rector.

The presently disclosed subject matter further provides a chimeric antigen receptor (CAR), comprising an extracellular antigen-binding domain that binds to Fc Receptor-Like 5 (FcRL5), a transmembrane domain, and an intracellular domain, wherein the extracellular antigen-binding domain comprises:

(aa) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:3, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:4;

(ab) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:7, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:8;

(ac) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:11, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:12;

(ad) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:15, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:16;

(ae) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:19, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:20;

(af) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:23, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:24;

(ag) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:27, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:28;

(ah) a light chain variable region comprising a CDR1, a CDR2, and a CDR3

of the light chain variable region sequence set forth in SEQ ID NO:31, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:32;

(ai) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:35, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:36;

(aj) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:39, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:40;

(ak) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:43, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:44;

(al) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:47, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:48;

(am) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:51, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:52;

(an) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:55, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:56;

(ao) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:59, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:60;

(ap) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:63, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain

variable region sequence set forth in SEQ ID NO:64;

(aq) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:67, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:68;

(ar) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:71, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:72;

(as) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:75, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:76;

(at) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:79, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:80;

(au) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:83, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:84;

(av) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:87, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:88;

(aw) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:91, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:92;

(ax) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:95, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:96;

(ay) a light chain variable region comprising a CDR1, a CDR2, and a CDR3

of the light chain variable region sequence set forth in SEQ ID NO:99, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:100;

(az) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:103, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:104;

(ba) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:107, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:108;

(bb) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:111, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:112;

(bc) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:115, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:116;

(bd) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:119, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:120;

(be) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:123, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:124;

(bf) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:127, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:128;

(bg) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:131, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain

variable region sequence set forth in SEQ ID NO:132;

(bh) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:135, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:136;

(bi) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:139, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:140;

(bj) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:143, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:144;

(bk) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:147, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:148;

(bl) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:151, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:152;

(bm) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:155, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:156;

(bn) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:159, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:160;

(bo) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:163, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:164;

(bp) a light chain variable region comprising a CDR1, a CDR2, and a CDR3

of the light chain variable region sequence set forth in SEQ ID NO:167, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:168;

(bq) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:171, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:172;

(br) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:175, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:176;

(bs) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:179, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:180;

(bt) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:183, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:184;

(bu) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:187, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:188;

(bv) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:191, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:192;

(bw) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:195, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:196;

(bx) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:199, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain

variable region sequence set forth in SEQ ID NO:200;

(by) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:203, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:204;

(bz) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:207, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:208;

(ca) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:211, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:212;

(cb) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:215, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:216;

(cc) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:219, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:220;

(cd) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:223, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:224;

(ce) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:227, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:228;

(cf) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:231, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:232;

(cg) a light chain variable region comprising a CDR1, a CDR2, and a CDR3

of the light chain variable region sequence set forth in SEQ ID NO:235, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:236;

(ch) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:239, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:240;

(ci) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:243, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:244;

(cj) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:247, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:248;

(ck) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:251, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:252;

(cl) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:255, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:256;

(cm) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:259, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:260;

(cn) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:263, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:264;

(co) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:267, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain

variable region sequence set forth in SEQ ID NO:268;

(cp) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:271, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:272;

(cq) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:275, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:276;

(cr) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:279, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:280;

(cs) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:283, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:284;

(ct) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:287, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:288;

(cu) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:291, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:292;

(cv) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:295, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:296;

(cw) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:299, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:300;

(cx) a light chain variable region comprising a CDR1, a CDR2, and a CDR3

of the light chain variable region sequence set forth in SEQ ID NO:303, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:304

(cy) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:917, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:915; or

(cz) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:921, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:919

The presently disclosed subject matter further provides a chimeric antigen receptor (CAR), comprising an extracellular antigen-binding domain that binds to Fc Receptor-Like 5 (FcRL5), a transmembrane domain, and an intracellular domain, wherein the extracellular antigen-binding domain comprises:

(aa) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 312, 313, and 314, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 309, 310, and 311, respectively;

(ab) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 318, 319, and 320, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 315, 316, and 317, respectively;

(ac) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 324, 319, and 325, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 321, 322, and 323, respectively;

(ad)

a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 329, 330, and 331, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 332, 333, and 334, respectively;

(ae) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 338, 330, and 339, respectively, and a heavy chain

variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 335, 336, and 337, respectively;

(af) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 343, 344, and 345, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 340, 341, and 342, respectively;

(ag) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 348, 349, and 350, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 346, 327, and 347, respectively;

(ah) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 352, 344, and 353, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 346, 327, and 351, respectively;

(ai) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 357, 358, and 359, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 354, 355, and 356, respectively;

(aj) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 363, 364, and 365, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 360, 361, and 362, respectively;

(ak) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 369, 370, and 371, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 366, 367, and 368, respectively;

(al) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 329, 330, and 375, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 372, 373, and 374, respectively;

(am) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 329, 330, and 377, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 346, 327, and 376, respectively;

(an) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 381, 382, and 383, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 378, 379, and 380, respectively;

(ao) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 329, 385, and 386, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 309, 310, and 384, respectively;

(ap) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 390, 391, and 392, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 387, 388, and 389, respectively;

(aq) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 318, 319, and 395, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 393, 355, and 394, respectively;

(ar) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 397, 398, and 399, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 346, 327, and 396, respectively;

(as) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 401, 398, and 402, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 346, 327, and 400, respectively;

(at) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 406, 398, and 407, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 403, 404, and 405, respectively;

(au) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 329, 409, and 410, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 346, 327, and 408, respectively;

(av) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 318, 319, and 414, respectively, and a heavy chain

variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 413, respectively;

(aw) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 416, 417, and 418, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 415, respectively;

(ax) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 318, 319, and 419, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 349, respectively;

(ay) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 423, 358, and 424, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 420, 421, and 422, respectively;

(az) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 428, 429, and 430, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 425, 426, and 427, respectively;

(ba) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 433, 434, and 435, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 372, 431, and 432, respectively;

(bb) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 423, 438, and 439, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 436, 388, and 437, respectively;

(bc) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 329, 330, and 443, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 440, 441, and 442, respectively;

(bd) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 447, 448, and 449, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 444, 445, and 446, respectively;

(be) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 318, 319, and 452, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 309, 450, and 451, respectively;

(bf) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 369, 454, and 455, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 453, respectively;

(bg) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 318, 319, and 457, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 456, respectively;

(bh) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 329, 330, and 331, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 346, 327, and 458, respectively;

(bi) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 460, 461, and 462, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 459, respectively;

(bj) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 318, 319, and 419, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 463, respectively;

(bk) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 423, 438, and 465, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 436, 388, and 464, respectively;

(bl) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 468, 469, and 470, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 466, and 467, respectively;

(bm) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 474, 358, and 465, respectively, and a heavy chain

variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 471, 472, and 473, respectively;

(bn) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 477, 478, and 479, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 372, 475, and 476, respectively;

(bo) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 483, 484, and 485, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 480, 481, and 482, respectively;

(bp) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 433, 487, and 488, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 346, 327, and 486, respectively;

(bq) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 490, 313, and 491, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 309, 310, and 489, respectively;

(br) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 312, 313, and 493, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 309, 310, and 492, respectively;

(bs) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 490, 349, and 495, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 403, 404, and 494, respectively;

