(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
13 September 2007 (13.09.2007)

PCT

(10) International Publication Number
WO 2007/103322 A3

(51) International Patent Classification:
A61K 39/02 (2006.01) *A61P 31/00* (2006.01)
A61K 39/145 (2006.01)

(21) International Application Number:
PCT/US2007/005611

(22) International Filing Date: 6 March 2007 (06.03.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/779,854	7 March 2006 (07.03.2006)	US
60/784,497	20 March 2006 (20.03.2006)	US
60/790,457	7 April 2006 (07.04.2006)	US
60/814,292	16 June 2006 (16.06.2006)	US
60/830,881	14 July 2006 (14.07.2006)	US
60/838,007	16 August 2006 (16.08.2006)	US
60/856,451	3 November 2006 (03.11.2006)	US

(71) Applicant *(for all designated States except US)*: **VAXINNATE CORPORATION** [US/US]; 3 Cedar Brook Drive, Cranbury, NJ 08512 (US).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: **SONG, Langzhou** [US/US]; 6 Petunia Place, Freehold, NJ 07728 (US). **NAKAAR, Valerian** [US/US]; 338 Hume Drive, Hamden, CT 06514 (US). **PRICE, Albert, E.** [US/US]; 494 Whitney Avenue, Unit 4B, New Haven, CT 06511 (US). **TUSSEY, Lynda, G.** [US/US]; 67 Truman Avenue, Princeton, NJ 08540 (US). **HULEATT, James, W.** [US/US]; 5 Evergreen Place, Brandford, CT 06405 (US). **POWELL, Thomas, J.** [US/US]; 154 Dorset Lane, Madison, CT 06443 (US). **EVANS, Robert, K.** [US/US]; 221 Cowpath Road, Souderton, PA 18964 (US).

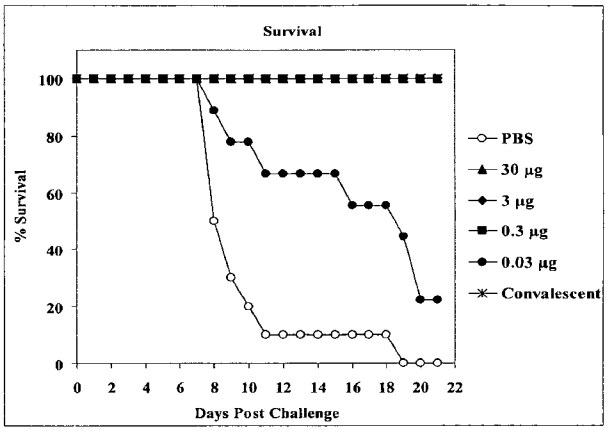
(74) Agents: **MURRAY, Mary, K.** et al.; Hamilton, Brook, Smith & Reynolds, P.C., 530 Virginia Road, P.O. Box 9133, Concord, MA 01742-9133 (US).

(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, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, 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,

[Continued on next page]

(54) Title: COMPOSITIONS THAT INCLUDE HEMAGGLUTININ, METHODS OF MAKING AND METHODS OF USE THEREOF



(57) Abstract: Methods of making and compositions that stimulate a protective immune response in a subject include a portion of a protein from a naturally occurring viral hemagglutinin, wherein the portion includes at least a portion of a globular head, includes at least a portion of at least one secondary structure that causes the globular head to essentially retain its tertiary structure, and lacks a membrane fusion domain, a transmembrane domain and a cytoplasmic domain. Compositions comprise a flagellin component or a Toll-like Receptor agonist component that is at least a portion of a flagellin or a Toll-like Receptor agonist, wherein the flagellin component or Toll-like Receptor agonist component includes at least one cysteine residue and whereby the flagellin component or Toll-like Receptor agonist component activates a Toll-like Receptor 5 or Toll-like Receptor. Compositions comprise a flagellin component that is at least a portion of a flagellin, wherein at least one lysine of the flagellin component has been substituted with at least one arginine, serine and histidine, whereby the flagellin component activates Toll-like Receptor 5. Compositions can further include an antigen, such as an influenza antigen, a flavivirus antigen, a pathogen-related antigen, a bacterial capsular antigen and a carrier protein. The compositions are used to stimulate an immune response and a protective immune response in a subject.

WO 2007/103322 A3

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, IS, IT, LT, LU, LV, MC, MT, 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*

— *with sequence listing part of description published separately in electronic form and available upon request from the International Bureau*

(88) Date of publication of the international search report:
24 January 2008

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.