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A61K 31/59 (2006.01) A61K 47/30 (2006.01)  
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(81) Designated States (unless otherwise indicated, for every

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WO 2012/145491 A3

(54) Title: COMPOSITION AND METHOD FOR ENHANCING AN IMMUNE RESPONSE

(57) Abstract: Disclosed are methods and compositions for treating or preventing microbial infections.

**A. CLASSIFICATION OF SUBJECT MATTER****A61K 35/74(2006.01)i, A61K 31/59(2006.01)i, A61K 9/22(2006.01)i, A61K 9/20(2006.01)i, A61K 47/30(2006.01)i, A61P 1/00(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 35/74; A61K 39/04; A61P 31/06; A61K 39/02; A61K 45/00; A61K 39/00; A61K 39/12; A61K 9/70

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) &amp; Keywords: irradiation, Mycobacterium, Brucella, Bacille Calmette Guerin, Streptococcus pyogenes

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2010-0112007 A1 (LIGHTER JENNIFER et al.) 06 May 2010 See abstract, claims 1-3,12-14,16, paragraph 44	1-8,37-39,46
Y	See claim 13, paragraph 44	13,25
Y	US 2005-0232946 A1 (CAMILO ANTHONY COLACO) 20 October 2005 See abstract	1-8,37-39,46
X	US 2006-0147509 A1 (NIKOLAI KIRKBY et al.) 06 July 2006 See abstract, claims 1,4, paragraphs 25,82,84,90,158	12,29,30,40
Y	See abstract	13,25
X	US 2010-0172941 A1 (VAJDY MICHAEL et al.) 08 July 2010 See abstract, claims 1,13,15, paragraph 29	33-36
A	US 7393539 B2 (JAMES BRIAN WILLIAM et al.) 01 July 2008 See whole document	1-8,12-25,29,30,33-40,46

 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

"&amp;" document member of the same patent family

Date of the actual completion of the international search

29 JANUARY 2013 (29.01.2013)

Date of mailing of the international search report

**30 JANUARY 2013 (30.01.2013)**

Name and mailing address of the ISA/KR

Korean Intellectual Property Office  
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City, 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

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SHIN, Dong Hwan

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**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.: 9-11,26-28,31,41,43-45  
because they relate to subject matter not required to be searched by this Authority, namely:
  - Claims 9-11, 26-28, 31, 41, and 43-45 pertain to methods for treatment of the human body, and thus relate to a subject matter which this International Searching Authority is not required, under PCT Article 17(2)(a)(i) and PCT Rule 39.1(iv), to search.
2.  Claims Nos.: 32,42  
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:
  - Claims 32 and 42 are unclear, since they are concerned with "a method", but claims 29 and 37, to which claims 32 and 42 refer respectively, are directed to "a composition" (PCT Article 6).
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:

Group I, claims 1-8, 37-39, and 46; and claims 12-25, drawn to a pharmaceutical composition comprising an irradiated *Brucella* microbial spp., or a method using said composition.

Group II, claims 29, 30, and 40, drawn to a pharmaceutical composition comprising an irradiated *S. pyogenes*, or a method using said composition.

Group III, claims 33-36, drawn to a pharmaceutical composition comprising an irradiated *Mycobacterium* microbial spp., or a method using said composition.

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/US2012/034221**

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2012/034221**

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