(bt) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 498, 344, and 499, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 403, 496, and 497, respectively;

(bu) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 503, 504, and 505, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 500, 501, and 502, respectively;

(bv) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 508, 349, and 509, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 403, 506, and 507, respectively;

(bw) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 312, 513, and 514, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 510, 511, and 512, respectively;

(bx) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 518, 319, and 519, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 515, 516, and 517, respectively;

(by) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 348, 523, and 524, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 520, 521, and 522, respectively;

(bz) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 406, 398, and 528, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 525, 526, and 527, respectively;

(ca) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 318, 319, and 530, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 529, respectively;

(cb) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 318, 319 and 531, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 515, 516, and 517, respectively;

(cc) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 533, 534, and 535, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 403, 404, and 532, respectively;

(cd) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 428, 429, and 430, respectively, and a heavy chain

variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 425, 426, and 536, respectively;

(ce) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 540, 398, and 541, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 537, 538, and 539, respectively;

(cf) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 406, 398, and 542, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 537, 538, and 539, respectively;

(cg) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 544, 448, and 545, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 543, respectively;

(ch) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 547, 548, and 549, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 546, respectively;

(ci) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 312, 313, and 314, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 309, 310, and 550, respectively;

(cj) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 312, 513, and 314, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 309, 310, and 550, respectively;

(ck) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 406, 398, and 554, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 551, 552, and 553, respectively;

(cl) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 556, 557, and 558, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 309, 310, and 555, respectively;

(cm) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 562, 563, and 564, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 559, 560, and 561, respectively;

(cn) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 568, 504, and 569, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 565, 566, and 567, respectively;

(co) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 571, 572, and 573, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 372, 475, and 570, respectively;

(cp) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 343, 575, and 576, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 403, 404, and 574, respectively;

(cq) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 312, 313, and 314, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 577, respectively;

(cr) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 312, 313, and 314, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 346, 327, and 578, respectively;

(cs) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 580, 438, and 581, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 436, 388, and 579, respectively;

(ct) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 585, 313, and 314, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 582, 583, and 584, respectively;

(cu) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 312, 586, and 314, respectively, and a heavy chain

variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 346, 327, and 578, respectively;

(cv) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 318, 319, and 592, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 589, 590, and 591, respectively;

(cw) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 329, 330, and 331, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 326, 327, and 328, respectively;

(cx) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 588, 385, and 375, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 403, 404, and 587, respectively;

(cy) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 926, 927, and 928, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 923, 924, and 925, respectively; or

(cz) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 932, 933, and 934, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 929, 930, and 931, respectively

The present disclosure subject matter also provides an immunoresponsive cell comprising the CAR as described herein.

The presently disclosed subject matter also provides isolated immunoresponsive cells comprising the above-described CARs. In certain embodiments, the isolated immunoresponsive cell is transduced with the CAR, for example, the CAR is constitutively expressed on the surface of the immunoresponsive cell. In certain embodiments, the isolated immunoresponsive cell is further transduced with at least one co-stimulatory ligand such that the immunoresponsive cell expresses the at least one co-stimulatory ligand. In certain embodiments, the at least one co-stimulatory ligand is selected from the group consisting of 4-1BBL, CD80, CD86, CD70, OX40L, CD48, TNFRSF14, and combinations thereof. In certain embodiments, the isolated immunoresponsive cell is further transduced with at

least one cytokine such that the immunoresponsive cell secrets the at least one cytokine. In certain embodiments, the at least one cytokine is selected from the group consisting of IL-2, IL-3, IL-6, IL-7, IL-11, IL-12, IL-15, IL-17, IL-21, and combinations thereof. In certain embodiments, the isolated immunoresponsive cell is selected from the group consisting of a T cell, a Natural Killer (NK) cell, a cytotoxic T lymphocyte (CTL), a regulatory T cell, a human embryonic stem cell, a lymphoid progenitor cell, a T cell-precursor cell, and a pluripotent stem cell from which lymphoid cells may be differentiated. In certain embodiments, the immunoresponsive cell is a T cell.

The presently disclosed subject matter further provides nucleic acid molecules encoding the presently disclosed CARs, vectors comprising the nucleic acid molecules, and host cells expressing such nucleic acid molecules. In certain embodiments, the nucleic acid molecule comprises nucleic acids having the sequence set forth in SEQ ID NO:951. In certain embodiments, the nucleic acid molecule comprises nucleic acids having the sequence set forth in SEQ ID NO:952. In certain embodiments, the vector is a γ-retroviral vector. In certain embodiments, the host cell is a T cell.

The presently disclosed subject matter further provides an immunoresponsive cell comprising the nucleic acid molecule as described herein.

The presently disclosed subject matter further provides a T cell comprising the CAR as described herein.

The presently disclosed subject matter further provides a T cell comprising the nucleic acid molecule as described herein.

Furthermore, the presently disclosed subject matter provides methods of using the above-described immunoresponsive cell for reducing tumor burden in a subject. For example, the presently disclosed subject matter provides methods of reducing tumor burden in a subject, where the method comprises administering an effective amount of the presently disclosed immunoresponsive cell to the subject, thereby

inducing tumor cell death in the subject. In certain embodiments, the method reduces the number of tumor cells. In another embodiment, the method reduces the tumor size. In yet another embodiment, the method eradicates the tumor in the subject. In certain embodiments, the tumor is selected from the group consisting of multiple myeloma, Non-Hodgkin Lymphoma (especially Mantle Cell), Hodgkin Lymphoma, Chronic Lymphocytic Leukemia (CLL), Acute lymphocytic leukemia (ALL), Hairy Cell Leukemia, Burketts Lymphoma, and Waldenstrom's Macroglobulinemia. In certain embodiments, the tumor is multiple myeloma. In certain embodiments, the subject is a human. In certain embodiments, the immunoresponsive cell is a T cell.

Furthermore, the presently disclosed subject matter provides methods of using the above-described immunoresponsive cell for increasing or lengthening survival of a subject having neoplasia. For example, the presently disclosed subject matter provides methods of increasing or lengthening survival of a subject having neoplasia, where the method comprises administering an effective amount of the presently disclosed immunoresponsive cell to the subject, thereby increasing or lengthening survival of the subject. In certain embodiments, the neoplasia is selected from the group consisting of multiple myeloma, Non-Hodgkin Lymphoma (especially Mantle Cell), Hodgkin Lymphoma, Chronic Lymphocytic Leukemia (CLL), Acute lymphocytic leukemia (ALL), Hairy Cell Leukemia, Burketts Lymphoma, and Waldenstrom's Macroglobulinemia. In certain embodiments, the neoplasia is multiple myeloma. In certain embodiments, the method reduces or eradicates tumor burden in the subject.

The presently disclosed subject matter further provides a use of an effective amount of the immunoresponsive cell as described herein or the T cell as described herein in the manufacture of a medicament for reducing tumor burden of a tumor expressing FcRL5 in a subject.

The presently disclosed subject matter further provides a use of an effective amount of the immunoresponsive cell as described herein or the T cell as described herein in the manufacture of a medicament for increasing or lengthening survival of a subject having a tumor expressing FcRL5.

The presently disclosed subject matter further provides a use of an effective amount of the immunoresponsive cell as described herein or the T cell as described

herein in the manufacture of a medicament for treating a tumor expressing FcRL5 in a subject.

