

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

(19) World Intellectual Property  
Organization  
International Bureau

(43) International Publication Date  
19 August 2021 (19.08.2021)



(10) International Publication Number  
**WO 2021/163616 A1**

(51) International Patent Classification:

C07K 14/705 (2006.01) C07K 16/30 (2006.01)  
C07K 16/28 (2006.01) C12N 15/62 (2006.01)

(21) International Application Number:

PCT/US2021/018027

(22) International Filing Date:

12 February 2021 (12.02.2021)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

62/976,997 14 February 2020 (14.02.2020) US  
63/109,831 04 November 2020 (04.11.2020) US

(71) Applicant: **THE BOARD OF TRUSTEES OF THE LE-  
LAND STANFORD JUNIOR UNIVERSITY** [US/US];  
Office of the General Counsel, Building 170, Third  
Floor, Main Quad, PO Box 20386, Stanford, California  
94305-2038 (US).

(72) Inventors: **MAJZNER, Robbie G.**; c/o Stanford Univer-  
sity, 1000 Welch Road, Palo Alto, California 94304 (US).  
**MACKALL, Crystal L.**; c/o Stanford University, 265

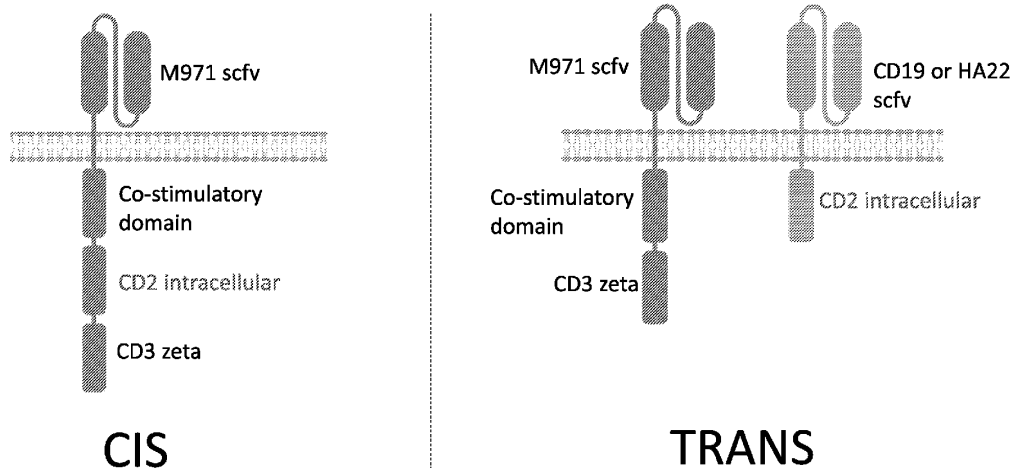
Campus Drive, Ste 3141a, Stanford, California 94305 (US).  
**TOUSLEY, Aidan**; c/o Stanford University, Building 170,  
Third Floor, Main Quad, PO Box 20386, Stanford, Califor-  
nia 94305 (US). **MONJE-DEISSEROTH, Michelle**; c/o  
Stanford University, 300 Pasteur Drive, A343 MC 5235,  
Stanford, California 94305 (US). **LABANIEH, Louai**; c/o  
Stanford University, Building 170, Third Floor, Main Quad,  
PO Box 20386, Stanford, California 94305 (US). **MOUNT,  
Christopher**; c/o Stanford University, Building 170, Third  
Floor, Main Quad, PO Box 20386, Stanford, California  
94305 (US).

(74) Agent: **SHIEH-NEWTON, Terri** et al.; One Financial  
Center, Boston, Massachusetts 02111 (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, IT, 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,

(54) Title: CHIMERIC ANTIGEN RECEPTORS WITH CD2 ACTIVATION

FIG. 19



(57) Abstract: Disclosed are chimeric antigen receptors comprising a CD2 co-stimulatory domain that retain function against CD58<sup>+</sup> and CD58<sup>low</sup> tumor cells, and CD2 co-stimulatory receptors that promote CAR function against CD58<sup>+</sup> and CD58<sup>low</sup> tumor cells.

[Continued on next page]

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, 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))*
- *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))*