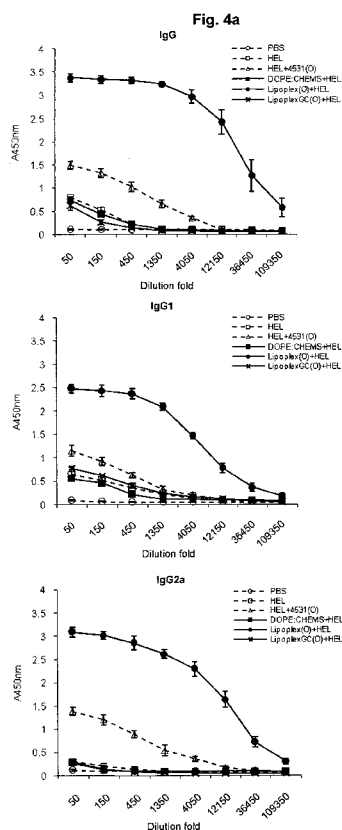
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[Continued on next page]

(54) Title: IMMUNOSTIMULATORY COMPOSITIONS COMPRISING LIPOSOME-ENCAPSULATED OLIGONUCLEOTIDES AS ACTIVE INGREDIENTS



(57) Abstract: The present invention relates to a composition for enhancing immune response comprising immunostimulatory oligonucleotides encapsulated by liposome comprising DOPE (dioleoyl phosphatidylethanolamine) and CHEMS (cholesterylhemisuccinate) as active ingredients also relates to novel immunostimulatory CpT-motif oligonucleotides. The present invention indicates that the liposome including fusogenic lipid of DOPE and CHEMS is the most excellent drug delivery system for the immunostimulatory oligonucleotides. The present invention can be applied to the immunostimulatory oligonucleotide having phosphorothioate backbones. The present invention may be effectively utilized for treating or preventing diverse immune-deficiency diseases through stimulating immune responses and also effectively utilized as immunoadjuvants as well.



GM, KE, LR, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*
- *with sequence listing part of description (Rule 5.2(a))*

(88) Date of publication of the international search report:

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Published:

- *with international search report (Art. 21(3))*

A. CLASSIFICATION OF SUBJECT MATTER*A61K 9/20(2006.01)i, A61K 31/7088(2006.01)i, A61K 9/127(2006.01)i, A61P 37/00(2006.01)i*

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)

A61K 9/20; A61K 9/127; A61K 48/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal), GOOGLE, PUBMED

Keywords: liposome, oligonucleotide, immunostimulatory, PE, CHEMS, PC, CpT, CpG

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2007-0027098 A1 (RAZ, E. et al.) 01 February 2007 See abstract; [0003], [0010]-[0039], [0120]-[0124]; examples 1-6; claims 79-83.	1-14
X	GURSEL, I. et al., "Sterically stabilized cationic liposomes improve the uptake and immunostimulatory activity of CpG oligonucleotides". Journal of Immunology 2001; 167; 3324-3328. See abstract; tables I-IV; figures 1-5; discussion.	1-14
X	JOSEPH, A. et al., "Liposomal immunostimulatory DNA sequence (ISS-ODN): an efficient parenteral and mucosal adjuvant for influenza and hepatitis B vaccines". Vaccine 2002; 20; 3342-3354. See abstract; tables 1-8; discussion.	1-14
A	LUDEWIG, B. et al., "In vivo antigen loading and activation of dendritic cells via a liposomal peptide vaccine mediates protective antiviral and antitumour immunity". Vaccine 2001; 19; 23-32. See the whole document.	1-14



Further documents are listed in the continuation of Box C.



See patent family 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 application or patent 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 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

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Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2010/003878

Box No. I Nucleotide and/or amino acid sequence(s) (Continuation of item 1.b of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of :

a. a sequence listing filed or furnished

- ☐ on paper
☒ in electronic form

b. time of filing or furnishing

- ☒ contained in the international application as filed
☐ filed together with the international application in electronic form
☐ furnished subsequently to this Authority for the purposes of search

2. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

3. Additional comments:

INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2010/003878**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 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.: 15-16
because they relate to subject matter not required to be searched by this Authority, namely:
The subject-matter of claims 15-16 pertain to the method for treatment of the human body by therapy, as well as diagnostic methods, and thus relate to a subject matter which this International Searching Authority is not required to search under Article 17(2)(a)(i) of the PCT and Rule 39.1(iv) of the Regulations under the PCT.
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 No. III Observations where unity of invention is lacking (Continuation of item 3 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 and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2010/003878Patent document
cited in search reportPublication
datePatent family
member(s)Publication
date

US 2007-0027098 A1

01.02.2007

US 2004-0006034 A1

08.01.2004

US 6589940 B1

08.07.2003