The presently disclosed subject matter also provides methods for producing an immunoresponsive cell that binds to Fc Receptor-like 5 (FcRL5), *e.g.*, domain 9 of FcRL5. In one non-limiting example, the method comprises introducing into the immunoresponsive cell a nucleic acid sequence that encodes a chimeric antigen receptor (CAR), which comprises an extracellular antigen-binding domain, a transmembrane domain and an intracellular domain, wherein the extracellular antigen-binding domain specifically binds to Fc Receptor-like 5 (FcRL5). In a specific non-limiting embodiment, the extracellular antigen-binding domain is an scFv.

The presently disclosed subject matter further provides a method for producing an immunoresponsive cell that binds to Fc Receptor-Like 5 (FcRL5), comprising introducing into the immunoresponsive cell a nucleic acid molecule that encodes the chimeric antigen receptor (CAR) as described herein, the nucleic acid molecule as described herein, or the vector as described herein.The presently disclosed subject matter further provides pharmaceutical compositions comprising an effective amount of the presently disclosed immunoresponsive cells and a pharmaceutically acceptable excipient. In certain

embodiments, the pharmaceutical compositions are for treating a neoplasia. In certain embodiments, the neoplasia is selected from the group consisting of multiple myeloma, Non-Hodgkin Lymphoma (especially Mantle Cell), Hodgkin Lymphoma, Chronic Lymphocytic Leukemia (CLL), Acute lymphocytic leukemia (ALL), Hairy Cell Leukemia, Burketts Lymphoma, and Waldenstrom's Macroglobulinemia. In certain embodiments, the neoplasia is multiple myeloma.

The presently disclosed subject matter further also provides a kit for treating a tumour expressing FcRL5, comprising the immunoresponsive cell as described herein or the T cell as described herein.

The presently disclosed subject matter further provides kits for treating a neoplasia, comprising the presently disclosed immunoresponsive cells. In certain embodiments, the kit further include written instructions for using the immunoresponsive cell for treating a neoplasia. In certain embodiments, the neoplasia is selected from the group consisting of multiple myeloma, Non-Hodgkin Lymphoma (especially Mantle Cell), Hodgkin Lymphoma, Chronic Lymphocytic Leukemia (CLL), Acute lymphocytic leukemia (ALL), Hairy Cell Leukemia, Burketts Lymphoma, and Waldenstrom's Macroglobulinemia. In certain embodiments, the neoplasia is multiple myeloma.

BRIEF DESCRIPTION OF THE FIGURES

The following Detailed Description, given by way of example, but not intended to limit the invention to specific embodiments described, may be understood in conjunction with the accompanying drawings.

Figure 1 depicts the FcRL5 expression in various normal tissues and human cancer cell lines.

Figure 2 depicts the screening of anti-FcRL5 scFvs using 3T3 cells expressing FcRL5 or FcRL1, 2, 3, 4 or 6.

Figure 3A-D. (A) A representation of the domains of FcRL5 and the soluble, glycosylphosphatidylinositol (GPI)-anchored and transmembrane forms of FcRL5. (B) A representation of the vector used to express a mutated form of FcRL5 that lacks domain 9 (also referred to herein as FcRL5Δdom9). (C) The nucleotide sequences of full length FcRL5 and the form of FcRL5 that lacks domain 9. (D) A representation

of the differences in the nucleotide sequences of full length FcRL5 and the mutated form of FcRL5 in which domain 9 is deleted (referred to herein as "FcRL5Δdom9").

Figure 4 depicts the screening of anti-FcRL5 scFv ET200-39 on 3T3 cells expressing FcRL5Δdom9.

CLAIMS

What is claimed is:

1. A chimeric antigen receptor (CAR), comprising an extracellular antigen-binding domain that binds to Fc Receptor-Like 5 (FcRL5), a transmembrane domain, and an intracellular domain, wherein the extracellular antigen-binding domain comprises:

(aa) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:3, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:4;

(ab) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:7, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:8;

(ac) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:11, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:12;

(ad) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:15, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:16;

(ae) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:19, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:20;

(af) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:23, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:24;

(ag) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:27, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth

in SEQ ID NO:28;

(ah) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:31, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:32;

(ai) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:35, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:36;

(aj) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:39, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:40;

(ak) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:43, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:44;

(al) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:47, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:48;

(am) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:51, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:52;

(an) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:55, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:56;

(ao) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:59, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth

in SEQ ID NO:60;

(ap) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:63, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:64;

(aq) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:67, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:68;

(ar) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:71, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:72;

(as) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:75, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:76;

(at) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:79, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:80;

(au) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:83, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:84;

(av) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:87, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:88;

(aw) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:91, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth

in SEQ ID NO:92;

(ax) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:95, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:96;

(ay) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:99, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:100;

(az) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:103, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:104;

(ba) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:107, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:108;

(bb) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:111, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:112;

(bc) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:115, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:116;

(bd) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:119, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:120;

(be) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:123, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth

in SEQ ID NO:124;

(bf) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:127, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:128;

(bg) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:131, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:132;

(bh) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:135, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:136;

(bi) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:139, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:140;

(bj) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:143, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:144;

(bk) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:147, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:148;

(bl) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:151, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:152;

(bm) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:155, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth

in SEQ ID NO:156;

(bn) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:159, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:160;

(bo) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:163, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:164;

(bp) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:167, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:168;

(bq) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:171, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:172;

(br) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:175, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:176;

(bs) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:179, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:180;

(bt) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:183, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:184;

(bu) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:187, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth

in SEQ ID NO:188;

(bv) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:191, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:192;

(bw) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:195, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:196;

(bx) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:199, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:200;

(by) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:203, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:204;

(bz) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:207, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:208;

(ca) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:211, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:212;

(cb) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:215, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:216;

(cc) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:219, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth

in SEQ ID NO:220;

(cd) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:223, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:224;

(ce) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:227, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:228;

(cf) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:231, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:232;

(cg) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:235, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:236;

(ch) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:239, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:240;

(ci) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:243, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:244;

(cj) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:247, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:248;

(ck) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:251, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth

in SEQ ID NO:252;

(cl) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:255, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:256;

(cm) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:259, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:260;

(cn) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:263, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:264;

(co) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:267, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:268;

(cp) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:271, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:272;

(cq) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:275, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:276;

(cr) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:279, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:280;

(cs) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:283, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth

in SEQ ID NO:284;

(ct) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:287, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:288;

(cu) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:291, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:292;

(cv) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:295, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:296;

(cw) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:299, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:300;

(cx) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:303, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:304

(cy) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:917, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:915; or

(cz) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 of the light chain variable region sequence set forth in SEQ ID NO:921, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 of the heavy chain variable region sequence set forth in SEQ ID NO:919.

