

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
25 January 2007 (25.01.2007)

PCT

(10) International Publication Number  
**WO 2007/012004 A3**

(51) International Patent Classification:  
C12P 21/04 (2006.01)

(21) International Application Number:  
PCT/US2006/028022

(22) International Filing Date: 19 July 2006 (19.07.2006)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:			
60/700,297	19 July 2005 (19.07.2005)	US	
11/244,105	6 October 2005 (06.10.2005)	US	
60/818,510	6 July 2006 (06.07.2006)	US	

(71) Applicant (for all designated States except US): **THE BOARD OF TRUSTEES OF THE UNIVERSITY OF ILLINOIS** [US/US]; 352 Henry Administration Building, 506 Wright Street, Urbana, IL 61801 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **HONG, Chang** [KR/US]; 901 South Ashland Avenue, Apt. 704, Chicago, IL 60607 (US). **YAMADA, Tohru** [JP/US]; 903 South

Cuyler Avenue, Apt. 2, Oak Park, IL 60304 (US). **FL-ALHO, Arsenio** [PT/PT]; Paceta Maestro Ivo Cruz, Lote 23 3 Esq, 1500-401 Lisboa (PT). **DAS GUPTA, Tapas** [US/US]; 1317 Jackson Avenue, River Forest, IL 60305 (US). **CHAKRABARTY, Ananda** [US/US]; 206 Julia Drive, Villa Park, IL 60181 (US).

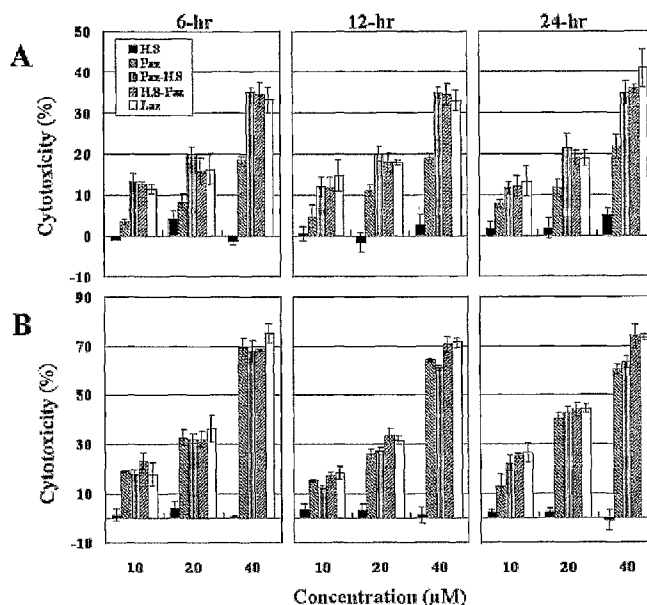
(74) Agents: **PELTO, Don** et al.; PRESTON GATES ELLIS & ROUVELAS MEEDS LLP, 1735 New York Avenue Nw, Suite 500, Washington, DC 20006 (US).

(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, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, 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,

[Continued on next page]

(54) Title: TRANSPORT AGENTS FOR CROSSING THE BLOOD-BRAIN BARRIER AND INTO BRAIN CANCER CELLS, AND METHODS OF USE THEREOF



(57) Abstract: The present invention discloses methods and materials for delivering a cargo compound into a brain cancer cell and/or across the blood-brain barrier. Delivery of the cargo compound is accomplished by the use of protein transport peptides derived from Neisseria outer membrane proteins, such as Laz. The invention also provides synthetic transit peptides comprised of the pentapeptide AAEAP. The invention further discloses methods for treating cancer, and specifically brain cancer, as well as other brain-related conditions. Further, the invention provides methods of imaging and diagnosing cancer, particular brain cancer.

WO 2007/012004 A3



FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, 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).

*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.*

**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:**

28 June 2007

INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US 06/28022

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC(8): C12P 21/04 (2007.01)  
 USPC: 435/69.7; 435/71.3  
 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)  
 USPC: 435/69.7; 435/71.3;

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
 http://scholar.google.com  
 Keyword= azurin or Laz and brain

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
 WEST: DB=PGPB,USPT,USOC,EPAB,JPAB; terms=neisseria or azurin and tumor

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X ---	Applicant's Admitted Prior Art, page 3, lns19-27; page 9, ln 16; page 25, lns 5-13	1-8 and 35-39
Y		9-17, 19-24, 27-34, 40-44
Y	WO 2004/046177 A2 (Chiron SRL) 03 June 2004 (03.06.2004), page 3, lns 13-14, 27-34;	9-17, 19-24, 27-34, 40-44
Y	US 2005/0037341 A1 (Dierynck et al) 17 February 2005 (17.02.2005), para [0034]-[0035].	19-20, 30-34, 41-44
Y	US 2002/0110872 A1 (Chakrabarty et al) 15 August 2002 (15.08.2002), Fig.4, para [0059], [0088], [0090]	17, 21-24, 27-34, 41-44

Further documents are listed in the continuation of Box C.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"E" earlier application or patent but 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 7 Feb 2007 (07.02.2007)	Date of mailing of the international search report <b>03 MAY 2007</b>
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. 571-273-3201	Authorized officer: Lee W. Young  PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774