



(51) International Patent Classification:

A61K 31/44 (2006.01) C07D 401/04 (2006.01)
C07D 213/22 (2006.01)

(21) International Application Number:

PCT/US2015/011191

(22) International Filing Date:

13 January 2015 (13.01.2015)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

61/927,055 14 January 2014 (14.01.2014) US
62/054,742 24 September 2014 (24.09.2014) US

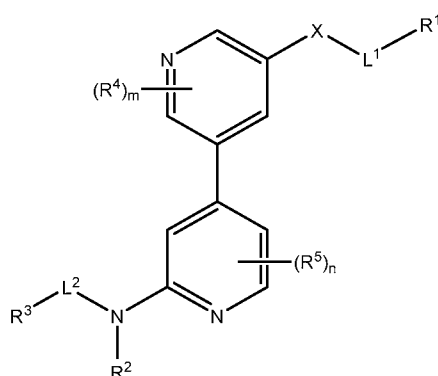
(71) Applicant: MILLENNIUM PHARMACEUTICALS, INC. [US/US]; 40 Landsdowne Street, Cambridge, Massachusetts 02139 (US).

(72) Inventors: BHARATHAN, Indu T.; 101 Western Avenue, Cambridge, Massachusetts 02139 (US). BLACKBURN, Chris; 25 Western Avenue, Natick, Massachusetts 01760 (US). CIAVARRI, Jeffrey P.; 30 Winthrop Avenue, Reading, Massachusetts 01867 (US). CHOUITAR, Jouhara; 9 Highland Street, Stoughton, Massachusetts 02072 (US). CULLIS, Courtney A.; 11 Page Road, Bedford, Massachusetts 01730 (US). D'AMORE, Natalie; 17

Bluejay Road, Lynnfield, Massachusetts 01940 (US). FLEMING, Paul E.; 15 Ridge Avenue, Natick, Massachusetts 01760 (US). GIGSTAD, Kenneth M.; 18 Briarwood Drive, Westford, Massachusetts 01886 (US). GIPSON, Krista E.; 42 Marion Street, Medford, Massachusetts 02155 (US). GIRARD, Mario; 175 Centre Street, Apt. 904, Quincy, Massachusetts 02169 (US). HU, Yongbo; 8 Churchill Circle, Winchester, Massachusetts 01890 (US). LEE, Janice; 931 Massachusetts Avenue, Cambridge, Massachusetts 02139 (US). LI, Gang; 3 Hundreds Road, Westborough, Massachusetts 01581 (US). REZAEI, Mansoureh; 100 Marina Drive #416, Quincy, Massachusetts 02171 (US). SINTCHAK, Michael D.; 34 Lloyd Street, Winchester, Massachusetts 01890 (US). SOUCY, Francois; 39 Ellen Road, Stoneham, Massachusetts 02180 (US). STROUD, Stephen G.; 53 Tesla Avenue, Medford, Massachusetts 02155 (US). VOS, Tricia J.; 510 Columbus Avenue #4, Boston, Massachusetts 02118 (US). WONG, Tzu-Tshin; 27 High Street, Acton, Massachusetts 01720 (US). XU, He; 43 Glover Road, Needham, Massachusetts 02194 (US). XU, Tianlin; 2 Arrowwood Drive, Shrewsbury, Massachusetts 01545 (US). YE, Yingchun; 36 Harley Street, Belmont, Massachusetts 02478 (US).

[Continued on next page]

(54) Title: HETEROARYLS AND USES THEREOF

**I**

(57) Abstract: The present invention provides a compound of formula I: and pharmaceutically acceptable salts thereof, wherein X, R¹, R², R³, R⁴, R⁵, L¹, L², m, and n, are as described in the specification. Such compounds are inhibitors of VPS34 and thus useful for treating proliferative, inflammatory, or cardiovascular disorders.



(74) **Agents:** REID, Andrea L.C. et al.; Choate, Hall & Stewart LLP, Two International Place, Boston, Massachusetts 02110 (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, BN, 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, IR, IS, JP, KE, KG, KN, KP, KR, 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).

Published:

— with international search report (Art. 21(3))