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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
31 May 2019 (31.05.2019)

WIPO | PCT

(10) International Publication Number
WO 2019/104115 A1

(51) International Patent Classification:
A61K 31/22 (2006.01) *C07F 9/50* (2006.01)

(21) International Application Number:
PCT/US2018/062174

(22) International Filing Date:
21 November 2018 (21.11.2018)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
62/590,432 24 November 2017 (24.11.2017) US

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(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, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, 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, ST, 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, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:
— *of inventorship (Rule 4.17(iv))*

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))*

WO 2019/104115 A1

(54) **Title:** TRIPHENYLPHOSPHONIUM-DERIVATIVE COMPOUNDS FOR ERADICATING CANCER STEM CELLS

(57) **Abstract:** Tri-phenyl-phosphonium (TPP) is a non-toxic chemical moiety that functionally behaves as a mitochondrial targeting signaling in living cells. TPP-related compounds may be utilized to target mitochondria in cancer stem cells (CSCs), and may be used for treating and/or preventing tumor recurrence, metastasis, drug resistance, and/or radiotherapy resistance, as well as for anti-cancer therapies. Various TPP-related compounds validated for oxygen consumption inhibition (OCR), were non-toxic, and had little or no effect on ATP production in normal human fibroblasts. Yet these compounds selectively target adherent "bulk" cancer cells. These compounds also inhibit the propagation of CSCs in suspension. TPP-related compounds provide a novel chemical strategy for effectively targeting both i) "bulk" cancer cells and ii) CSCs, while specifically minimizing or avoiding off-target side-effects in normal cells, among other useful therapies.