2. A chimeric antigen receptor (CAR), comprising an extracellular antigen-binding domain that binds to Fc Receptor-Like 5 (FcRL5), a transmembrane domain, and an intracellular domain, wherein the extracellular antigen-binding domain comprises:

(aa) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 312, 313, and 314, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 309, 310, and 311, respectively;

(ab) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 318, 319, and 320, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 315, 316, and 317, respectively;

(ac) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 324, 319, and 325, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 321, 322, and 323, respectively;

(ad)

a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 329, 330, and 331, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 332, 333, and 334, respectively;

(ae) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 338, 330, and 339, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 335, 336, and 337, respectively;

(af) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 343, 344, and 345, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 340, 341, and 342, respectively;

(ag) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 348, 349, and 350, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 346, 327, and 347, respectively;

(ah) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 352, 344, and 353, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 346, 327, and 351, respectively;

(ai) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 357, 358, and 359, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 354, 355, and 356, respectively;

(aj) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 363, 364, and 365, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 360, 361, and 362, respectively;

(ak) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 369, 370, and 371, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 366, 367, and 368, respectively;

(al) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 329, 330, and 375, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 372, 373, and 374, respectively;

(am) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 329, 330, and 377, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 346, 327, and 376, respectively;

(an) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 381, 382, and 383, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 378, 379, and 380, respectively;

(ao) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 329, 385, and 386, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 309, 310, and 384, respectively;

(ap) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 390, 391, and 392, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 387, 388, and 389, respectively;

(aq) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 318, 319, and 395, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 393, 355, and 394, respectively;

(ar) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 397, 398, and 399, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 346, 327, and 396, respectively;

(as) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 401, 398, and 402, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 346, 327, and 400, respectively;

(at) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 406, 398, and 407, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 403, 404, and 405, respectively;

(au) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 329, 409, and 410, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 346, 327, and 408, respectively;

(av) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 318, 319, and 414, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 413, respectively;

(aw) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 416, 417, and 418, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 415, respectively;

(ax) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 318, 319, and 419, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 349, respectively;

(ay) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 423, 358, and 424, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 420, 421, and 422, respectively;

(az) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 428, 429, and 430, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 425, 426, and 427, respectively;

(ba) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 433, 434, and 435, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 372, 431, and 432, respectively;

(bb) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 423, 438, and 439, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 436, 388, and 437, respectively;

(bc) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 329, 330, and 443, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 440, 441, and 442, respectively;

(bd) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 447, 448, and 449, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 444, 445, and 446, respectively;

(be) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 318, 319, and 452, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 309, 450, and 451, respectively;

(bf) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 369, 454, and 455, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 453, respectively;

(bg) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 318, 319, and 457, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 456, respectively;

(bh) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 329, 330, and 331, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 346, 327, and 458, respectively;

(bi) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 460, 461, and 462, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 459, respectively;

(bj) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 318, 319, and 419, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 463, respectively;

(bk) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 423, 438, and 465, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 436, 388, and 464, respectively;

(bl) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 468, 469, and 470, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 466, and 467, respectively;

(bm) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 474, 358, and 465, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 471, 472, and 473, respectively;

(bn) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 477, 478, and 479, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 372, 475, and 476, respectively;

(bo) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 483, 484, and 485, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 480, 481, and 482, respectively;

(bp) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 433, 487, and 488, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 346, 327, and 486, respectively;

(bq) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 490, 313, and 491, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 309, 310, and 489, respectively;

(br) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 312, 313, and 493, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 309, 310, and 492, respectively;

(bs) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 490, 349, and 495, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 403, 404, and 494, respectively;

(bt) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 498, 344, and 499, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 403, 496, and 497, respectively;

(bu) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 503, 504, and 505, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 500, 501, and 502, respectively;

(bv) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 508, 349, and 509, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 403, 506, and 507, respectively;

(bw) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 312, 513, and 514, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 510, 511, and 512, respectively;

(bx) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 518, 319, and 519, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 515, 516, and 517, respectively;

(by) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 348, 523, and 524, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 520, 521, and 522, respectively;

(bz) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 406, 398, and 528, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 525, 526, and 527, respectively;

(ca) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 318, 319, and 530, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 529, respectively;

(cb) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 318, 319 and 531, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 515, 516, and 517, respectively;

(cc) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 533, 534, and 535, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 403, 404, and 532, respectively;

(cd) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 428, 429, and 430, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 425, 426, and 536, respectively;

(ce) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 540, 398, and 541, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 537, 538, and 539, respectively;

(cf) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 406, 398, and 542, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 537, 538, and 539, respectively;

(cg) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 544, 448, and 545, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 543, respectively;

(ch) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 547, 548, and 549, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 546, respectively;

(ci) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 312, 313, and 314, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 309, 310, and 550, respectively;

(cj) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 312, 513, and 314, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 309, 310, and 550, respectively;

(ck) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 406, 398, and 554, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 551, 552, and 553, respectively;

(cl) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 556, 557, and 558, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 309, 310, and 555, respectively;

(cm) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 562, 563, and 564, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 559, 560, and 561, respectively;

(cn) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 568, 504, and 569, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 565, 566, and 567, respectively;

(co) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 571, 572, and 573, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 372, 475, and 570, respectively;

(cp) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 343, 575, and 576, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 403, 404, and 574, respectively;

(cq) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 312, 313, and 314, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 577, respectively;

(cr) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 312, 313, and 314, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 346, 327, and 578, respectively;

(cs) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 580, 438, and 581, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 436, 388, and 579, respectively;

(ct) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 585, 313, and 314, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 582, 583, and 584, respectively;

(cu) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 312, 586, and 314, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 346, 327, and 578, respectively;

(cv) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 318, 319, and 592, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 589, 590, and 591, respectively;

(cw) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 329, 330, and 331, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 326, 327, and 328, respectively;

(cx) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 588, 385, and 375, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 403, 404, and 587, respectively;

(cy) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 926, 927, and 928, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 923, 924, and 925, respectively; or

(cz) a light chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 932, 933, and 934, respectively, and a heavy chain variable region comprising a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 929, 930, and 931, respectively.

3. The CAR of claim 1 or 2, wherein:

(aa) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:3, and the heavy chain variable

region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:4;

(ab) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:7, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:8;

(ac) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:11, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:12;

(ad) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:15, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:16;

(ae) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:19, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:20;

(af) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:23, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:24;

(ag) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:27, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:28;

(ah) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:31, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:32;

(ai) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:35, and the heavy chain variable

region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:36;

(aj) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:39, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:40;

(ak) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:43, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:44;

(al) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:47, and the heavy chain variable region comprises an amino acid sequence that has at least 90%sequence identity to the sequence set forth in SEQ ID NO:48;

(am) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:51, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:52;

(an) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:55, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:56;

(ao) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:59, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:60;

(ap) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:63, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:64;

(aq) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:67, and the heavy chain variable

region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:68;

(ar) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:71, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:72;

(as) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:75, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:76;

(at) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:79, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:80;

(au) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:83, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:84;

(av) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:87, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:88;

(aw) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:91, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:92;

(ax) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:95, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:96;

(ay) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:99, and the heavy chain variable

region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:100;

(az) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:103, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:104;

(ba) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:107, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:108;

(bb) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:111, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:112;

(bc) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:115, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:116;

(bd) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:119, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:120;

(be) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:123, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:124;

(bf) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:127, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:128;

(bg) the light chain variable region comprises an amino acid sequence h that as at least 90% sequence identity to the sequence set forth in SEQ ID NO:131, and the heavy chain variable

region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:132;

(bh) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:135, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:136;

(bi) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:139, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:140;

(bj) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:143, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:144;

(bk) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:147, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:148;

(bl) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:151, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:152;

(bm) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:155, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:156;

(bn) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:159, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:160;

(bo) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:163, and the heavy chain variable

region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:164;

