

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
26 February 2004 (26.02.2004)

PCT

(10) International Publication Number
WO 2004/016803 A3

(51) International Patent Classification⁷: **A61K 48/00**,
C12N 5/00, 15/00, 15/63, 15/87

(21) International Application Number:
PCT/US2003/025375

(22) International Filing Date: 14 August 2003 (14.08.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/402,944 14 August 2002 (14.08.2002) US

(71) Applicant (for all designated States except US): **DUKE
UNIVERSITY** [US/US]; Office of Science and Technol-
ogy, P.O. Box 90083, Durham, NC 27708 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **GILBOA, Eli**
[US/US]; 3604 Stonegate Drive, Durham, NC 27705 (US).
ZHAO, Yangbing [CN/US]; 260 Congressional Lane,
Apt. 102, Rockville, MD 20852 (US).

(74) Agent: **TAYLOR, Arles, A., Jr.**; Jenkins, Wilson & Tay-
lor, P.A., Suite 1400, University Tower, 3100 Tower Boule-
vard, Durham, NC 27707 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,
CZ, DE, DK, DM, DZ, EC, 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, MA, MD, MG, MK, MN, MW,
MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC,
SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA,
UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

(88) Date of publication of the international search report:
29 December 2004

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: METHOD OF ENHANCING CD4⁺ T CELL RESPONSES

(57) Abstract: The present invention provides a method of enhancing CD4 T cell responses to antigens by inhibiting expression of invariant chain protein (Ii) in antigen presenting cells and antigen presenting cells modified by the method.



WO 2004/016803 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/25375

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A61K 48/00; C12N 5/00, 15/00, 15/63, 15/87

US CL : 514/44; 435/325, 320.1, 455; 424/93.1

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)

U.S. : 514/44; 435/325, 320.1, 455; 424/93.1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
None

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6,368,855 B1 (XU et al.) 9 April 2002 (09.04.2002), see entire document.	1-18
Y	US 5,853,719 (NAIR et al.) 29 Dec. 1998 (29.12.1998), see entire document.	1-18
Y	HEISER. A. et al. Human dendritic cells transfected with renal tumor RNA stimulate polyclonal T-cell responses against antigens expressed by primary and metastatic tumors. Cancer Research. April 2001, Vol. 61, pages 3388-3393, see entire document.	1-18
Y	XU. M. et al. Genetic modulation of tumor antigen presentation. TIBTECH. April 2000, Vol. 18, pages 167-172, see entire document.	1-18
Y	BOCZKOWSKI. D. et al. Induction of tumor immunity and cytotoxic T lymphocyte responses using dendritic cells transfected with messenger RNA amplified from tumor cells. Cancer Research. February 2000, Vol. 60, pages 1028-1034, see entire document.	1-18

☐ 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 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 another 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

17 February 2004 (17.02.2004)

Date of mailing of the international search report

22 SEP 2004

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Facsimile No. (703)305-3230

Authorized officer

Anne Marie S. Wehbe

Telephone No. (571) 272-1600

INTERNATIONAL SEARCH REPORT

PCT/US03/25375

Continuation of B. FIELDS SEARCHED Item 3:

DIALOG-Medline, Embase, Cancerlit, Scisearch, Biosis; BRS/EAST-USPatful, EPO, JPO, Derwint
search terms: invariant chain, Ii, MHC, rnai, ribozyme, antisense, mrna, tumor, immuniz?, vaccin?