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

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
16 December 2010 (16.12.2010)

PCT

(10) International Publication Number
WO 2010/144789 A2

(51) International Patent Classification:
A61K 9/14 (2006.01) *A61K 38/28* (2006.01)

(21) International Application Number:
PCT/US2010/038298

(22) International Filing Date:
11 June 2010 (11.06.2010)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/186,773 12 June 2009 (12.06.2009) US

(71) Applicant *(for all designated States except US)*: **MANNKIND CORPORATION** [US/US]; 28903 North Avenue Paine, Valencia, CA 91355 (US).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **GRANT, Marshall, L.** [US/US]; 53A Mile Hill Road South, Newtown, CT 06070 (US). **STOWELL, Grayson, W.** [US/US]; 14 Pilgrims Way, Gaylordsville, CT 06755 (US). **MENKIN, Paul** [US/US]; 251 Blueberry Lane, Branford, CT 06405 (US).

(74) Agents: **CULLMAN, Louis, C.** et al.; K & L GATES LLP, 1900 Main Street, Suite 600, Irvine, CA 92614-7319 (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, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*

WO 2010/144789 A2

(54) Title: DIKETOPIPERAZINE MICROPARTICLES WITH DEFINED SPECIFIC SURFACE AREAS

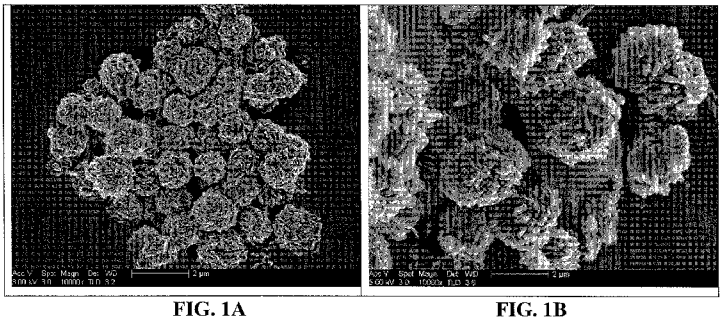


FIG. 1A FIG. 1B

(57) Abstract: Disclosed herein are diketopiperazine microparticles having a specific surface area of less than about 67 m^2/g. The diketopiperazine microparticle can be fumaryl diketopiperazine and can comprise a drug such as insulin.