(bp) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:167, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:168;

(bq) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:171, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:172;

(br) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:175, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:176;

(bs) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:179, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:180;

(bt) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:183, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:184;

(bu) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:187, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:188;

(bv) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:191, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:192;

(bw) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:195, and the heavy chain variable

region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:196;

(bx) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:199, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:200;

(by) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:203, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:204;

(bz) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:207, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:208;

(ca) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:211, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:212;

(cb) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:215, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:216;

(cc) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:219, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:220;

(cd) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:223, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:224;

(ce) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:227, and the heavy chain variable

region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:228;

(cf) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:231, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:232;

(cg) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:235, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:236;

(ch) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:239, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:240;

(ci) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:243, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:244;

(cj) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:247, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:248;

(ck) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:251, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:252;

(cl) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:255, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:256;

(cm) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:259, and the heavy chain variable

region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:260;

(cn) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:263, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:264;

(co) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:267, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:268;

(cp) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:271, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:272;

(cq) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:275, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:276;

(cr) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:279, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:280;

(cs) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:283, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:284;

(ct) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:287, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:288;

(cu) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:291, and the heavy chain variable

region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:292;

(cv) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:295, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:296;

(cw) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:299, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:300;

(cx) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:303, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:304

(cy) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:917, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:915; or

(cz) the light chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:921, and the heavy chain variable region comprises an amino acid sequence that has at least 90% sequence identity to the sequence set forth in SEQ ID NO:919.

4. The CAR of any one of claims 1-3, wherein:

(aa) the light chain variable region comprises the sequence set forth in SEQ ID NO:3, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:4;

(ab) the light chain variable region comprises the sequence set forth in SEQ ID NO:7, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:8;

(ac) the light chain variable region comprises the sequence set forth in SEQ ID NO:11, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:12;

(ad) the light chain variable region comprises the sequence set forth in SEQ ID NO:15, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:16;

(ae) the light chain variable region comprises the sequence set forth in SEQ ID NO:19, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:20;

(af) the light chain variable region comprises the sequence set forth in SEQ ID NO:23, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:24;

(ag) the light chain variable region comprises the sequence set forth in SEQ ID NO:27, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:28;

(ah) the light chain variable region comprises the sequence set forth in SEQ ID NO:31, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:32;

(ai) the light chain variable region comprises the sequence set forth in SEQ ID NO:35, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:36;

(aj) the light chain variable region comprises the sequence set forth in SEQ ID NO:39, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:40;

(ak) the light chain variable region comprises the sequence set forth in SEQ ID NO:43, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:44;

(al) the light chain variable region comprises the sequence set forth in SEQ ID NO:47, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:48;

(am) the light chain variable region comprises the sequence set forth in SEQ ID NO:51, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:52;

(an) the light chain variable region comprises the sequence set forth in SEQ ID NO:55, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:56;

(ao) the light chain variable region comprises the sequence set forth in SEQ ID NO:59, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:60;

(ap) the light chain variable region comprises the sequence set forth in SEQ ID NO:63, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:64;

(aq) the light chain variable region comprises the sequence set forth in SEQ ID NO:67, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:68;

(ar) the light chain variable region comprises the sequence set forth in SEQ ID NO:71, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:72;

(as) the light chain variable region comprises the sequence set forth in SEQ ID NO:75, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:76;

(at) the light chain variable region comprises the sequence set forth in SEQ ID NO:79, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:80;

(au) the light chain variable region comprises the sequence set forth in SEQ ID NO:83, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:84;

(av) the light chain variable region comprises the sequence set forth in SEQ ID NO:87, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:88;

(aw) the light chain variable region comprises the sequence set forth in SEQ ID NO:91, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:92;

(ax) the light chain variable region comprises the sequence set forth in SEQ ID NO:95, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:96;

(ay) the light chain variable region comprises the sequence set forth in SEQ ID NO:99, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:100;

(az) the light chain variable region comprises the sequence set forth in SEQ ID NO:103, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:104;

(ba) the light chain variable region comprises the sequence set forth in SEQ ID NO:107, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:108;

(bb) the light chain variable region comprises the sequence set forth in SEQ ID NO:111, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:112;

(bc) the light chain variable region comprises the sequence set forth in SEQ ID NO:115, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:116;

(bd) the light chain variable region comprises the sequence set forth in SEQ ID NO:119, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:120;

(be) the light chain variable region comprises the sequence set forth in SEQ ID NO:123, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:124;

(bf) the light chain variable region comprises the sequence set forth in SEQ ID NO:127, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:128;

(bg) the light chain variable region comprises the sequence set forth in SEQ ID NO:131, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:132;

(bh) the light chain variable region comprises the sequence set forth in SEQ ID NO:135, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:136;

(bi) the light chain variable region comprises the sequence set forth in SEQ ID NO:139, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:140;

(bj) the light chain variable region comprises the sequence set forth in SEQ ID NO:143, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:144;

(bk) the light chain variable region comprises the sequence set forth in SEQ ID NO:147, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:148;

(bl) the light chain variable region comprises the sequence set forth in SEQ ID NO:151, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:152;

(bm) the light chain variable region comprises the sequence set forth in SEQ ID NO:155, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:156;

(bn) the light chain variable region comprises the sequence set forth in SEQ ID NO:159, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:160;

(bo) the light chain variable region comprises the sequence set forth in SEQ ID NO:163, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:164;

(bp) the light chain variable region comprises the sequence set forth in SEQ ID NO:167, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:168;

(bq) the light chain variable region comprises the sequence set forth in SEQ ID NO:171, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:172;

(br) the light chain variable region comprises the sequence set forth in SEQ ID NO:175, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:176;

(bs) the light chain variable region comprises the sequence set forth in SEQ ID NO:179, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:180;

(bt) the light chain variable region comprises the sequence set forth in SEQ ID NO:183, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:184;

(bu) the light chain variable region comprises the sequence set forth in SEQ ID NO:187, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:188;

(bv) the light chain variable region comprises the sequence set forth in SEQ ID NO:191, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:192;

(bw) the light chain variable region comprises the sequence set forth in SEQ ID NO:195, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:196;

(bx) the light chain variable region comprises the sequence set forth in SEQ ID NO:199, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:200;

(by) the light chain variable region comprises the sequence set forth in SEQ ID NO:203, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:204;

(bz) the light chain variable region comprises the sequence set forth in SEQ ID NO:207,

and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:208;

(ca) the light chain variable region comprises the sequence set forth in SEQ ID NO:211, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:212;

(cb) the light chain variable region comprises the sequence set forth in SEQ ID NO:215, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:216;

(cc) the light chain variable region comprises the sequence set forth in SEQ ID NO:219, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:220;

(cd) the light chain variable region comprises the sequence set forth in SEQ ID NO:223, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:224;

(ce) the light chain variable region comprises the sequence set forth in SEQ ID NO:227, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:228;

(cf) the light chain variable region comprises the sequence set forth in SEQ ID NO:231, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:232;

(cg) the light chain variable region comprises the sequence set forth in SEQ ID NO:235, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:236;

(ch) the light chain variable region comprises the sequence set forth in SEQ ID NO:239, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:240;

(ci) the light chain variable region comprises the sequence set forth in SEQ ID NO:243, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:244;

(cj) the light chain variable region comprises the sequence set forth in SEQ ID NO:247, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:248;

