



(51) International Patent Classification:
A61P 35/02 (2006.01) *A61K 35/17* (2015.01)

(21) International Application Number:
PCT/US2020/020824

(22) International Filing Date:
03 March 2020 (03.03.2020)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
62/814,180 05 March 2019 (05.03.2019) US
62/895,910 04 September 2019 (04.09.2019) US
62/932,165 07 November 2019 (07.11.2019) US

(71) Applicant: **NKARTA, INC.** [US/US]; 6000 Shoreline Court, Suite 102, South San Francisco, California 94080 (US).

(72) Inventors: **TRAGER, James, Barnaby**; 6000 Shoreline Court, Suite 102, South San Francisco, California 94080 (US). **BUREN, Luxuan, Guo**; 6000 Shoreline Court, Suite 102, South San Francisco, California 94080 (US). **GUO, Chao**; 6000 Shoreline Court, Suite 102, South San Francisco, California 94080 (US). **TOHME, Mira**; 6000 Shoreline Court, Suite 102, South San Francisco, California 94080 (US).

(US). **CHAN, Ivan**; 6000 Shoreline Court, Suite 102, South San Francisco, California 94080 (US). **LAZETIC, Alexandra, Leida, Liana**; 6000 Shoreline Court, Suite 102, South San Francisco, California 94080 (US).

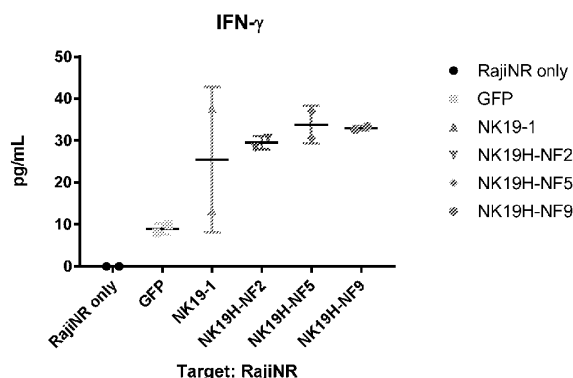
(74) Agent: **DELANEY, Karoline, A.**; KNOBBE, MARTENS, OLSON & BEAR, LLP, 2040 Main Street, 14th Floor, Irvine, California 92614 (US).

(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, 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, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, 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,

(54) Title: CD19-DIRECTED CHIMERIC ANTIGEN RECEPTORS AND USES THEREOF IN IMMUNOTHERAPY

Figure 33A



(57) Abstract: Provided for herein in several embodiments are immune cell-based (e.g., natural killer (NK) cell) compositions comprising CD19-directed chimeric antigen receptors. In some, embodiments the anti-CD19 binder portion of the CAR is humanized. In several embodiments, the humanized anti-CD19 CAR expressing cells exhibit enhanced expression of the CAR as well as enhanced cytotoxicity and/or persistence. Several embodiments include methods of using of the anti-CD19 CAR expressing immune cells in immunotherapy.

[Continued on next page]

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:

- *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))*
- *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))*
- *with sequence listing part of description (Rule 5.2(a))*