



## (51) International Patent Classification:

A61K 9/127 (2006.01) A61K 47/30 (2006.01)  
A61K 31/475 (2006.01) A61P 35/00 (2006.01)

## (21) International Application Number:

PCT/US2012/037295

## (22) International Filing Date:

10 May 2012 (10.05.2012)

## (25) Filing Language:

English

## (26) Publication Language:

English

## (30) Priority Data:

61/484,496 10 May 2011 (10.05.2011) US

(71) Applicant (for all designated States except US): **THE PENN STATE RESEARCH FOUNDATION** [US/US]; 304 Old Main, University Park, PA 16802 (US).

## (72) Inventors; and

(75) Inventors/Applicants (for US only): **KESTER, Mark** [US/US]; 4709 Great Oak Lane, Harrisburg, PA 17110 (US). **SHANMUGAVELANDY, Sriram, S.** [IN/US]; 165 East Derry Road, Hershey, PA 17033 (US). **FOX, Todd** [US/US]; 101 Hallmark House, Hershey, PA 17033 (US).

(74) Agents: **STAPLE, Julie, K.** et al.; Gifford, Krass, Sprinkle, Anderson & Citkowski, P.C., 2701 Troy Center Drive, Suite 330, Po Box 7021, Troy, MI 48007-7021 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, 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, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

## Published:

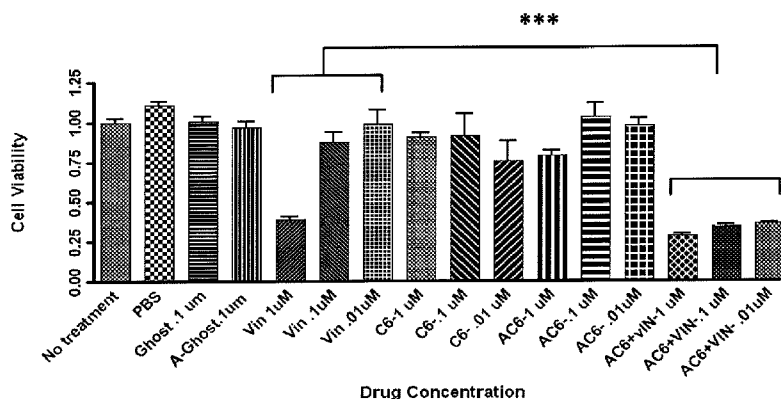
- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

## (88) Date of publication of the international search report:

3 January 2013

(54) Title: CERAMIDE ANIONIC LIPOSOME COMPOSITIONS

Figure 2



(57) Abstract: Described herein are pharmaceutical compositions according to aspects of the present invention which include one or more hydrophilic antineoplastic chemotherapeutics, such as vinca alkylid antineoplastic chemotherapeutics, encapsulated in ceramide anionic liposomes. Methods of treatment of a subject having cancer using the pharmaceutical compositions are described, along with methods of making ceramide anionic liposomes which encapsulate one or more hydrophilic antineoplastic chemotherapeutics in the aqueous interior of the ceramide anionic liposomes.