(ck) the light chain variable region comprises the sequence set forth in SEQ ID NO:251, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:252;

(cl) the light chain variable region comprises the sequence set forth in SEQ ID NO:255, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:256;

(cm) the light chain variable region comprises the sequence set forth in SEQ ID NO:259, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:260;

(cn) the light chain variable region comprises the sequence set forth in SEQ ID NO:263, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:264;

(co) the light chain variable region comprises the sequence set forth in SEQ ID NO:267, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:268;

(cp) the light chain variable region comprises the sequence set forth in SEQ ID NO:271,

and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:272;

(cq) the light chain variable region comprises the sequence set forth in SEQ ID NO:275, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:276;

(cr) the light chain variable region comprises the sequence set forth in SEQ ID NO:279, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:280;

(cs) the light chain variable region comprises the sequence set forth in SEQ ID NO:283, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:284;

(ct) the light chain variable region comprises the sequence set forth in SEQ ID NO:287, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:288;

(cu) the light chain variable region comprises the sequence set forth in SEQ ID NO:291, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:292;

(cv) the light chain variable region comprises the sequence set forth in SEQ ID NO:295, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:296;

(cw) the light chain variable region comprises the sequence set forth in SEQ ID NO:299, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:300;

(cx) the light chain variable region comprises the sequence set forth in SEQ ID NO:303, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:304

(cy) the light chain variable region comprises the sequence set forth in SEQ ID NO:917, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:915; or

(cz) the light chain variable region comprises the sequence set forth in SEQ ID NO:921, and the heavy chain variable region comprises the sequence set forth in SEQ ID NO:919.

5. The CAR of any one of claims 1-3, wherein: (a) the heavy chain variable region comprises a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 923, 924, and 925, respectively; and (b) the light chain variable region comprises a CDR1, a CDR2 and a CDR3 sequence set forth in SEQ ID NOs: 926, 927, and 928, respectively.

6. The CAR of any one of claims 1-3, wherein: (a) the heavy chain variable region comprises a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 929, 930, and 931, respectively; and (b) the light chain variable region comprises a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 932, 933, and 934, respectively.

7. The CAR of any one of claims 1-3, wherein: (a) the heavy chain variable region comprises a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 463,

respectively; and (b) the light chain variable region comprises a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 318, 319, and 419, respectively.

8. The CAR of any one of claims 1-3, wherein: (a) the heavy chain variable region comprises a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 515, 516, and 517, respectively; and (b) the light chain variable region comprises a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 318, 319, and 531, respectively.

9. The CAR of any one of claims 1-3, wherein: (a) the heavy chain variable region comprises a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 403, 404, and 532, respectively; and (b) the light chain variable region comprises a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 533, 534, and 535, respectively.

10. The CAR of any one of claims 1-3, wherein: (a) the heavy chain variable region comprises a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 411, 412, and 543, respectively; and (b) the light chain variable region comprises a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 544, 448, and 545, respectively.

11. The CAR of any one of claims 1-3, wherein: (a) the heavy chain variable region comprises a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 372, 475, and 570, respectively; and (b) the light chain variable region comprises a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 571, 572, and 573, respectively.

12. The CAR of any one of claims 1-3, wherein: (a) the heavy chain variable region comprises a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 440, 441, and 442, respectively; and (b) the light chain variable region comprises a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 329, 330, and 443, respectively.

13. The CAR of any one of claims 1-3, wherein: (a) the heavy chain variable region comprises a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 309, 310, and 489, respectively; and (b) the light chain variable region comprises a CDR1, a CDR2, and a CDR3 sequence set forth in SEQ ID NOs: 490, 313, and 491, respectively.

14. The CAR of any one of claims 1-5, wherein: (a) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO:915; and (b) the light chain variable

region comprises the amino acid sequence set forth in SEQ ID NO:917.

15. The CAR of any one of claims 1-4 and 6, wherein: (a) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO:919; and (b) the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO:921.

16. The CAR of any one of claims 1-4 and 7, wherein: (a) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO:144, and (b) the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO:143.

17. The CAR of any one of claims 1-4 and 8, wherein: (a) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO:216, and (b) the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO:215.

18. The CAR of any one of claims 1-4 and 9, wherein: (a) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO:220, and (b) the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO:219.

19. The CAR of any one of claims 1-4 and 10, wherein: (a) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO:236, and (b) the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO:235.

20. The CAR of any one of claims 1-4 and 11, wherein: (a) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO:268, and (b) the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO:267.

21. The CAR of any one of claims 1-4 and 12, wherein: (a) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO:116, and (b) the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO:115.

22. The CAR of any one of claims 1-4 and 13, wherein: (a) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO:172, and (b) the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO:171.

23. The CAR of any one of claims 1-22, wherein the extracellular antigen-binding domain further comprises a linker positioned between the heavy chain variable region and the light chain

variable region.

24. The CAR of claim 23, wherein the linker comprises the amino acid sequence set forth in SEQ ID NO:307 or SEQ ID NO:897.

25. The CAR of any one of claims 1-24, wherein the extracellular antigen-binding domain comprises a single-chain variable fragment (scFv).

26. The CAR of any one of claims 1-25, wherein the extracellular antigen-binding domain comprises a human scFv.

27. The CAR of any one of claims 1-4 and 23-26, wherein the extracellular antigen-binding domain comprises the amino acid sequence set forth in SEQ ID NO: 594, SEQ ID NO: 596, SEQ ID NO: 598, SEQ ID NO: 600, SEQ ID NO: 602, SEQ ID NO: 604, SEQ ID NO: 606, SEQ ID NO: 608, SEQ ID NO: 610, SEQ ID NO: 612, SEQ ID NO: 614, SEQ ID NO: 616, SEQ ID NO: 618, SEQ ID NO: 620, SEQ ID NO: 621, SEQ ID NO: 624, SEQ ID NO: 626, SEQ ID NO: 628, SEQ ID NO: 630, SEQ ID NO: 632, SEQ ID NO: 634, SEQ ID NO: 636, SEQ ID NO: 638, SEQ ID NO: 640, SEQ ID NO: 642, SEQ ID NO: 644, SEQ ID NO: 646, SEQ ID NO: 648, SEQ ID NO: 650, SEQ ID NO: 652, SEQ ID NO: 654, SEQ ID NO: 656, SEQ ID NO: 658, SEQ ID NO: 660, SEQ ID NO: 662, SEQ ID NO: 664, SEQ ID NO: 666, SEQ ID NO: 668, SEQ ID NO: 670, SEQ ID NO: 672, SEQ ID NO: 674, SEQ ID NO: 676, SEQ ID NO: 678, SEQ ID NO: 680, SEQ ID NO: 682, SEQ ID NO: 684, SEQ ID NO: 686, SEQ ID NO: 688, SEQ ID NO: 690, SEQ ID NO: 692, SEQ ID NO: 694, SEQ ID NO: 696, SEQ ID NO: 698, SEQ ID NO: 700, SEQ ID NO: 702, SEQ ID NO: 704, SEQ ID NO: 706, SEQ ID NO: 708, SEQ ID NO: 710, SEQ ID NO: 712, SEQ ID NO: 714, SEQ ID NO: 716, SEQ ID NO: 718, SEQ ID NO: 720, SEQ ID NO: 722, SEQ ID NO: 724, SEQ ID NO: 726, SEQ ID NO: 728, SEQ ID NO: 730, SEQ ID NO: 732, SEQ ID NO: 734, SEQ ID NO: 736, SEQ ID NO: 738, SEQ ID NO: 740, SEQ ID NO: 742, or SEQ ID NO: 744.

