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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
16 June 2011 (16.06.2011)

PCT

(10) International Publication Number
WO 2011/071758 A1

(51) International Patent Classification:
C07D 487/08 (2006.01) *A61P 25/16* (2006.01)
A61K 31/4995 (2006.01) *A61P 25/28* (2006.01)
A61P 25/00 (2006.01)

(21) International Application Number:
PCT/US2010/058836

(22) International Filing Date:
3 December 2010 (03.12.2010)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/267,218 7 December 2009 (07.12.2009) US

(71) Applicant *(for all designated States except US)*: **TARGACEPT, INC.** [US/US]; 200 East First Street, Suite 300, Winston-Salem, North Carolina 27101-4165 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **AKIREDDY, Srinivasa Rao** [US/US]; 5829 Fox Point Circle, Winston-Salem, North Carolina 27104 (US). **BHATTI, Balwinder Singh** [US/US]; 2536 Polo Road, Winston-Salem, North Carolina 27106 (US). **HEEMSTRA, Ronald Joseph** [US/US]; 1145 Norwood Lane, Lewisville, North Carolina 27023 (US). **MURTHY, Srinivasa V.** [US/US]; 5337 Hidden Stream Drive, Lewisville, North Carolina 27023 (US). **STRACHAN, Jon-Paul** [GB/US]; 1871 Dunbar Place, Burlington, North Carolina 27215 (US). **XIAO, Yunde** [US/US]; 2079 Waterford Village Drive, Clemmons, North Carolina 27012 (US).

(74) Agent: **FIX, Amy H.**; Womble Carlyle Sandridge & Rice, PLLC, Attn: Patent Docketing, P.O. Box 7037, Atlanta, Georgia 30357 (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, RO, RS, RU, 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, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, 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).

Declarations under Rule 4.17:

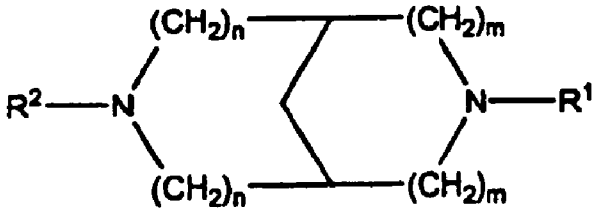
— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

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

(54) **Title**: 3,6-DIAZABICYCLO[3.1.1]HEPTANES AS NEURONAL NICOTINIC ACETYLCHOLINE RECEPTOR LIGANDS



(I)

(57) **Abstract**: The present invention relates to compounds that bind to and modulate the activity of neuronal nicotinic acetylcholine receptors (NNRs), to processes for preparing these compounds, to pharmaceutical compositions containing these compounds, and to methods of using these compounds for treating a wide variety of conditions and disorders, including those associated with dysfunction of the central nervous system (CNS). The present invention includes compounds which bind with high affinity to NNRs of either the α4β2 subtype, or the α6-containing subtype, or both NNR subtypes. Formula (I), wherein: each m is identical and is 0 or 1; each n is identical and is 0 or 1; when each m is 0, then each n is 1; when each m is 1, then each n is 0; R^1 is -C(O)-R^3, -C(O)O-R^3, -C(O)NH-R^3, -C(O)-$(CH_2)_q$-X-R^3, -C(O)O-$(CH_2)_q$-X-R^3, or -C(O)NH-$(CH_2)_q$-X-R^3; q is 1, 2, 3, 4, 5, or 6; X is -0-, -S-, -NH-, or -NHC(O)-; R^2 is H or alkyl; R^3 is alkyl, alkenyl, alkynyl, cycloalkyl, cycloalkenyl, cycloalkynyl, aryl, heteroaryl, or heterocyclic.

WO 2011/071758 A1