

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
17 February 2005 (17.02.2005)

PCT

(10) International Publication Number
WO 2005/014776 A3

(51) International Patent Classification⁷: **A61K 31/715**,
31/66, 39/395

(21) International Application Number:
PCT/US2003/032196

(22) International Filing Date: 9 October 2003 (09.10.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/268,201 9 October 2002 (09.10.2002) 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, 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, 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).

(71) Applicant (*for all designated States except US*):
BIOPOLYMER ENGINEERING, INC. [US/US];
3388 Mike Collins Drive, Eagan, MN 55121-2236 (US).

(72) Inventor; and

(75) Inventor/Applicant (*for US only*): **OSTROFF, Gary, R.**
[US/US]; 301 Bridle Path, Worcester, MA 01604 (US).

(74) Agents: **DOLAN, John, F.** et al.; Fredrikson & Byron,
P.A., 4000 Pillsbury Center, 200 South Sixth Street, Min-
neapolis, MN 55402-1425 (US).

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 "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: USE OF BETA-GLUCANS AGAINST BIOLOGICAL WARFARE WEAPONS AND PATHOGENS INCLUDING ANTHRAX

(57) **Abstract:** The present invention provides a means to broadly protect the military and the public from injury from biological warfare weapons, particularly infective agents such as anthrax. Beta (1,3)-glucans, particularly whole glucan particles, PGG-Glucan, and microparticulate glucan, provide general immune enhancement, thereby increasing the body's ability to defend against a wide variety of biological threats. Beta (1,3)-glucans have been shown to increase the resistance to infection by anthrax and other infectious organisms when administered before and after infection. The anti-infective mechanism of 3 (1,3)-glucan appears to involve stimulation of the innate immune system through increased cytokine release and CR3 receptor activation. Beta (1,3)-glucan is pharmaceutically stable, relatively compact, and can also be used without significant side effects. Beta (1,3)-glucan can also enhance the effectiveness of other medical countermeasures such as antibiotics, vaccines, and immune antibodies.



WO 2005/014776 A3

INTERNATIONAL SEARCH REPORT

International application No. _____

PCT/US03/32196

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : A61K 31/715; A61K 31/66; A61K 39/395.

US CL : 514/54, 885, 61; 536/123.12, 124, 127, 114, 123, 1.11, 117, 23.1, 23.2, 55.1; 424/1.73, 278.1, 442.

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. : 514/54, 885, 61; 536/123.12, 124, 127, 114, 123, 1.11, 117, 23.1, 23.2, 55.1; 424/1.73, 278.1, 442.

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)
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 6,355,625 B1 (PAVLIAK et al) 12 March 2002 (12.03.2002), abstract and claims 21-24.	1-23
Y	US 6,413,715 B2 (WAKSHULL et al) 02 July 2002 (02.07.2002), abstract and column 4, lines 35-41.	1-23
Y	US 5,057,503 (CZOP et al) 15 October 1991 (15.10.1991), abstract and column 14, lines 45-55.	1-23
A	US 5,622,940 (OSTROFF) 22 April 1997 (22.04.1997), abstract.	1-23

☐ 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

22 April 2005 (22.04.2005)

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US

Commissioner of Patents

P.O. Box 1450

Alexandria, Virginia 22313-1450

Facsimile No. (703)305-3230

Date of mailing of the international application

18 MAY 2005

Authorized officer

Devash Khare

Telephone No. 703-308-0196

INTERNATIONAL SEARCH REPORT

PCT/US03/32196

Continuation of B. FIELDS SEARCHED Item 3:

CAS online, EAST. Search terms used: glucan and pathogenesis; beta glucan and infection; PGC glucan; whole glucan particles; anthrax; tuberculosis; and biological warfare agents.