28. The CAR of claim 23 or 24, wherein: (a) the heavy chain variable region comprises the amino acid sequence set forth in SEQ ID NO:915; (b) the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO:917, and (c) the linker consists of the amino acid sequence set forth in SEQ ID NO:897.

29. The CAR of claim 23 or 24, wherein: (a) the heavy chain variable region comprises the

amino acid sequence set forth in SEQ ID NO:919; (b) the light chain variable region comprises the amino acid sequence set forth in SEQ ID NO:921; and (c) the linker consists of the amino acid sequence set forth in SEQ ID NO:897.

30. The CAR of any one of claims 1-4, 7, 16 and 23-27, wherein the extracellular antigen-binding domain comprises the amino acid sequence set forth in SEQ ID NO:664.

31. The CAR of any one of claims 1-4, 8, 17 and 23-27, wherein the extracellular antigen-binding domain comprises the amino acid sequence set forth in SEQ ID NO:700.

32. The CAR of any one of claims 1-4, 9, 18 and 23-27, wherein the extracellular antigen-binding domain comprises the amino acid sequence set forth in SEQ ID NO:702.

33. The CAR of any one of claims 1-4, 10, 19 and 23-27, wherein the extracellular antigen-binding domain comprises the amino acid sequence set forth in SEQ ID NO:710.

34. The CAR of any one of claims 1-4, 11, 20 and 23-27, wherein the extracellular antigen-binding domain comprises the amino acid sequence set forth in SEQ ID NO:726.

35. The CAR of any one of claims 1-4, 12, 21 and 23-27, wherein the extracellular antigen-binding domain comprises the amino acid sequence set forth in SEQ ID NO:650.

36. The CAR of any one of claims 1-4, 13, and 22-27, wherein the extracellular antigen-binding domain comprises the amino acid sequence set forth in SEQ ID NO:678.

37. The CAR of any one of claims 1-22, wherein the extracellular antigen-binding domain comprises a Fab.

38. The CAR of any one of claims 1-22, wherein the extracellular antigen-binding domain comprises a $F(ab')_2$.

39. The CAR of any one of claims 25-38, wherein one or more of the scFv, Fab and $F(ab')_2$ are comprised in a fusion protein with a heterologous sequence to form the extracellular antigen-binding domain.

40. The CAR of any one of claims 1-39, wherein the extracellular antigen-binding domain binds to FcRL5 with a binding affinity (K_d) of from 1×10^{-9} M to 3×10^{-6} M.

41. The CAR of any one of claims 1-40, wherein the extracellular antigen-binding domain binds to domain 7, domain 8 or domain 9 of FcRL5 with a binding affinity (K_d) of from 1 x 10^{-9} M to 3 x 10^{-6} M.

42. The CAR of any one of claims 1-41, wherein a signal peptide is covalently joined to the N-terminus of the extracellular antigen-binding domain.

43. The CAR of any one of claims 1-42, wherein the FcRL5 comprises the amino acid sequence set forth in SEQ ID NO:899.

44. The CAR of any one of claims 1-43, wherein the extracellular antigen-binding domain binds to an epitope comprising the amino acid sequence set forth in SEQ ID NO:964.

45. The CAR of any one of claims 1-43, wherein the extracellular antigen-binding domain binds to an epitope comprising the amino acid sequence set forth in SEQ ID NO:965.

46. The CAR of any one of claims 1-45, wherein the transmembrane domain comprises a CD8 polypeptide, a CD28 polypeptide, a CD3ζ polypeptide, a CD4 polypeptide, a 4-1BB polypeptide, an OX40 polypeptide, an ICOS polypeptide, a CTLA-4 polypeptide, a PD-1 polypeptide, a LAG-3 polypeptide, a 2B4 polypeptide, a BTLA polypeptide, a synthetic peptide or a combination thereof.

47. The CAR of any one of claims 1-46, wherein the transmembrane domain comprises a CD8 polypeptide.

48. The CAR of any one of claims 1-46, wherein the transmembrane domain comprises a CD28 polypeptide.

49. The CAR of any one of claims 1-48, wherein the intracellular domain comprises a CD3ζ polypeptide.

50. The CAR of any one of claims 1-49, wherein the intracellular domain further comprises at least one signaling region.

51. The CAR of claim 50, wherein the at least one signaling region comprises a CD28 polypeptide, a 4-1BB polypeptide, an OX40 polypeptide, an ICOS polypeptide, a PD-1 polypeptide, a CTLA-4 polypeptide, a LAG-3 polypeptide, a 2B4 polypeptide, a BTLA

polypeptide, a synthetic peptide, or a combination thereof.

52. The CAR of claim 50 or 51, wherein the at least one signaling region comprises at least one co-stimulatory signaling region.

53. The CAR of claim 52, wherein the at least one co-stimulatory signaling region comprises a CD28 polypeptide, a 4-1BB polypeptide, an OX40 polypeptide, an ICOS polypeptide, a DAP-10 polypeptide, or a combination thereof.

54. The CAR of claim 52 or 53, wherein the at least one co-stimulatory signaling region comprises a CD28 polypeptide.

55. The CAR of claim 52 or 53, wherein the at least one co-stimulatory signaling region comprises a 4-1BB polypeptide.

56. The CAR of any one of claims 52-54, wherein the transmembrane domain comprises a CD28 polypeptide, the intracellular domain comprises a CD3ζ polypeptide, and the at least one co-stimulatory signaling region comprises a CD28 polypeptide.

57. The CAR of any one of claims 52, 53 and 55, wherein the transmembrane domain comprises a CD8 polypeptide, the intracellular domain comprises a CD3ζ polypeptide, and the at least one co-stimulatory signaling region comprises a 4-1BB polypeptide.

58. The CAR of any one of claims 52, 53 and 55, wherein the transmembrane domain comprises a CD28 polypeptide, the intracellular domain comprises a CD3ζ polypeptide, and the at least one co-stimulatory signaling region comprises a 4-1BB polypeptide.

59. The CAR of any one of claims 1-58, wherein the CAR is recombinantly expressed.

60. The CAR of any one of claims 1-59, wherein the CAR is expressed from a vector.

61. The CAR of claim 60, wherein the vector is a γ-retroviral vector.

62. The CAR of claim 60, wherein the vector is a lentiviral vector.

63. An immunoresponsive cell comprising the CAR of any one of claims 1-62.

64. The immunoresponsive cell of claim 63, wherein the immunoresponsive cell is

transduced with a nucleic acid molecule encoding the CAR.

65. The immunoresponsive cell of claim 63 or 64, wherein the CAR is constitutively expressed on the surface of the immunoresponsive cell.

66. The immunoresponsive cell of any one of claims 63-65, wherein the immunoresponsive cell is further transduced with a nucleic acid molecule encoding at least one co-stimulatory ligand such that the immunoresponsive cell expresses the at least one co-stimulatory ligand.

67. The immunoresponsive cell of claim 66, wherein the at least one co-stimulatory ligand is selected from the group consisting of 4-1BBL, CD80, CD86, CD70, OX40L, CD48, TNFRSF14, and combinations thereof.

