

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
2 December 2004 (02.12.2004)

PCT

(10) International Publication Number
WO 2004/103304 A3

(51) International Patent Classification⁷: **A61K 38/00**

(21) International Application Number:
PCT/US2004/015340

(22) International Filing Date: 14 May 2004 (14.05.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/471,017 15 May 2003 (15.05.2003) US
60/489,270 21 July 2003 (21.07.2003) US
60/514,930 27 October 2003 (27.10.2003) US
60/517,338 4 November 2003 (04.11.2003) US

(71) Applicant: **DMI BIOSCIENCES, INC.** [US/US]; 3601
S. Clarkson St., Suite 420, Englewood, CO 80110 (US).

(72) Inventors: **BAR-OR, David**; 900 E. Oxford Lane, En-
glewood, CO 80110 (US). **BAR-OR, Raphael**; 1720
Wynkoop Street #214, Denver, CO 80202 (US). **SHI-
MONKOVITZ, Richard**; 2334 East Terrace Drive,
Highlands Ranch, CO 80126 (US).

(74) Agents: **CONNELL, Gary, J.** et al.; Sheridan Ross P.C.,
Suite 1200, 1560 Broadway, Denver, CO 80202-5141 (US).

(81) Designated States (*unless otherwise indicated, for every
kind of national protection available*): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, 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, NA, 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 (*unless otherwise indicated, for every
kind of regional protection available*): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI,
SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, ML, MR, NE, SN, TD, TG).

Published:

- *with international search report*
- *before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments*

(88) Date of publication of the international search report:
7 July 2005

*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: TREATMENT OF T-CELL MEDIATED DISEASES

(57) Abstract: The invention provides a method of treating T-cell mediated diseases and a method of inhibiting the activation of T-cells using certain diketopiperazines. The invention also provides methods of synthesizing diketopiperazines and pharmaceutical compositions comprising certain diketopiperazines. The invention further provides methods of making improved pharmaceutical compositions of proteins and peptides by either increasing or decreasing the content of diketopiperazines in the compositions and the resultant improved pharmaceutical compositions.

WO 2004/103304 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/1534C

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A61K 38/00
US CL : 514/9

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. :

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 practicable, search terms used)
STN, EAST, PubMed, Google

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4331595 (Heavner et al.) 25 May 1982 (25.05.1982), entire document.	1, 2, 18, 20, 21, 37
X	US 2002/0052381 A1 (Bar-Or et al.) 2 May 2002 (02.05.2002), entire document, in particular paragraphs [0007]-[0019], [0043], [0068]-[0069], [0079], and claim 25.	1-9, 16-18, 20-27, 35-37
X	Chan B, Dodsworth N, Woodrow J, Tucker A, Harris R, Site-specific N-terminal auto-degradation of human serum albumin, Eur J Biochem, Jan 1995, 227(1-2), pages 524-8, especially pages 524, 525, and 527 (Fig. 6).	57, 58, 61

Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:	"T"
"A" document defining the general state of the art which is not considered to be of particular relevance	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
"E" earlier application or patent published on or after the international filing date	"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
"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)	"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
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 08 March 2005 (08.03.2005)	Date of mailing of the international search report 12 MAY 2005
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 <i>Stephen J. Lee</i> Stephen J. Lee, Ph.D. Telephone No. 571-272-1600