68. The immunoresponsive cell of any one of claims 63-67, wherein the immunoresponsive cell is further transduced with a nucleic acid molecule encoding at least one cytokine such that the immunoresponsive cell secretes the at least one cytokine.

69. The immunoresponsive cell of claim 67, wherein the at least one cytokine is selected from the group consisting of IL-2, IL-3, IL-6, IL-7, IL-11, IL-12, IL-15, IL-17, IL-21, and combinations thereof.

70. The immunoresponsive cell of any one of claims 63-69, wherein the immunoresponsive cell is selected from the group consisting of a T cell, a Natural Killer (NK) cell, a cytotoxic T lymphocyte (CTL), a regulatory T cell, a human embryonic stem cell, a lymphoid progenitor cell, a T cell-precursor cell, and a pluripotent stem cell from which lymphoid cells may be differentiated.

71. The immunoresponsive cell of any one of claims 63-70, wherein the immunoresponsive cell is a T cell.

72. A nucleic acid molecule encoding the chimeric antigen receptor (CAR) of any one of claims 1-62.

73. The nucleic acid molecule of claim 72, comprising the nucleotide sequence set forth in SEQ ID NO:951, SEQ ID NO:952, SEQ ID NO:953, SEQ ID NO:954, SEQ ID NO:955, SEQ ID NO:956, SEQ ID NO:957, SEQ ID NO:958, or SEQ ID NO:959.

74. The nucleic acid molecule of claim 72 or 73, comprising the nucleotide sequence set forth in SEQ ID NO:951.

75. The nucleic acid molecule of claim 72 or 73, comprising the nucleotide sequence set forth in SEQ ID NO:952.

76. The nucleic acid molecule of claim 72 or 73, comprising the nucleotide sequence set forth in SEQ ID NO:953.

77. The nucleic acid molecule of claim 72 or 73, comprising the nucleotide sequence set forth in SEQ ID NO:954.

78. The nucleic acid molecule of claim 72 or 73, comprising the nucleotide sequence set forth in SEQ ID NO:955.

79. The nucleic acid molecule of claim 72 or 73, comprising the nucleotide sequence set forth in SEQ ID NO:956.

80. The nucleic acid molecule of claim 72 or 73, comprising the nucleotide sequence set forth in SEQ ID NO:957.

81. The nucleic acid molecule of claim 72 or 73, comprising the nucleotide sequence set forth in SEQ ID NO:958.

82. The nucleic acid molecule of claim 72 or 73, comprising the nucleotide sequence set forth in SEQ ID NO:959.

83. A vector comprising the nucleic acid molecule of any one of claims 72-82.

84. The vector of claim 83, wherein the vector is a γ-retroviral vector.

85. The vector of claim 83, wherein the vector is a lentiviral vector.

86. An immunoresponsive cell comprising the nucleic acid molecule of any one of claims 72-82.

87. The immunoresponsive cell of claim 86, wherein the immunoresponsive cell is a T cell.

88. A T cell comprising the CAR of any one of claims 1-62.

89. A T cell comprising the nucleic acid molecule of any one of claims 72-82.

90. Use of an effective amount of the immunoresponsive cell of any one of claims 63-71, 86 and 87 or the T cell of claim 88 or 89 in the manufacture of a medicament for reducing tumor burden of a tumor expressing FcRL5 in a subject.

91. The use of claim 90, wherein the medicament reduces the number of tumor cells.

92. The use of claim 90, wherein the medicament reduces tumor size.

93. The use of claim 90, wherein the medicament eradicates the tumor in the subject.

94. The use of any one of claims 90-93, wherein the tumor is selected from the group consisting of multiple myeloma, Non-Hodgkin Lymphoma, Mantle Cell Lymphoma, Hodgkin Lymphoma, Chronic Lymphocytic Leukemia (CLL), Acute lymphocytic leukemia (ALL), Hairy Cell Leukemia, Burkitt's Lymphoma, and Waldenstrom's Macroglobulinemia.

95. The use of any one of claims 90-94, wherein the tumor is multiple myeloma.

96. The use of any one of claims 90-95, wherein the subject is a human.

97. The use of any one of claims 90-96, wherein the immunoresponsive cell is a T cell.

98. Use of an effective amount of the immunoresponsive cell of any one of claims 63-71, 86 and 87 or the T cell of claim 88 or 89 in the manufacture of a medicament for increasing or lengthening survival of a subject having a tumor expressing FcRL5.

99. Use of an effective amount of the immunoresponsive cell of any one of claims 63-71, 86 and 87 or the T cell of claim 88 or 89 in the manufacture of a medicament for treating a tumor expressing FcRL5 in a subject.

100. The use of claim 98 or 99, wherein the tumor is selected from the group consisting of multiple myeloma, Non-Hodgkin Lymphoma, Mantle Cell Lymphoma, Hodgkin Lymphoma, Chronic Lymphocytic Leukemia (CLL), Acute lymphocytic leukemia (ALL), Hairy Cell Leukemia, Burkitt's Lymphoma, and Waldenstrom's Macroglobulinemia.

101. The use of any one of claims 98-100, wherein the tumor is multiple myeloma.

102. The use of any one of claims 98-101, wherein the medicament reduces or eradicates tumor burden in the subject.

103. A method for producing an immunoresponsive cell that binds to Fc Receptor-Like 5 (FcRL5), comprising introducing into the immunoresponsive cell a nucleic acid molecule that encodes the chimeric antigen receptor (CAR) of any one of claims 1-62, the nucleic acid molecule of any one of claims 72-82, or the vector of any one of claims 83-85.

104. A pharmaceutical composition comprising an effective amount of the immunoresponsive cell of any one of claims 63-71, 86 and 87 or the T cell of claim 88 or 89 and a pharmaceutically acceptable excipient.

105. The pharmaceutical composition of claim 104, wherein the pharmaceutical composition is for treating a tumor expressing FcRL5.

106. The pharmaceutical composition of claim 104 or 105, wherein the tumor is selected from the group consisting of multiple myeloma, Non-Hodgkin Lymphoma, Mantle Cell Lymphoma, Hodgkin Lymphoma, Chronic Lymphocytic Leukemia (CLL), Acute lymphocytic leukemia (ALL), Hairy Cell Leukemia, Burkitt's Lymphoma, and Waldenstrom's Macroglobulinemia.

107. The pharmaceutical composition of any one of claim 104-106, wherein the tumor is multiple myeloma.

108. A kit for treating a tumor expressing FcRL5, comprising the immunoresponsive cell of any one of claims 63-71, 86 and 87 or the T cell of claim 88 or 89.

109. The kit of claim 108, wherein the kit further comprises written instructions for using the immunoresponsive cell or the T cell for treating the tumor.

110. The kit of claim 108 or 109, wherein the tumor is selected from the group consisting of multiple myeloma, Non-Hodgkin Lymphoma, Mantle Cell Lymphoma, Hodgkin Lymphoma, Chronic Lymphocytic Leukemia (CLL), Acute lymphocytic leukemia (ALL), Hairy Cell Leukemia, Burkitt's Lymphoma, and Waldenstrom's Macroglobulinemia.

111. The kit of any one of claim 108-110, wherein the tumor is multiple myeloma.